Deathways and Lifeways in the American Southwest

Tucson's Historic Alameda-Stone Cemetery and The Transformation of a Remote Outpost into an Urban City

Edited by
Michael Heilen and
Marlesa A. Gray

Volume 1
Context and Synthesis from the Joint Courts Complex Archaeological Project, Tucson, Arizona

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Marlesa A. Gray,
series editors

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Submitted to
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Pima County Cultural Resources and Historic Preservation Office
Tucson, Arizona

Contract No. 07-73-S-138479-0806

Technical Report 10-95
Statistical Research, Inc.
Tucson, Arizona

November 2010

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ACKNOWLEDGMENTS

The magnitude of the Joint Courts Complex Archaeological Project obviously demanded the participation and support of scores of people and institutions. I wish to publicly thank the following, without whose involvement this project would never have been successfully completed.

First of all, I want to express my deepest gratitude to the staff of the Pima County Cultural Resources and Historic Preservation Office, most notably Roger Anyon and Linda Mayro, for their trust, support, advice, and constructive criticism. Roger, in particular, was involved in the project on a daily basis, and it was both a pleasure and a stimulating challenge to work with such an able archaeologist. I truly enjoyed collaborating with him on this important project. Thanks also to Debra Rodriguez for her careful attention to the financial aspects of the contract and to Terri Spencer, Pima County Contracts Officer, for her able handling of the contract and its various modifications.

I would like to thank the Pima County Board of Supervisors for their support of this project, without which the project would not have been completed. This includes Ann Day, Ramón Valadez, Sharon Bronson, Raymond J. Carroll, and Richard Elías. Pima County Administrator Chuck Huckelberry recognized the sensitivity of a large cemetery excavation and supported the project through wise directives to all county personnel. I wish to thank as well Jim Glock, City of Tucson Department of Transportation, for disabling the city webcams that covered the project area during the sensitive excavations.

Working with staff from Pima County's Facilities Management Department, we were able to conquer the logistical challenges that arose during fieldwork. Thanks especially to Mike Tuinstra, Reid Spaulding, Carter Volle, Gary Campbell, Lisa Josker, Dan Meinke, and Chuck Haak. For their support we are indebted as well to Presiding Judge Jan E. Kearney and Judge John S. Leonardo of the Arizona Superior Court in Pima County, Presiding Judge Maria Felix of the Pima County Consolidated Justice Court, and Presiding Magistrate Antonio Riojas and Court Administrator Joan Harphant of the Tucson City Court. Support and assistance were also provided by John Bernal and Nanette Slusser of Pima County Public Works, and legal advice and court orders were provided by Jacob Lines, Hal Gilbreath, and Neil Konigsberg of the Pima County Attorney's Office. I am grateful for the public relations assistance provided by Annabelle Valenzuela and Carol Brichta of the Pima County Department of Transportation's Community Relations Office.

Words cannot begin to express our gratitude for the advice and assistance provided by John Madsen of the Arizona State Museum. As Arizona State Repatriation Coordinator, John was responsible for preparing the burial agreements under which we operated and for ensuring that the project was in compliance with those agreements. We could not have enjoyed a more amicable working relationship. John was ably assisted by Todd Pitezel, to whom we also give our sincerest thanks. Thanks are gratefully extended to Douglas Leach of the Arizona Department of Health Services, Office of Vital Records, who expedited the disinterment/reinterment permit.

The excavation of a public cemetery in a culturally mixed community meant that many stakeholders were involved. Through the careful preparations of Roger Anyon, Linda Mayro, and John Madsen, descendant groups and other project stakeholders were identified, notified in advance of the project's goals, and allowed to express their concerns. During fieldwork, stakeholders were kept informed of the project's progress through daily reports from the field. Repatriation and reburial plans were also made in conjunction with descendant groups. As a result, the project was completed without incident or controversy. I would like to thank the following stakeholder representatives for their support and participation in the Joint Courts Complex Archaeological Project: Fred McAninch, Arnold Smith, and Hector Soza from Los Descendientes del Presidio de

Tucsón; Joe Joaquin and Peter Steere from the Tohono O'odham Nation; Tony Burrell from the San Xavier District of the Tohono O'odham Nation; Rolando Flores, Amalia Reyes, Veronica LaMotte Darnell, and Marcelino Flores from the Pascua Yaqui Tribe; Vernelda Grant from the San Carlos Apache Indian Tribe; Bishop Gerald Kicanas, Jim DeCastro, Fred Allison, and Kay Mullenax from the Diocese of Tucson; Joe Larson and Crickette King from the Southern Arizona Veterans' Memorial Cemetery; Joan Way from the Southwest Association of Buffalo Soldiers; Barnaby Lewis from the Gila River Indian Community; and from the Jewish community, Eileen Warshaw and the Jewish History Museum. For officiating at the reburial service and the memorial dedication at All Faiths Cemetery, I would like to thank Rabbi Thomas Louchheim and Reverend John Lille.

More than 180 employees of Statistical Research, Inc., participated in the Joint Courts Complex Archaeological Project during its 4-year contract period. Although I cannot list everyone's names, I would like to single out certain staff members who contributed greatly to the project's success, and to whom I am deeply indebted. First of all, I wish to thank Scott O'Mack for providing the groundwork for the project through completion of two background and archival reports prior to fieldwork, and for so ably serving as archaeological principal investigator during the fieldwork phase of the project. He was succeeded by Michael Heilen, who very competently oversaw the analysis and reporting of the cemetery component. Joe Hefner served the project well as principal investigator for bioarchaeology, and Karen Swope managed the analysis and reporting of the postcemetery component.

Archaeological fieldwork direction was ably provided first by David Palmer, then by John Hall. John was responsible for preparation of the end-of-fieldwork report; the burial descriptions; and the analysis and reporting of the prehistoric component, all of which he completed with utmost skill. Sincerest thanks are extended to Mitch Keur, who supervised the burial excavations, analysis, and much of the bioarchaeological reporting. A similar level of gratitude goes to Kristin Sewell, who was responsible for overseeing and reporting the mortuary analysis, and Scott Plumlee, who oversaw the field operations for the postcemetery component and provided much of the writing for the same. Ashley Morton capably supervised the postcemetery artifact analysis and wrote many of the results. William A. White and Shari Tiedens also wrote up many of the postcemetery results. The bulk of the bioarchaeological excavations, analysis, and reporting were conducted by Patrick Stanton, Amber Harrison, Willa Trask, Bob Dayhuff, Tamara Leher, Tracie Diaz, and Shannon Black. Janet Griffitts and Justin Lev-Tov analyzed and reported on the large assemblage of faunal remains, and Dorothy Ohman and Amanda Cannon conducted the invertebrate analysis and reporting. I am especially indebted to Dottie for heading up the field laboratory, ably assisted by Erica Young, and to Jody Holmes for managing the Tucson laboratory and the curation efforts.

Thanks to staff members who served variously as crew chiefs, analysts, and/or writers, including Cannon Daughtrey, Amelia Natoli, Karry Blake, Kandus Linde, Kate McMahon, Callie Unverzagt, Jeremy Pye, Resha Shenandoah, William G. White, and Kelly Jenks. Jason Windingstad conducted and reported on the geomorphological and environmental setting, and Carrie Gregory provided her expertise on the architecture of the postcemetery period. Kerry Sagebiel conducted the Native American and prehistoric ceramics analysis, and Stacey Lengyel analyzed the archaeomagnetic results for the prehistoric period. Data entry was conducted most competently by Lexi O'Donnell and George Vanovich. John Pope supervised the field sorting crew and kept the mechanical sorter in good working condition.

An important part of the project was the mapping of all excavated features, and I owe a deep level of gratitude to Stephen McElroy and Nahide Aydin, who supervised the mapping efforts so efficiently. They were assisted in the field and office by a number of staff members, notably Rita Sulkosky and Tim Gibbs. Matt Lewis and Malcolm (Skip) Hooe conducted the three-dimensional scanning of the burials, which provided invaluable assistance in the analysis and interpretation of the human remains. The amount of data collected during the project was staggering, and it could not have been managed effectively without the efforts of a number of programmers and analysts. Special thanks are extended to Robby Heckman, Jim LoFaro, Andy Bean, James Harvey, Carey Tilden, and Ivan Davis. The project servers, workstations, and communication networks were built, maintained, upgraded, and backed up by our competent IT staff, including Mitch Eichenseer, Dale Tersey, Josh Johnson, Ken Ramey, William Hayden, Paul Burns, and Mark Woodson.

The publications department was responsible for turning our written drafts into coherent reports, and they succeeded admirably. I am deeply indebted to Mary Robertson and María Molina for their leadership, support, and assistance with the many written products generated during the course of the project. Special thanks go to the layout designers for the final volumes—Jason Pitts (Volumes 1 and 3), Linda Wooden (Volume 2), and KeAndra Begay (Volume 4)—and to the editors—Beth Bishop, John Cafiero, Diane Holliday, Grant Klein, Jennifer Shopland, Niamh Wallace, and Julie Wilson. April Moles produced the necessary copies efficiently and with unfailing good humor. A picture is worth a thousand words, and the graphics department ensured that our visual presentations were always of top quality. My sincerest thanks are extended to Peg Robbins and her gifted staff of graphic artists: William Olguin, Andrew Saiz, Jackie Dominguez, and Wallace Begay.

I am grateful for the leadership support from the owners and executive committee of Statistical Research, Inc.: Jeff and Debbie Altschul, Donn Grenda, Terry Majewski, Peter Fox, Richard Ciolek-Torrello, Stephanie Whittlesey, Chris Dore,

Bob Grenda, and Clay Mathers. I am especially grateful to Terry Majewski, who provided overall project management, as well as lending her not inconsiderable talent for historical-period ceramics analysis when we needed it. Both Richard and Stephanie contributed to written products, and their thoughtful reviews of the research were always appreciated.

Ed Huber proved to be an invaluable ally during the early days of mobilization, and I am forever in his debt. Administrative support for the project was ably provided by Janet Grenda, Trish Craig, Kelly Davern, Nicole Torstvet, Cory McKean, Edie Darling, and Rita Griffin. Finally, I would like to thank the many field, lab, and analytical personnel who participated on the Joint Courts Complex Archaeological Project. Your efforts and hard work under sometimes daunting conditions and within tight time constraints were truly appreciated.

Despite the large size and considerable depth of staff within Statistical Research, Inc., we could not have accomplished this project without the assistance of a number of subconsultants. First of all, I would like to most sincerely thank Lynne Goldstein, Michigan State University, for agreeing to serve as mortuary advisor for the project. Lynne did more than advise; she provided encouragement to staff, reviewed large portions of the text, and wrote a significant section of the synthetic report. Additional bioarchaeological expertise was provided during the fieldwork by John McClelland and Lane Beck from the Arizona State Museum. John spearheaded the dental analysis and wrote significant portions of the report. Bioarchaeological excavation, analysis, and reporting were also provided by Lorrie Lincoln-Babb, Bioarch LLC, and Kimberly Spurr, Past Peoples Consulting LLC.

The mechanical excavations were conducted by one of the best backhoe operators in the business, Dan Arnit from Innovative Excavating, Inc. He was ably assisted by Steve Ditschler. Demolition of existing buildings and debris removal was conducted by staff from Barnett & Shore Contractors LLC, who were efficiently directed by Ed Barnett and Frank Shore. Cheryl Cooper from Barnett & Shore provided excellent administrative assistance.

Again, the success of the Joint Courts Complex project hinged on good communications with stakeholders, media, and the general public, and on sensitivity to the issues surrounding the excavation of human remains. Sincerest thanks are extended to Jan Gordley and Marsha Baker of Gordley Design Group for overseeing the public relations efforts for the project, and to Carol Ellick and Joe Watkins of the SRI Foundation for designing and implementing a sensitivity training workshop that was videotaped. Attendance at the workshop or viewing of the videotape was required for all project personnel.

Database design was conducted by John Donoghue of Donoghue and Associates, and Stephen Ousley from Mercyhurst College provided advice on refinements to the bioarchaeological database. Initial mapping of the project area and setup of the datums was accomplished by Darling Environmental and Surveying Ltd.

A number of professionals provided analytical expertise and advice during the course of the project. The project staff was greatly appreciative of the help from the following individuals: James Ayres for his advice on historical-period excavation, research into Tucson newspapers, and artifact analyses; Karen Adams for macrobotanical analysis and reporting; Owen Davis for pollen analysis; Karl Reinhard, PathoEcology Services LLC, for parasitological and pollen analysis; Heather Edgar, University of New Mexico, for dental analysis; Ken Gobalet, California State University, for the analysis of fish remains; Laurie Webster for textile analysis; Nicholas Herrmann, University of Tennessee, for bioarchaeological and demographic analysis; Homer Thiel, Desert Archaeology, Inc., for historical-period artifact analysis and research into Tucson newspapers; James Davidson, University of Florida, for mortuary analysis advice; Gregory L. Fox, Joint POW-MIA Accounting Command (JPAC), Department of the Navy, for advice on cultural affinity determinations; Árpád Somogyi, University of Arizona, for mass spectrometry analysis of medicinal remains; Bill Lockhart and Carol Serr for assistance in bottle analysis; Nancy Odegaard, Arizona State Museum, for X-ray fluorescence analysis; Mark Candee, University of Arizona, for analysis of a garnet recovered from the postcemetery component; and Bruce Anderson, Pima County Medical Examiner, for bioarchaeological analysis advice.

Logistical support was provided on a number of fronts, and the project would not have succeeded without it. I would like to thank the following individuals and companies for their assistance on the project: Christine Reks from The Riverpark Inn; Scott Eisenfeld from Castro Engineering; Kevin Josker from Vanir Construction; Gregg Williams from DMJM; Debbie Stratton from Pima County Wastewater Management; and the staff of Orta Fence Company. Off-hours security of the project area was provided by staff from Securitas, ably managed by Gwen Parker. Reburial efforts were most ably assisted by the following staff from the All Faiths Cemeteries, Evergreen Cemetery, and Holy Hope Cemetery: Kenny Larson, Cameron Nerison, Chris Evans, Cruz Cota, Enrique Martinez, and Able Santiago.

I would like to thank Dolan Ellis, Arizona State Balladeer, for permission to use his ballad dedicated to the military soldiers who were buried in the Alameda-Stone cemetery; Representative Steve Farley for his design of the artwork for the memorial at All Faiths Cemeteries dedicated to memory of the persons who were interred at the Alameda-Stone cemetery; and to the staff of Chicanos por la Causa, especially the late Lorraine Lee, who put up with the noise and dust from our extended field season. Finally, if I have forgotten anyone, I most sincerely apologize. I am exceedingly grateful to everyone and every organization or company that participated in the Joint Courts Complex Archaeological Project.

Marlesa Gray,
Project Manager

Context and Synthesis from the Joint Courts Complex Archaeological Project, Tucson, Arizona

Figure 1. Modern downtown Tucson, with the cleared Joint Courts Complex Archaeological Project area in the foreground (Henry Wallace, courtesy Center for Desert Archaeology).

CHAPTER 1

Introduction

Michael Heilen and Marlesa A. Gray

The Joint Courts Complex Archaeological Project ranks among the largest and most complete excavations of a historical-period cemetery ever undertaken in North America. Conducted on a 4.3-acre parcel located in downtown Tucson, Arizona (Figure 1), the project was large even by international standards. In addition to completely excavating 1,083 grave features, recovering all secondary deposits of human remains, and fully documenting all findings, the project also identified 736 features dating to the postcemetery period, 3 prehistoric features, and prehistoric and historical-period artifact scatters. The central focus of the project was the cemetery component, which dated from the late 1850s or early 1860s through the early 1880s.

Archival information suggested that approximately 1,800–2,100 individuals were likely to have been buried in the cemetery, including Hispanic individuals from Mexico, the southwestern United States, Spain, and South America; non-Hispanic Euroamericans from many parts of the United States, Canada, Europe, the Caribbean, and the Middle East; Native Americans, including Tohono O'odham, Akimel O'odham, Yaqui, and Apache; and a small number of African Americans as well. Many of the Hispanics using the cemetery would have likely been buried according to Catholic traditions, whereas non-Hispanic Euroamericans would likely have been buried according to Protestant, Catholic, or Jewish traditions. Native Americans and African Americans buried in the cemetery may also have been buried according to a variety of traditions, including Christian or syncretic Christian traditions, given the public nature of the cemetery within a largely Christian cultural context. Burials of individuals associated with the U.S. military were also expected. The diverse cultural and religious backgrounds of individuals buried in the cemetery and the correspondingly diverse and large number of descendant groups meant that archaeologists had to be prepared to encounter burial contexts associated with a wide array of burial practices. It was thus necessary to develop appropriate historical, contextual, and osteological data to differentiate burials according to possible cultural affinity (for a complete discussion of cultural affinity, please see Chapters 2 and 6).

Prior to excavation, it was unknown how many intact burials would be encountered within the project area. Archival information performed in anticipation of excavation revealed that the cemetery was a public one, used by the entire Tucson community, and that it was divided at a minimum into a military section and a civilian section (Figure 2). Limited historical documentation suggested, correctly, that the vast majority of the cemetery was contained within the project area and that at least one portion of the cemetery was completely destroyed by previous excavation of a basement for the Tucson Newspapers building in the 1940s and 1950s. Human remains had also been repeatedly disturbed during multiple other construction events during the 13 decades between the closing of the cemetery and the beginning of the archaeological project. Graves in the military section were exhumed when the military section was moved 7 miles away to Fort Lowell in June 1884; some burials were also removed from the civilian section of the cemetery in 1882 in order to make way for the planned construction of a new road through the middle of the cemetery. Individuals exhumed from the civilian section in 1882 were to be buried in a new cemetery established in June 1875 north of town, the Court Street cemetery, but no information survived on who may have been moved to the new cemetery or how many burials were actually moved. In essence, despite archival research, Pima County and the City of Tucson had no way of knowing with any degree of certainty how many grave pit and burial features remained intact within the project area. When Statistical Research, Inc., began excavating the site on November 6, 2006, the archaeologists discovered the first intact grave pit feature within hours of beginning work. A large number of additional grave pit features were discovered within the next few days of fieldwork (Figure 3). Early on, it became clear that most burials

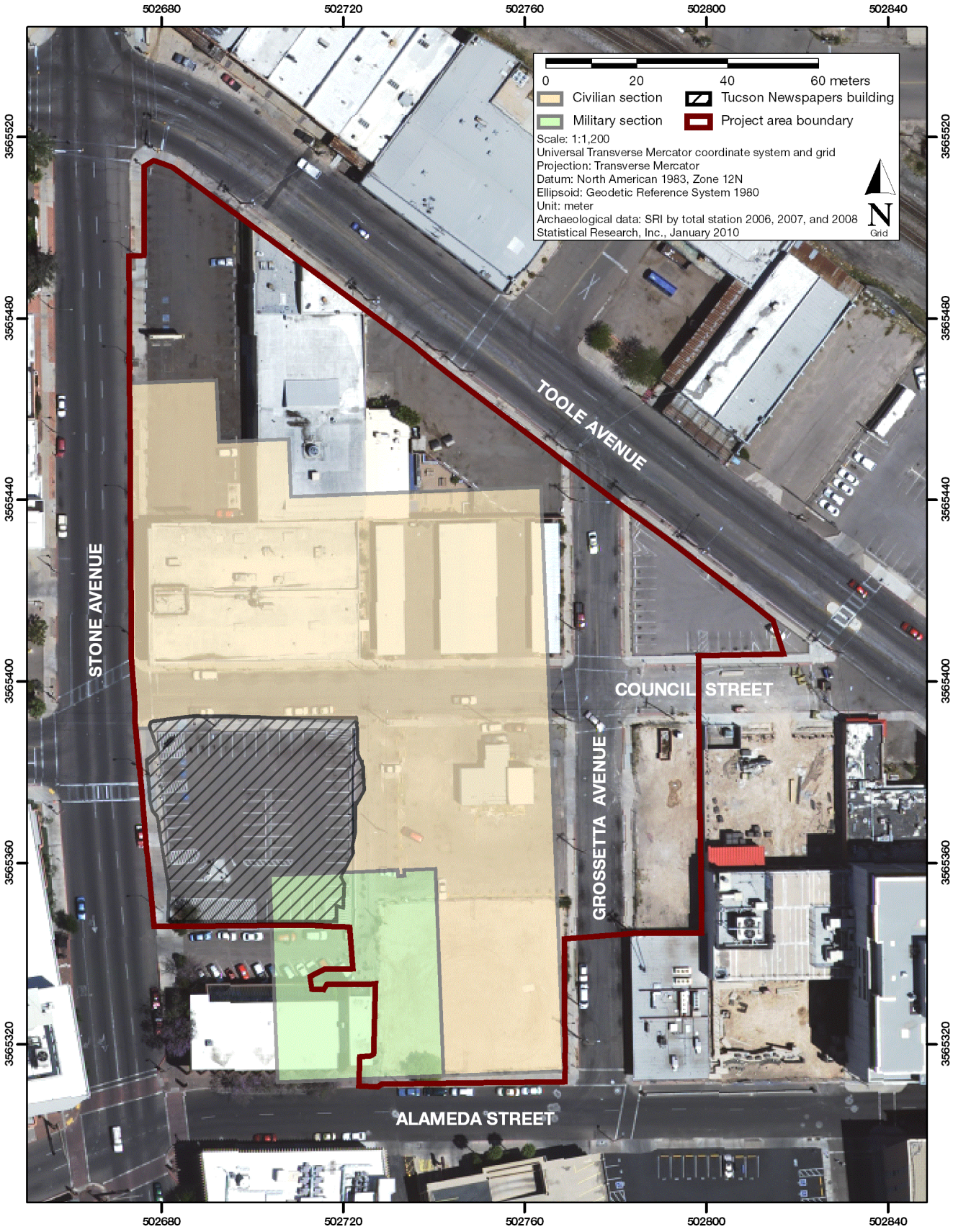


Figure 2. Map of the Joint Courts Complex project area, showing military and civilian sections of the Alameda-Stone cemetery.

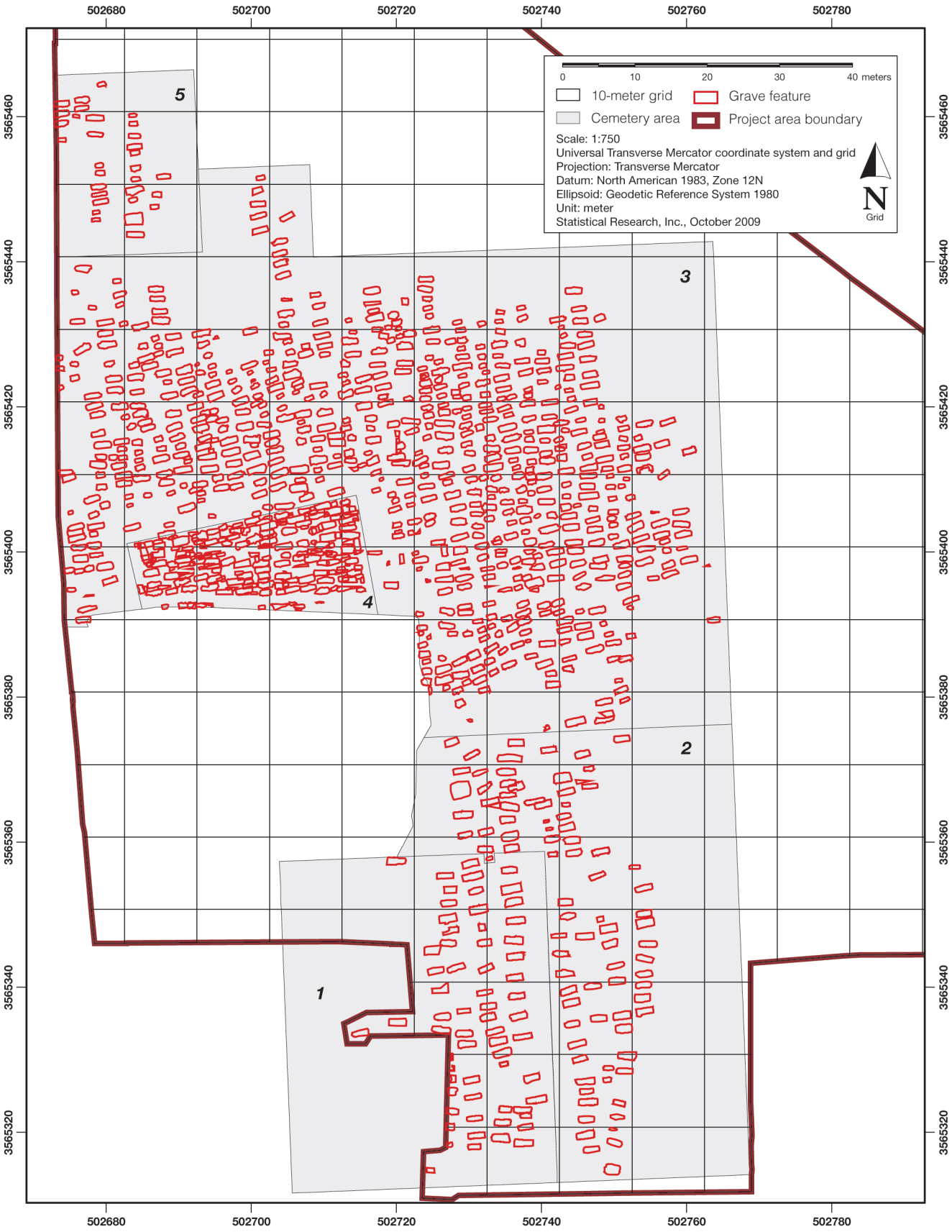


Figure 3. Map of the Joint Courts Complex project area, showing grave features.

within what came to be known as the Alameda-Stone cemetery had not been exhumed historically or destroyed by subsequent disturbance.

Figure 5. Workboot refit from the grave of an older adult female of Hispanic cultural affinity.

Tucson's Historic Alameda-Stone Cemetery and the Transformation of a Remote Outpost into an Urban City

At the time that the Alameda-Stone cemetery was in use, Tucson had evolved into a growing multicultural community in the midst of the Sonoran desert. Although once isolated and sparsely inhabited, Tucson had become home to Hispanic settlers; native Yaqui, O'odham, and Apache individuals; U.S. military personnel; and Euroamerican migrants. Their remains in the cemetery—as well as the artifacts found with them (Figures 4–8)—testify to the multiethnic nature of the cemetery as well as the complex makeup of a community that grew as a result of missionary efforts, military action, and economic opportunity and despite resistance by native peoples, a reputation for lawlessness, and a rugged environment that presents many challenges to human occupants even today.

The Alameda-Stone cemetery lies on a long-abandoned floodplain of the Santa Cruz River known locally as the Cemetery Terrace, "so named for the Tucson city cemeteries that are present on this terrace" (Smith 1938:58). The cemetery is situated within the approximately 1,000-square-mile Tucson Basin in southeastern Arizona, which is bounded by the Santa Catalina Mountains on the north, the Rincon and Tanque Verde mountains on the east, the Tucson Mountains on the west, and the Sierrita, Santa Rita, and Whetstone Mountains on the south (Davidson 1973). Despite the harshness of its climate, this area has been inhabited for thousands of years by groups of who adapted to the unforgiving climate and ruggedly beautiful landscape (for a discussion of the prehistory of the region, please see Chapter 3).The climate of the Tucson Basin is semiarid, with long, hot summers characterized by temperatures that commonly exceed 100°F and warm winters. Precipitation is seasonal, with summer and winter rainy seasons separated by short dry periods (Sellers and Hill 1974). Summer rains come in the form of violent monsoon thunderstorms that may drop more than half the annual rainfall in a single event. Vegetation in the Tucson Basin includes creosotebush and a variety of cacti, including the saguaro, prickly pear, and barrel cactus. Dense riparian communities that provided critical habitat to many plant and animal species were once common along the major drainages but are less common today because of disturbance and a lowering of the water table during the historical period. Riparian vegetation is dominated by cottonwood trees and broad mesquite *bosques* (forests), along with seep willow, hackberry, and desert willow. Many different species of insects, birds, and reptiles inhabit the Sonoran Desert, including the bark scorpion, the cactus wren, and the Gila monster. Several species of fish, such as the currently endangered Gila topminnow and the desert pupfish, were present in

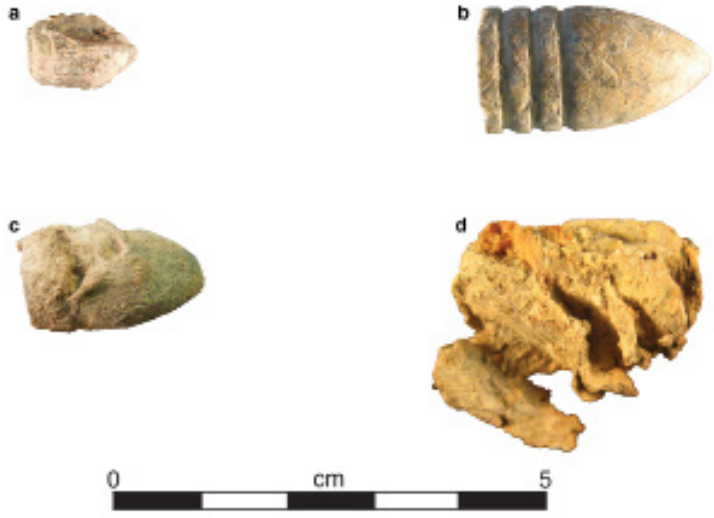


Figure 4. Examples of bullets from the Alameda-Stone cemetery.

Figure 6. Bottles from the Alameda-Stone cemetery.

Figure 7. Coins and tokens from the Alameda-Stone Cemetery.

Figure 8. Examples of beads from the Alameda-Stone cemetery.

major drainages prior to historical-period disturbance and channel adjustment. Common mammals consist of the desert cottontail, the black-tailed jackrabbit, the antelope jackrabbit, and many species of desert-adapted rodents, such as the kangaroo rat. Larger mammals include the mule deer, the javelina, and the coyote (Phillips and Comus 2000) (a more thorough treatment of the environmental context is provided in Chapter 3, Volume 2 of this series).

The first missionary to brave this harsh environment, Eusebio Francisco Kino, arrived in southern Arizona to expand the missionary frontier of northern New Spain, passing through Tucson with a military escort several times between 1694 and 1697 (the enduring influence of these and subsequent missionaries is evident in various artifacts found in the Alameda-Stone cemetery; Figures 9–11). Spaniards referred to portions of southern Arizona and northern Mexico as the Pimería Alta, because of the Piman-speaking groups that inhabited the region and who are now referred to collectively as O'odham. In addition to O'odham, Athabaskan-speaking Apache groups lived in mountainous regions on the northern and eastern outskirts of the Pimería Alta. The more mobile Apache groups frequently entered the Pimería Alta to raid settlements for food, livestock, and personnel (Dobyns 1976; Goodwin 1969; Kessell 1976; Officer 1987). Expansion of the mission frontier proved to be very slow in southern Arizona because of frequent Apache raiding activity and resistance to the missionaries among O'odham, including an O'Odham revolt in 1751. Settlements were repeatedly abandoned or destroyed because of Apache attacks (Dobyns 1959, 1976). Spanish settlement in the region was centered around Tubac and Tumacacori, around 50 miles south of Tucson, until a presidio was established at Tucson in 1775 in an effort to improve defense along the 2,000-mile frontier of northern New Spain (Jones 1979:177; McCarty 1976:19; Officer 1987:4). Now a military colony with an associated mission settlement, Tucson became the northernmost settlement of northern New Spain (Moore and Beene 1971:266; Officer 1987:50).

The first several decades at the Spanish presidio were spent by soldiers fighting in campaigns against the Apache, who continued unrelentingly to raid settlements and parties of travelers. However, by 1804, Los Tucsonenses had established a system of irrigation-fed fields along the Santa Cruz River, and aided by native labor, they planted barley, wheat, corn, vegetables, and fruit trees in the fertile fields of the valley. Cattle, sheep, and goats fed on the lush Sonoran desert grasslands that bordered the river and covered the valley floor. The frontier settlement was becoming a multiethnic community of Hispanic soldiers, settlers, and their families; O'odham; pacified Apache; and Yaqui escaping unrest in their

Figure 9. Examples of medallions and religious pendants from the Alameda-Stone cemetery.

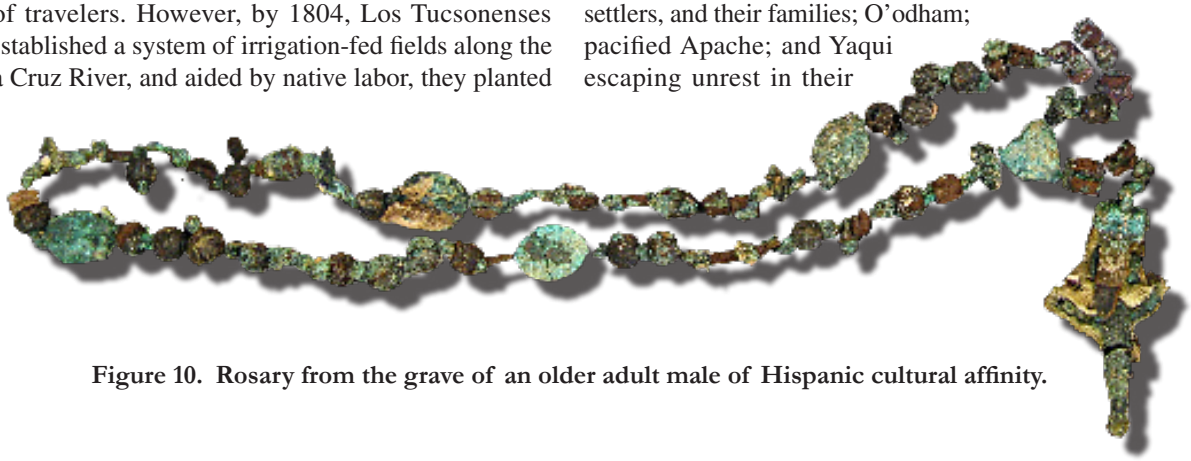


Figure 10. Rosary from the grave of an older adult male of Hispanic cultural affinity.

Figure 11. Examples of crucifixes from the Alameda-Stone cemetery.

Figure 12. Military uniform buttons from the Alameda-Stone cemetery.

homelands to the south in the Yaqui River Valley (Officer 1987; Sheridan 1986).

Life became more dangerous for Tucson residents with the fight for Mexican independence, beginning in 1810, as the presidio's soldiers were increasingly called to fight campaigns against the revolutionaries, leaving the settlers to fend for themselves (Officer 1987:84–87). Tucson became a town on the frontier of northern Mexico with the winning of Mexican Independence in 1821 and remained within Mexico for several years after the U.S.-Mexico War (1846–1848), when parts of Arizona were ceded to the United States as a result of the treaty of Guadalupe Hidalgo. Although still within Mexico, Tucson saw thousands of American travelers pass through the town after the discovery of gold in California in 1848. These fortune-seekers engaged in a brisk trade with the locals and wrote entries about their experience in their diaries. The 19-year-old traveler, Robert Eccleston, wrote in early 1849, for instance, that he "rode into town this morning to see the famous city & found a tolerable respectable town composed of Mexican adobes & a few Indian huts. There is no large building & their church is much dilapidated… I believe this town was built for mining purposes, & now contains a population of about 7 or 800 inhabitants. Nearly every house had a small mill, worked by the ass, whose specie is plenty about the town. They are also used in packing wood & also for the saddle. There's no sugar or molasses to be had, but plenty of wheat, flour, corn, &c." (Hanchett 2002:205).

Tucson became part of the United States with the Gadsen Purchase in 1854, when additional parts of southern Arizona and southwestern New Mexico were acquired by the United States. The town's population at this time is estimated to have been around 400–500 (Browne 1869:133), having declined since a cholera epidemic in 1851. Mexican soldiers stayed in Tucson, waiting to be relieved by American soldiers until 1856, when they moved to Imuris, Mexico (Officer 1987:xv; Sheridan 1986). Many of the Mexican soldiers who left would soon return to lead civilian lives in Tucson.

Parts of Arizona, including Tucson, were declared a Confederate Territory during the Civil War. As the major settlement of southern Arizona, Tucson was occupied briefly by Confederate troops under the command of Captain Sherod Hunter (Faust and Randall 2003:127; Masich 2006:30–31). The U.S. military retook the town in May 1862 with a large body of California volunteers, referred to as the California Column (Figure 12). While undertaking a long and grueling march across the western deserts of Arizona to occupy the town, a small engagement occurred between California volunteer units and Confederates at Picacho, about 40 miles north of Tucson, resulting in the deaths of three U.S. soldiers, two of whom were eventually buried at the Alameda-Stone cemetery (*List of the Captured, Missing, Killed and Wounded in Action, of the 1st Regiment of Cavalry Cal Vols,* signed by Lieutenant Colonel E. E. Eyre, 1st California Cavalry; National Archives and Records Administration, Record

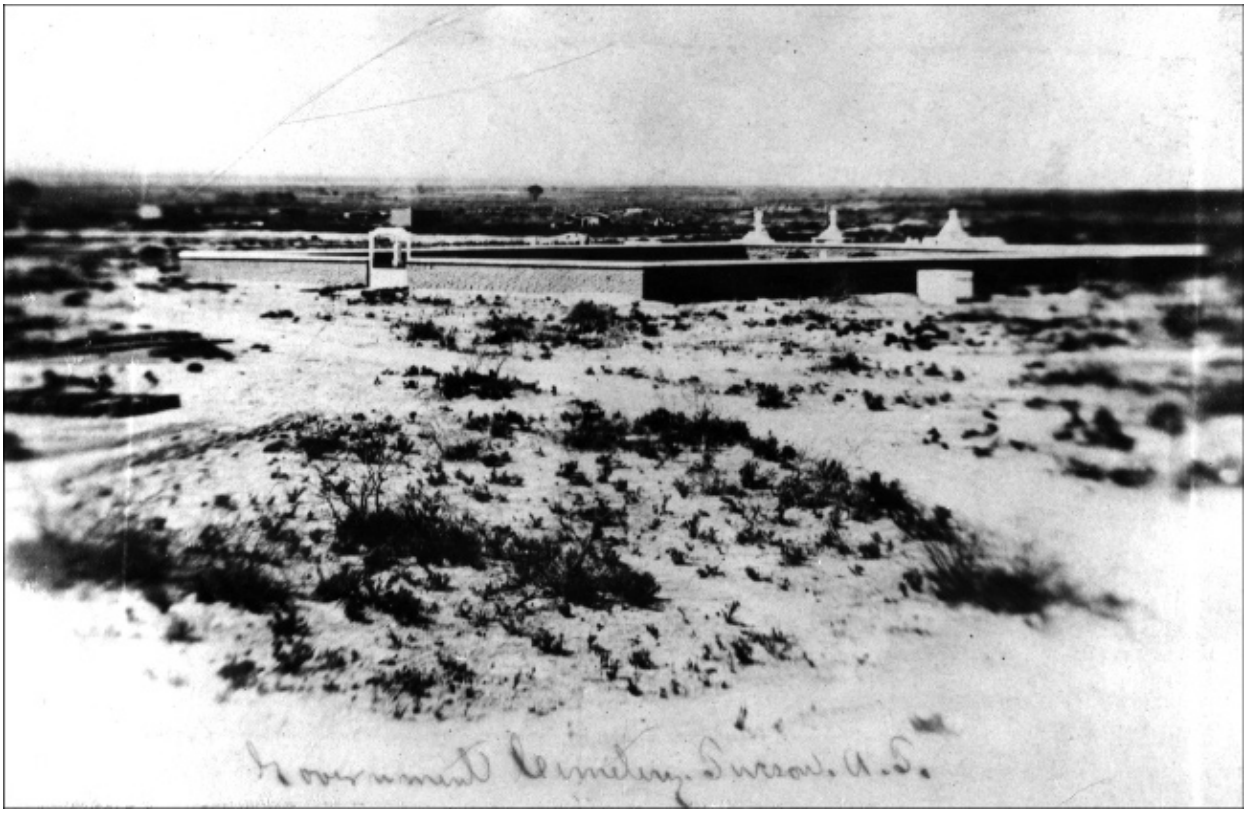


Figure 13. The "National" or "Government" Cemetery at Tucson, 1870. Photograph by John Vance Lauderdale. John Vance Lauderdale Papers, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut. Courtesy of the Beinecke Rare Book and Manuscript Library.

Group 92, Entry 225 Box 1159; Masich 2006). The post established at Tucson with the arrival of the California Column was abandoned in 1864 and then reoccupied in 1866, at which point the post was renamed Camp Lowell (Faust and Randall 2003:131).The first burials placed in the military section were placed in the Alameda-Stone cemetery shortly after the arrival of the California Column in 1862. Whether civilian burials had already been placed in the cemetery is not clear, but it is suspected that the civilian section was first used around this time or perhaps several years earlier (Figure 13).

By 1870, Tucson's population stood at over 3,000, many of them recent arrivals to the town (Mabry et al. 1994). In the following year, the Village of Tucson was incorporated. Camp Lowell was moved to Fort Lowell in 1873, but the military section of the Alameda-Stone cemetery continued to be used until closed by the City in 1881 (Callender 1998; Faust and Randall 2002; O'Mack 2005,2006). The civilian section of the Alameda-Stone cemetery was officially closed by the Village Council on May 31, 1875, and the Court Street Cemetery was opened the following day on the far northern edge of town (*Arizona Citizen* 1875). Tucson was granted city status on February 7, 1877 (*Tucson City Directory* 1881). During its period of use, the Alameda-Stone cemetery was used by the entire community for the burial of more than 1,800 people and was the only cemetery in Tucson.

The year 1880 marked a major milestone in Tucson's development. On March 20, 1880, the Southern Pacific Railroad completed its connection to Tucson, and the city's worldview changed forever. Bringing to the city new immigrants, easy and inexpensive access to mass-produced commodities and world markets, and, probably most importantly, new ideas, the railroad began to transform a small hinterland community into one of the hubs of commerce and culture in the Southwest (this is evident in the artifacts found by archaeologists in the postcemetery component; Figures 14–17). Tucson's population in 1880 had more than doubled since the previous census in 1870 (Mabry et al. 1994; Luckingham 1982). In the same year, telephone service was established, franchises were let for the construction of a municipal gas works and a street car system, and the first street addresses were assigned (*Tucson City Directory* 1881).

On January 23, 1881, the last known burial was placed in the military section of the Alameda-Stone cemetery, that of Corporal John Lyons (*Arizona Weekly Star* 1881). By mid-February, the southwestern corner of the cemetery had been deeded to the school trustees, with the stipulation that they would be responsible for removing

Figure 14. Japanese pitcher with "Kanji" maker's mark (Inventory No. 08000C658).

all bodies from that parcel. Furthermore, the commanding officer of Fort Lowell was notified by the City Council that the military cemetery was closed to further burials (*Arizona Weekly Citizen* 1881a). That the cemetery was physically being affected by expansion of the city was evidenced by the granting of a petition by Mr. Fuller to make adobe bricks from a portion of the old cemetery grounds (*Arizona Weekly Citizen* 1881b). Finally, that year, the City Council voted to open Miltenberg Street from Stone Avenue to Toole Avenue, through the heart of the cemetery (*Arizona Weekly Citizen* 1881c). In 1882, some burials were removed from the cemetery in response to a notification from the City Council that burials in the cemetery needed to be removed within 60 days and reburied in the new Court Street cemetery (*Arizona Daily Star* 1882). In local newspapers, undertaker E. J. Smith advertised his services—in Spanish as well as English—to assist with the removal of burials from the nonmilitary portion of the cemetery (O'Mack 2006:44). Also in that year, electrical generation began in Tucson, gas lights were first used, and the first water company began to deliver running water in Tucson (Schladweiler 2004). By January 1883, the cemetery wall had been demolished (*Arizona Weekly Citizen* 1883; *Arizona Weekly Star* 1883).

In June, 1884, the burials from the military section of the Alameda-Stone cemetery were moved to a new cemetery associated with Fort Lowell, 7 miles away (*Arizona Weekly Citizen* 1884). Two months earlier, in special session, the City Council began discussions concerning the selling of lots in the former cemetery (*Arizona Daily Citizen* 1884). However, it was not until April 1889 that the old cemetery grounds were divided into lots and sold at auction (*Arizona Daily Citizen* 1889a) (Figure 18). Shortly after their sale, lots were graded, removing all surface evidence of the former cemetery. Construction of at least eight houses in the project area was soon underway (*Arizona Daily Citizen* 1890a).

During the 1880s, Arizona and, by extension, Tucson were deep in the throes of an economic recession brought on by a withdrawal of the military on cessation of the Apache Wars, prolonged drought, and a decline in silver prices. By 1890, Tucson's population had actually dropped to 5,150 (Luckingham 1982). It is tempting to hypothesize that the impetus to subdivide and sell lots on the cemetery lands was predicated on a need for revenue as much as on the need to free up land for the growing city. Transfer of all lands containing the cemetery into private hands was complete by early 1890, when the School Trustees decided to sell the parcel they had been granted within the former cemetery boundaries in 1881 (*Arizona Daily Citizen* 1890b).

The next few decades witnessed developments that threatened the existence of the cemetery as increasingly urbanized Tucson grew over the project area. Homes were built on the lots in the project area, with many of them used as rental properties; privies, trash pits, utility trenches, and landscaping features were dug into the former cemetery, often impacting the graves below.

Transportation services and public utilities continued to be developed in the growing city. Extending from

Figure 15. Gold-framed eyeglasses (Inventory No. 08000D323).

Figure 16. Heinz Chow Chow Pickle bottle (Inventory No. 080006189).

Figure 17. Complete doll head (Inventory No. 080006EB3).

Stone Avenue in downtown Tucson to the main gate of the University of Arizona (which first opened its doors to a class of six students in 1891), a mule-powered streetcar system was put into service in 1898. By 1893, electric wires were being strung throughout the city by the Tucson Electric Light and Power Company, incorporated the year before (Schladweiler 2004; Tucson Electric Power Company 2008), and more than 300 Tucson homes and businesses were illuminated with electricity by 1903 (Tucson Electric Power Company 2008). To serve Tucson's increasing population—7,531 inhabitants by 1900 (Luckingham 1982)—the first public sanitary sewers were installed in Tucson (Schladweiler 2004). Sewers were installed along Alameda Street in February 1902, coinciding with the first commercial development in the project area, the construction of the Troy Laundry. This was notable because several sets of human remains were uncovered during the installation (*Tucson Citizen* 1902). In the following year, numerous burials were disturbed by construction of a gas main at Stone Avenue and Miltenberg Street as well as during installation of a private sewer within the project area (*Tucson Citizen* 1903a).

By 1910, Tucson's population had almost doubled since the previous decade (Luckingham 1982). Having been a U.S. Territory for six decades, Arizona achieved statehood on February 14, 1912, after a long battle that was spearheaded by one of the project area's residents, Marcus Aurelius Smith, who also became one of

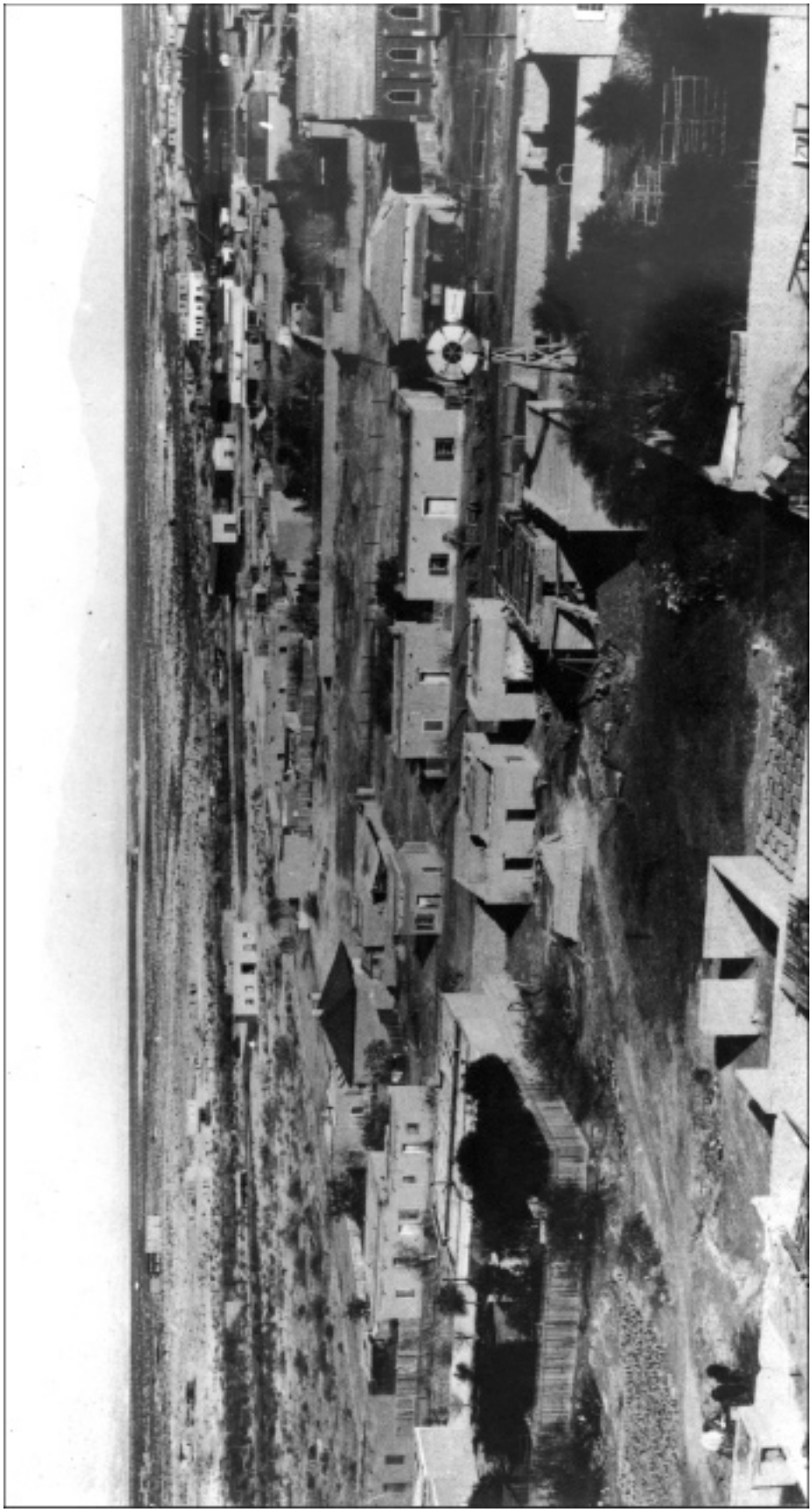


Figure 18. A view of a portion of downtown Tucson ca. 1889, probably from atop the old courthouse at Church Avenue and Pennington Street, camera facing northeast. The abandoned National Cemetery is at the far left side, between the railroad and the rows of houses along Stone Avenue, which runs north-south across the center of the photograph.

Figure 19. Arizona seal medallion.

Arizona's first two senators (Goff 1989) (Figure 19). Tucson continued to modernize its transportation facilities with the opening of the first municipal airport in the United States in 1919.

Having been transformed from a cemetery to a residential neighborhood during the late eighteenth and nineteenth centuries, the project area soon entered another stage of transformation as it became a commercial district in the heart of downtown Tucson. The year 1925 marked the beginning of the commercial period in the Joint Courts Complex project area, with establishment of the Baum and Adamson Tire and Automotive Company. The first civic use of the project area was marked by use of a former residence for offices of the Works Progress Administration and the National Youth Administration in 1938. By 1940, Tucson's population growth had slowed significantly, to just under 37,000, and the proportion of city to county residents began to decrease through the following decade, signaling a shift of population from the city to the suburbs. This shift was evident in the project area, as the last residences were razed by 1959.

In 1940, construction of the Tucson Newspapers Building basement in the project area destroyed an unknown number of burials from the former cemetery (*Arizona Daily Star* 1940). Construction of an addition in the early 1950s resulted in the destruction of even more burials (*Arizona Daily Star* 1955) (Figure 20). Archaeologically, the total number of burials destroyed appears to number at least several hundred. The Tucson Newspapers Building lasted only a few decades and was razed in 1974. After this, the project area was marked by urban decay and abandonment until archaeological excavation began in 2006 (for a more complete discussion of Tucson's history, see Chapters 4, 5, and 12, this volume).

The rediscovery of Tucson's late-nineteenth-century inhabitants, long buried under city buildings and pavement, was of great interest to the community, but especially to descendant groups. One of the most important aspects of any cemetery excavation for descendant groups is its completion, including the repatriation and reburial of human remains (for a complete description of repatriation and reburial, see Chapter 11). Once removed from the Alameda-Stone cemetery, the U.S. military, Hispanic, Yaqui, O'odham, Apache, Euroamerican, and African American individuals were relocated to new burial locations more than 130 years after the cemetery had officially closed. No longer forgotten, these men, women, and children were reburied and celebrated as a testament to Tucson's diverse, multicultural history in multiple ceremonies that included as participants descendants, religious leaders, government officials, and other community members.

Archaeology and History in Cemetery Investigations

Archival research is an essential component of historical archaeology and can often be used to supplement or illuminate archaeological findings. In the case of the Alameda-Stone cemetery, archival research could be used to establish a great many aspects of the cemetery, including

- a reasonable, if inexact, approximation of the original number of burials
- the likely extent of the cemetery
- the existence of major cemetery divisions
- the identity of a large proportion of individuals
- the relative location of burials in the military section
- the general characteristics of some grave markers and cemetery features (such as walls)
- the official dates of closing
- the process of exhumation and removal in the military section, and
- the nature and location of various postcemetery disturbances.

Despite this information, there was a great deal of information about the cemetery that was not revealed through archival research. As Scott O'Mack (2006:1), who performed the archival research noted, "the most surprising discovery [resulting from the archival research] is how little documentation of the cemetery exists . . . we have had to rely heavily on scattered, often incidental references to the [cemetery] in a variety of sources, and we can provide

Figure 20. Historical photograph of the excavation for the expansion of Tucson Newspapers building.

only partial or tentative answers to most of the questions we set out to answer."

In a sense, archaeology and history can be used as parallel sources of information to understand behaviors hidden through burial, decay, and the passage of time. Together, they can be used to restore a connection with the events and processes that originally created those behaviors. Like archaeological field and laboratory research, what is possible to do with historical research can be highly variable. Particularly for more recently used cemeteries, there might be abundant information on where each individual was buried in a cemetery. Examination of public records—such as tax records, census records, property records, medical records, etc.—might reveal information about the age, dates of death and burial, occupation, cause of death and medical history, or the cultural background of an individual. These kinds of information can prove very helpful not only in identifying each individual in the ground, but also in understanding how an individual's particular background affected burial characteristics, how different groups of individuals were treated similarly or differently in death, or how living conditions affected the life experiences of individuals or groups.

Archaeologists often find, particularly regarding mortuary behavior, that much of the information needed to understand a mortuary context is not recorded in a documentary record. There may be very few, if any, photographs or drawings of burial ceremonies or burial spaces and there may be few descriptions of how people were treated in death or why a burial custom was performed in the way that it was. The meaning of objects placed—or not placed—with an individual in the grave may not be readily understood because nothing was ever written about a burial practice, and nobody living seems to remember. What people think of as traditional—"the way we do things"—changes quite often, as what people feel is appropriate to do in a burial context can shift in response to new situations. What happened 50 or 100 years ago may have differed substantially from what goes on today, even if there

appears to be a strong historical connection between past and present practices.

Archaeology does not always agree with the documentary record and it often does not inform on the same kinds of things either. History might tell you, for instance, that an adult male found dead on the road was buried in a specific grave at a cemetery, whereas archaeology may indicate that in fact a subadult female dressed in men's clothing was buried in the same spot. Now, that would be a story. What history probably will also not tell you is how the grave was dug, or whether the individual was placed in a coffin similar to other coffins placed in the same cemetery, or whether the individual was treated differently in death. A historical account may reveal these details, but not in the same ways as in archaeology. Through the application of archaeological methods, there is the opportunity to make objective and systematic observations on individuals, burials, grave pits, and cemeteries that are simply impossible to derive from historical text or memory. Only archaeology could answer many of the basic questions about the Alameda-Stone cemetery, and even with our intensive investigations, basic questions were still not clearly answered, such as when the cemetery was first used or where, precisely, the wall around the military section was located.

Context is Everything

Literally thousands of historic cemeteries and graveyards have been investigated archaeologically in North America. Many others have been subjected to relocation efforts with little or no archaeological work. In some cases, when a cemetery is relocated, burials are simply scooped out of the ground with shovels and the remains placed in a box to be reburied in another location. This is sometimes referred to as the coroner's method, because the aim of the work is not archaeological but instead serves only to move burials from one location to another. Little or no attempt is made to understand or investigate the archaeological context of a burial. For many archaeological investigations of historic cemeteries, documentation is limited due to a variety of factors, including lack of adequate resources, lack of knowledge of pertinent mortuary behaviors, or restrictions placed by stakeholders on what can be documented and how.

In essence, a great deal of information can be learned by studying mortuary artifacts and human remains, but there are different levels of effort that can be applied in these studies. In some cemetery excavations, archaeological work is restricted to performing only a cursory examination of items found within grave-pit features. There is little opportunity to carefully excavate and document the full context of a burial. Similarly, an osteologist may only be allowed to examine bones and teeth while in situ or for a brief period in the field once remains are taken out of the ground. Scheduling constraints or restrictions placed by descendant groups on what can be done archaeologically may allow few opportunities to make all the observations that can be important to understanding the context of a burial and the life experience of the individual(s) within it. Archaeologists may only be allowed to document what they can see at a glance before the contents of a burial are placed in a box and reburied elsewhere, never to be examined again.

In these cases, there is no opportunity to examine the contents of a grave in a controlled laboratory setting or to conduct specialized studies that could inform on such things as the season of burial, past diets, or medical treatments, using advanced techniques such as macrobotanical analysis, isotope analysis, or X-ray fluorescence. Furthermore, because items and samples removed from the ground cannot always be cleaned and examined in appropriate lighting or with scientific instruments under a controlled laboratory setting, some of the observations that are made will not be as well -supported as those that could have been made under better conditions with the appropriate tools and resources. In other words, the quality of the data is rarely as strong as it could be.

Archaeologists typically do the best they can with the available resources of time, money, labor, and equipment, and in the case of cemeteries, they may often be dealing with restrictions that dictate what they can and cannot record. They might not be allowed to take photographs, for instance, or they might not be allowed to remove the contents of an intact burial container for closer examination. Obviously, all these factors affect what can actually be learned about a burial or a cemetery.

Any archaeologist can tell you that the excavation of a grave-pit feature, no matter how careful, destroys the archaeological context. Traces of the behaviors that first laid a body in the grave cannot be restored, even when remains are placed back in the ground in another location or stored in a curation facility. The context of the original burial is lost when a burial is disturbed or removed. There are no second chances to re-excavate the same grave.

If a detailed record of the context is developed, there is at least some information about (1) how the remains were placed in the ground, (2) the burial containers they were placed in, (3) how bodies were prepared or dressed, and (4) what kinds of items were placed with an individual, on or underneath a burial container, or at the surface of the grave. For instance, in the Alameda-Stone cemetery, remnants of wire wrapped with paper or ribbon and sometimes adorned with paper or fabric flowers and beads were found with many juvenile individuals. These items were inferred to have represented floral crowns. Their discovery suggested that infants and children buried with these items were buried as *los angelitos*, or "little angels," according to a Hispanic Catholic burial tradition that symbolized the innocence and purity of children who had died (Figure 21).

In addition to closely examining a burial feature and human remains, important clues to understanding the burial context may also be found by examining grave-pit fill, examining the ground surface above the grave, and examining

Figure 21. Postmortem photograph ca. 1916 of a mother holding her deceased child wearing a floral crown. (Photograph courtesy of the Arizona Historical Society, Tucson, Accession No. B89855.)

sediments surrounding the grave pit. Items placed within a grave pit in association with burial or at the surface of a grave during burial or at other times can be found in these contexts. Evidence for structures or markers placed at the grave, such as grave curbs or altars, might also be found by examining these contexts. The shape, size, and depth of the grave pit is also important to document.

By the time a grave pit is excavated, human remains are often reduced to fragile bones and teeth in varying states of preservation due to prior disturbance and decay; artifacts are often only the more durable parts of larger and more complex tools. These material traces of what was once in the grave provide many clues to a person's identity and life experiences and collectively represent a tremendous reservoir of information on the life and death of an individual and their place in society, as well as on the aspirations of mourners (Buikstra and Beck 2006; Parker Pearson 1999; Reimers 1999). Artifacts, such as particular kinds of screws, nails, or coffin handles can allow us to order graves in time as well as allow us to infer the level of investment in a particular individual's grave. Burial container shapes, construction techniques, and decorations can also provide information about how burial containers were made and acquired, when they were built, religious beliefs, and other factors. Bones and teeth can be assessed to determine age, sex, and biological affinity and can be examined for evidence of disease, nutritional deficiencies and metabolic disturbances, trauma, work patterns, growth and development, medical intervention, and many other factors that help to explain variation in the origins, health, mortality, and demography of a burial population.

In short, there are many kinds of information that can be gleaned about a burial by closely examining and documenting the diverse attributes of grave pits and the burials within in them. In combination with information on the context of burial, the study of human bones and teeth can reveal much information about the organization of cemeteries and communities and their relationship to the implementation of burial practices. Bioarchaeological research can tell us about when a burial was placed in time, the cultural or religious affinity of the deceased, the relationship of the deceased to mourners and to the community, spiritual beliefs, gender roles, and other issues.

The Excavation of the Alameda-Stone Cemetery: A Carefully Controlled Context

In the past, many archaeological projects in the United States and in other countries have been selective in sampling components that were not the primary focus of investigations. For instance, if a project's focus was to move a cemetery—as was the case for the Joint Courts Complex Archaeological Project—a project may have explored only a small sample of the other impacted components, or even ignored them entirely. While less costly and time consuming than complete excavation, such selective approaches risk the loss of information on resources that, although not the main focus of the excavation at hand, could become significant to future research questions and stakeholders. This was not the case with the Alameda-Stone cemetery. Because complete excavation and screening of all features and cultural deposits was required to ensure complete recovery of all human remains, a comprehensive approach was taken to excavate the project area during the Joint Courts Complex Archaeological Project. In anticipation of clearing the land for construction of a new city/county joint courts facility, Pima County tasked Statistical Research with moving the Alameda-Stone cemetery and documenting archaeological resources within the project area. This required the removal of all human remains from the portion of the Alameda-Stone cemetery within the project area, appropriate documentation of any other archaeological resources encountered during excavations, repatriation of remains claimed by descendant groups, and reburial of remains not repatriated to a specific group (for a discussion of consultation with descendant groups, see Chapters 2 and 11).

Once excavation was fully underway, Pima County knew that the number of intact grave pit and burial features still existing within the project area was quite large, despite decades

Figure 22. Mechanically stripping the Joint Courts Complex project area using a specially designed backhoe blade, by Innovative Excavating, Inc., Tucson, Arizona.

Figure 23. Using a TEREX Powerscreen Mark II to recover artifacts and bones from the project area overburden.

of disturbance, but exactly how large remained unknown until the entire project area was stripped and every cultural deposit in the project area was screened. To accomplish this gigantic task, mechanical excavation was used to strip surface deposits to expose feature outlines (Figure 22). The massive quantities of overburden removed during stripping had to be screened to sort out human remains; this required the operation of a large, automated screening machine (Figure 23).

Pima County required that the project be completed within a time frame that accommodated their funding schedule and the needs of the city and county administration in developing the new courts complex. The Joint Courts Complex Archaeological Project was completed in just over 4 years to meet the schedule required by Pima County. The contract began in August 2006. Fieldwork began in November 2006 and was completed less than 2 years later, in August 2008. Necessarily, laboratory analysis and reporting began concurrently with fieldwork and continued after fieldwork was completed. The entire project was completed by November 2010. By comparison, many equally large projects have taken more than a decade, or even decades, to complete.

Such a large and complex undertaken in such a short time required, by archaeological standards, an unusually large staffing. As many as 70 people worked in the field at any one time, and more than 180 people were involved in the project, with specializations including historical archaeology, prehistoric archaeology, geoarchaeology, human osteology, chronometry, cartography, geographic information systems, material culture analysis, botanical analysis, parasitology, software programming, database design, graphic design, technical editing, accounting, human resources, and project management. Personnel who worked on the project included field crew,

Figure 24. Shelves from the grave of an adult male of Hispanic cultural affinity.

Figure 25. Head niche with human remains from the grave of an adult male of Euroamerican cultural affinity.

crew chiefs, project directors, principal investigators, laboratory analysts, cartographers, software programmers, database developers and managers, graphic designers, technical editors, and administrative support specialists. Like other projects of this magnitude, the project was almost an entity in itself. For the duration of the project, the project staff lived and breathed the archaeology and history of the project area, many of them working full time on this one project.

During the Alameda-Stone cemetery excavations, ensuring the development of highly detailed and accurate data on grave-pit and burial features, mortuary artifacts, and osteological materials was of paramount importance. Special methods were developed to ensure that the mortuary context was thoroughly documented from the moment a grave-pit feature outline was identified (see Chapter 2, Volume 2 of this series for a comprehensive discussion of project field and laboratory methods). To ensure that nothing was misplaced, all burial associated items were stored at the site until transferred for reburial. Grave-pit features were carefully excavated, mapped, and examined by hand. Burial features within grave pits were individually identified to distinguish among multiple burials within grave pits and to distinguish between grave-pit fill and materials directly associated with a burial. Without careful excavation and appropriate documentation, intriguing practices would have remained entirely invisible to scientific inquiry. For example, at the Alameda-Stone cemetery, special shelves were sometimes dug in the side walls of the grave pit to support planks of wood to shield the coffin beneath from dirt (Figure 24). Other grave pits had something we called head niches (Figure 25). These were cavities dug in the short axis of the grave to shield the head of a body interred without a coffin. Head niches

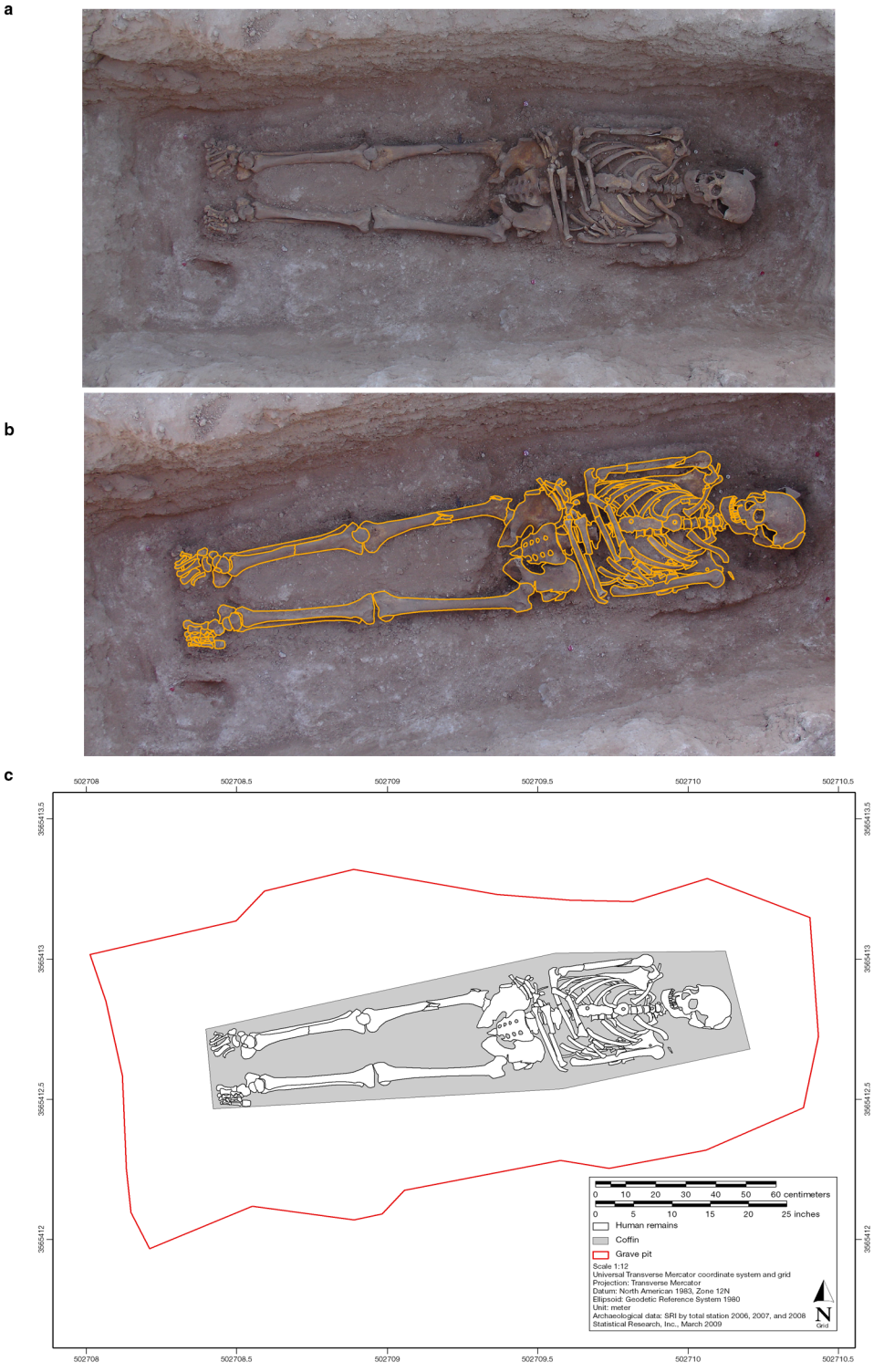


Figure 26. Grave 13614, Burial 21829, adult Euroamerican male: (*a*) photogrammetry; (*b*) digitization of osteological elements; and (*c*) final feature map.

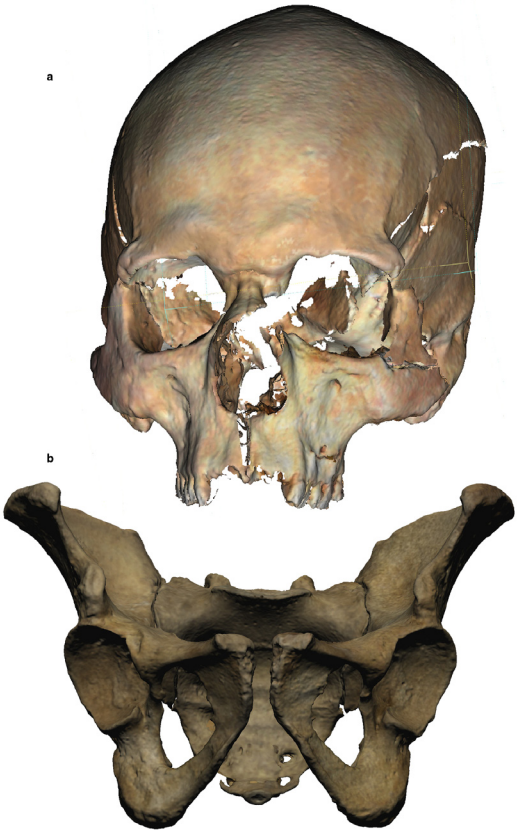


Figure 27. Three dimensional rendering of (*a*) the cranium of the young adult Hispanic male in Grave 3243, Burial 3422; and (*b*) the pelvis from the adult Euroamerican male in Grave 3038, Burial 3952.

Figure 28. Grave Pit 13614, Burial 21829, adult Euroamerican male: an example of a three-dimensional scanned image.

had never been documented before and, thus far, appear to have been unique to this context.

Once feature outlines were identified, deposits excavated from grave pit and burial features were removed by hand. In addition to traditional archaeological practices, important methodological advances were required by the project's the large size, cultural sensitivity, and archaeological complexity. These included orthorectified photogrammetric documentation of all in situ burial features and digitization of in situ osteological elements (Figure 26); the use of three-dimensional scanning to document features and osteological elements (Figures 27 and 28); highly sophisticated, detailed, and accurate digital cartography; balloon aerial photography; mechanical stripping; mechanical screening; new methods for discovering and attributing grave pits and burial features; and implementation of a project-specific relational database system that stored and linked the millions of field and laboratory observations recorded during the project. Grave pits, burial features, osteological elements, and associated artifacts were carefully mapped with digital survey equipment, photogrammetry, and LIDAR (see Chapter 2, Volume 2). The skeletons of individuals in primary context that were exposed in the

ground were mapped in situ with photogrammetry, and many were mapped with three-dimensional LIDAR imaging.

When preservation is poor, mortuary artifacts and osteological remains will become so fragile that they fall apart easily after being removed from the ground, and subtle clues about a person and their burial can be lost. For this reason, osteologists and mortuary analysts made observations on skeletal materials and mortuary artifacts while still in situ as well as after they were removed from the ground. All materials removed from the ground, including sediment samples, were carefully provenienced and placed in individual bags with printed bar code labels, ensuring that all recovered materials from graves could be tracked at any point in time and allowing for the physical relationship of recovered materials to be preserved within a relational database. Using this system, the location and status of each artifact could be tracked at any time throughout the course of the project, from the moment artifacts were collected and entered into the database system until repatriated or curated.

Research questions designed to interpret the diversity of artifact types, feature types, and components discovered in the project area required a wide variety of laboratory analyses to be performed. These included osteological analysis, mortuary artifact analysis, lithic analysis, postcemetery artifact analysis, macrobotanical and pollen analysis, faunal analysis, analysis of archival records, spatial analysis, and multiple other forms of analysis. Detailed analysis of provenienced artifacts, osteological materials, and sediment samples were performed in a controlled laboratory setting in a secure, climate-controlled facility at the project area. Teams of analysts worked continually to identify and attribute materials recovered in the field and to enter the resulting data into our relational database system. For instance, to adhere to the project schedule, multiple mortuary artifact analysts and multiple osteologists analyzed the recovered materials concurrently during and after fieldwork. Postcemetery artifact analysis was conducted mostly after these initial analyses had been completed, so that analysts with the necessary specialties could be freed up to perform other analytical tasks. Analyses performed for the project were highly detailed, and each observation was tied ultimately to a specific set of recovered materials and to a unique, spatial provenience. In addition, all the cartographic information collected in the field was processed in our geospatial laboratory in order to develop maps of each individual feature, feature profiles, and a spatial dataset that could be dynamically linked with attribute information recorded on artifacts and features. Specific data collection and analytical methods are presented in detail in Chapter 2, Volume 2 of this series. Quality controls, including randomized spot checks and the evaluation of data for logical consistency, were put in place to ensure that data were being recorded consistently and accurately for each analysis.

Once initial analyses of artifacts, osteological materials, and sediment samples were complete, we were able to analyze multiple data categories in a highly flexible manner using GIS and the database system. This permitted the examination of spatial or temporal patterns and relationships that were not apparent when studying individual contexts in the field or laboratory, as well as the creative manipulation of multiple, related data categories and vast quantities of data. The relational database system allowed powerful exploratory analyses to be performed on mortuary behavior, cemetery organization, the biology and health status of the burial sample, and use of the project area during prehistory and the postcemetery period. In many cases, advanced statistical methods and novel approaches were applied to answering important research questions. These are discussed in detail in Volumes 2 and 3.

Without the analytical tools and methods developed for the project, it would have been impossible to maintain accurate and consistent data for higher-level analysis and reporting. To ensure that analyses were on the right track, that important research avenues were pursued, and that related analyses were integrated to the greatest extent possible, regular meetings were held with project team members, including principal investigators, project directors, laboratory analysts, geospatial analysts, and database designers. Among other things, the organizational and data management structures developed for the project allowed investigation of the cemetery component to be truly bioarchaeological, such that different lines of historical, contextual, and osteological evidence were consistently integrated and combined in creative ways and used together to achieve important project goals. No archaeological project conducted in the United States to date has implemented and integrated these technologies and methods as comprehensively or on as large a scale. Advanced methods and technologies were essential to developing timely, accurate, and updatable data on artifacts, features, and human remains; and they were an absolute necessity, because daily reporting on the discovery of grave and burial features was required by the burial agreements for the project.

The Alameda-Stone Cemetery in Cultural and Behavioral Context

The larger context of how graves are arranged within the cemetery, with respect to each other, to cardinal features, and to features of the landscape is just as important as documenting and analyzing the context of individual grave pits and burial features. Many historical-period grave pits and burial features in North America during the nineteenth century were oriented along a generally east-west axis and were often aligned with buildings, roads, or fences that were used as guides for cardinal direction. Variation in the orientation of grave pits can signal temporal differences, if referenced landscape features (such as roads or buildings) shifted in their alignment, or appeared and disappeared, over time. Variation in affinity can also be detected if different groups oriented themselves according to features important to their particular view of the world. At the Alameda-Stone cemetery, variation in the alignment of some grave pits could signal temporal differences with later graves oriented in a more strictly east-west

alignment. How individuals were oriented within the grave appeared to relate to religious preferences—that is, whether their heads were to the west and the feet to the east, or vice versa. Many apparent Catholic burials contained individuals placed with their heads to the east and feet the west, whereas others, many of whom may have been Protestant Euroamericans, were placed with their heads to the west and their feet to the east.

How grave pits are arranged with respect to each other can also be very important. Specific groups of people might be buried close together, such as families, soldiers, or religious orders. At the Alameda-Stone cemetery, graves were clustered in different ways, signaling not only the presence of different cemetery areas, such as the military section, but other relationships between individuals as well. Some clusters of individuals, for instance, appeared to represent possible family relationships. So, in essence, not only is there behavioral information stored within the attributes of a grave-pit and burial feature, there is information in its relationship to the cemetery landscape and the world around it (Francis 2003; Sloane 1991; Warner 1959). For this project, we were greatly aided by the use of detailed cartography and a geographic information system, which allowed us to closely examine spatial relationships among grave-pit features, individual burials, and the larger landscape context.

The formal attributes of the cemetery itself also provide information on how a cemetery was used. These include not only the grave pits and burials within a cemetery and their particular arrangement, but also such features as walkways and paths, walls, entrances, memorials, sculptures, flagpoles, trees and shrubs, and the many other features that can make up a cemetery. These kinds of features inform on how a cemetery was organized and changed through time and how visitors and mourners would have interacted with the cemetery landscape. Unfortunately, grading of the Alameda-Stone cemetery and other disturbances after the cemetery was abandoned in historical times destroyed the traces of many of these features. In-depth archival research, however, permitted reconstruction of some aspects of the cemetery that had become inaccessible to archaeological observation, such as the characteristics and location of walls and entrances.

The Larger Context of Landscape and Community

The place of a burial space within the larger landscape is also important, as it can tell us how a cemetery related to settlement and a larger society, the society of the living. For some investigators, a cemetery is a specific kind of burial space that distinguishes it from other burial spaces. According to Rugg (2000), for instance, a cemetery is generally placed in a somewhat removed setting away from the center of a settlement and consists of a bounded space with a formal entrance that declares its meaning symbolically to its users. It has an ordered arrangement of individual graves that allows for each grave to be individually located and for specific individuals to be memorialized and visited. Cemeteries, according to Rugg (2000), also carry with them the expectation of some level of permanence as, at least theoretically, each new burial was provided its own grave pit, and earlier burials would not be dug up to make way for new burials. The term "cemetery" is often used in a more inclusive sense as a term used to describe any burial space used for a collection of burials, but if we follow Rugg's more restrictive definition, then a cemetery is defined in part by its relationship to the surrounding landscape, as well as in its internal organization, and in the treatment and memorialization of individual graves. In its various properties documented archaeologically and historically, the Alameda-Stone cemetery appears to largely conform to this definition, but not entirely, signaling the transitional nature of this site and historic context.

The relationship of a cemetery to a community is reflected in the relationship of a cemetery to the settlement with which it articulates. In the case of the Alameda-Stone cemetery, the cemetery was located a couple hundred meters or more outside of town when it was first established. It was not miles away, like other cemeteries have been, but fairly close to town and reasonably so, as people were not safe from Apache raiding more than a few hundred meters from town. This was, at the time, as far as people were willing to go outside of town to bury their dead. Earlier burial spaces in Tucson were more centrally placed, within the walls of the presidio and adjacent to the place of worship, in part due to security but also so that the living could care for and interact with souls of the dead during daily activities (Figure 29).

Despite the originally removed setting of the Alameda-Stone cemetery, Tucson soon expanded, and the cemetery was bounded on one side by residential development and on the other side by a railroad. Although the cemetery itself had not moved, its physical relationship to the surrounding cultural landscape had changed, and it was no longer sufficiently outside of town to meet the expectations for a cemetery at the time. At that time, cemeteries and the dead bodies they contained were considered to be unsanitary and dangerous sources of contagion. In addition, to be respectful, cemeteries needed to be in a quiet and removed location where the dead were not disturbed by the daily affairs of the living (Faust 2008; Laderman 1996; Lomnitz 2008; Voekel 2002; Will de Chaparro 2007). Coexistence in the same space was a nuisance to both the dead and the living. Precisely these kinds of problems were invoked in Tucson to justify moving the cemetery (O'Mack 2006). Following the same pattern of establishing a cemetery on the outskirts of town as had occurred with the Alameda-Stone cemetery, the new Court Street cemetery was placed in 1875 at the edge of the newly surveyed townsite and more than twice as far outside of existing development as the Alameda-Stone cemetery had been. Clearly, town folk saw the need to separate burial spaces from the everyday spaces of the living.

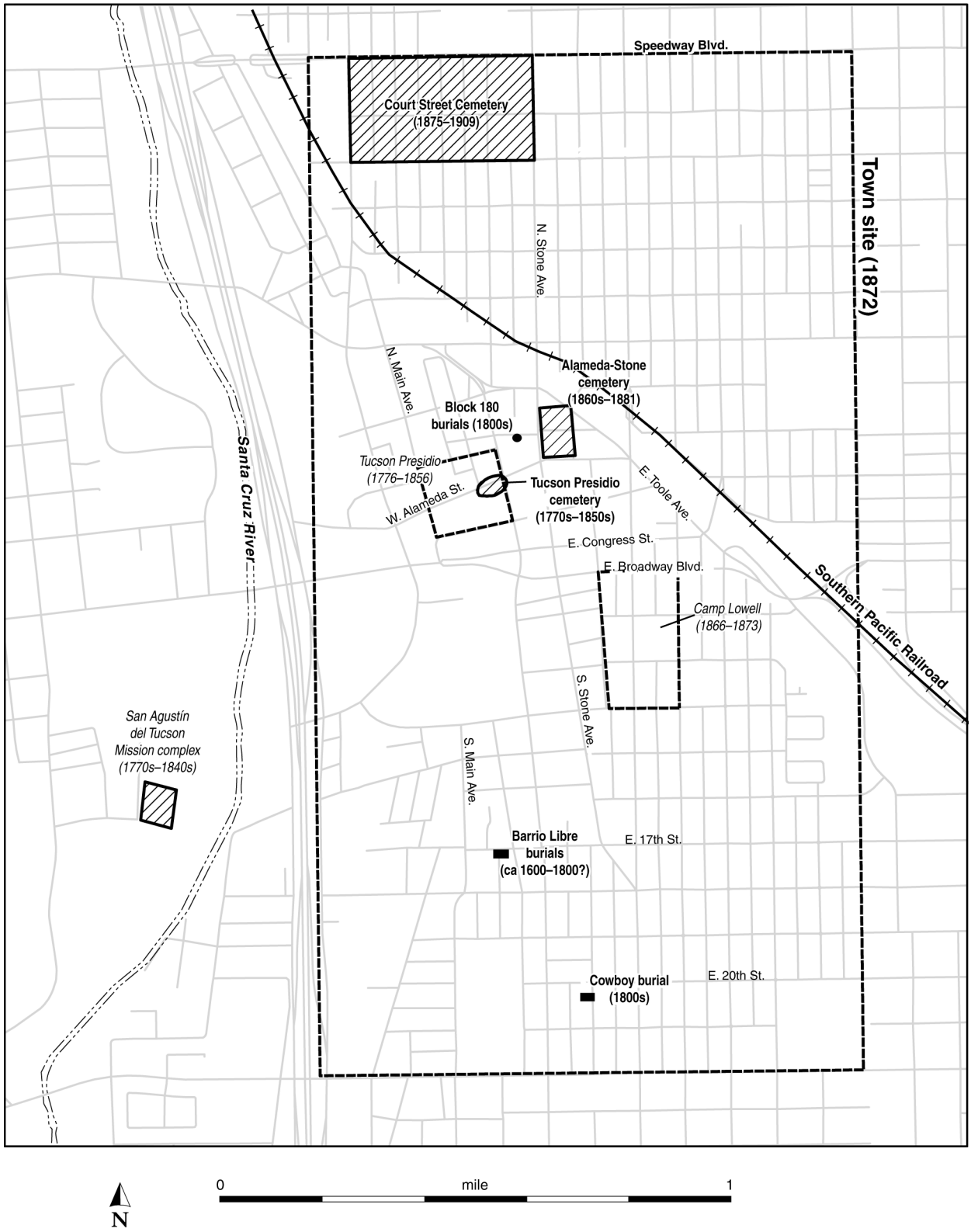


Figure 29. Burial spaces in Tucson.

Social, Economic, and Political Context

The social, economic, and political context of the cemetery is also significant. The cemetery was established, used, and abandoned during an important period of transition in Tucson and in the American West. Recently incorporated into the expanding frontier of the United States, communities in the American West were thrust into an expansive, capitalist world system that connected these peripheral communities to administrative and economic centers in other parts of the United States as well as to capitalist markets in the United States and other parts of the globe. In Tucson and in other parts of the American West, communities were being transformed by processes of internal colonization, resource commodification, and an expanding American economy, processes supported by the U.S. military and federal incentive programs, such as the Homestead Act of 1862 (Hardesty 1991; Heilen and Reid 2009; Limerick 1987; Meinig 1998). Land and other resources came to be exploited differently by this new political economy, according to a capitalist market system emphasizing individual ownership and control. The original Hispanic and Native American inhabitants of colonized regions were increasingly exploited and subordinated to support this new system (Sheridan 1986, 1995). At the same time, the health and life experiences of people throughout the country were being transformed, and in other industrializing nations as well, as people came into greater contact with diseases for which they had no resistance and were exposed to the hazards of urbanizing environments. Living conditions became increasingly urbanized and unsanitary, and nutrition was compromised due to an increased dependence of many people on wage labor and a greater susceptibility to fluctuating food prices in the new capitalist markets (Haines 2004; Haines et al. 2003; Lee 1997).

Yet the maintenance of social and economic ties with northern Mexico insulated Hispanic Tucsonans to some degree from the increasingly class-based and racialized subordination of Hispanics and Native Americans throughout the American Southwest, allowing the persistence of Mexican American culture and lifeways in Tucson, even as Euroamericans began to control local politics and economic resources. The common threat felt by all Tucsonans to Apache depredations led to a certain level of solidarity among the populace. Native Americans, Hispanics, and non-Hispanic Euroamericans all joined forces to campaign against raiding Apache bands, resulting in frequent and bloody interpersonal violence, atrocities, and even enslavement of captives on both sides. At the same time, socioeconomic and class-based divisions in the community began to create an increasing rift between Hispanics and non-Hispanic Euroamericans while the cemetery was in use (Officer 1987; Sheridan 1986).

In addition to the sweeping changes in political economy that occurred during this time, there were major changes in approaches to death and burial occurring in the United States and in Mexico that were now affecting mortuary practice in Tucson (Faust 2008; Laderman 1996; Lomnitz 2008; Voekel 2002; Will de Chaparro 2007). In cemetery organization, location, and the attributes of burials, the Alameda-Stone cemetery reflects changes in mortuary practice, political economy, and health occurring in Tucson and throughout the American West.

Comparative Context

Still another level of documentation and analysis for cemetery investigations is the relationship of the results of a cemetery investigation to the results of investigations at cemeteries of other times and places. Comparisons along these lines help to place the cemetery within a broader cross-cultural and diachronic perspective. They serve to isolate what is unusual about a particular cemetery and what is not, which in turn helps to delineate the processes and conditions that generate the similarities and differences seen among cemeteries and burial populations. These kinds of comparisons can sometimes be among the most difficult to evaluate objectively, due to broad variability in the methods used to study individual cemeteries. A measurement made during one investigation is not necessarily, and not often, equivalent to a similar measurement made for a compared investigation. Nonetheless, comparisons of these types ultimately can be highly informative. Lynne Goldstein, a professor from Michigan State University and one of the most experienced and innovative of mortuary specialists this country has to offer, shows in Chapter 10 that "At a very general level, the Alameda-Stone cemetery fits the general model of a nonurban cemetery for the 1860s–1880s." At the same time, she notes that "(1) it is the only example of a large, predominantly Hispanic cemetery that was also multicultural; (2) it is the cemetery with the highest proportion of religious items within the cemetery; and (3) both poor and middle-class individuals were buried there. The Alameda-Stone cemetery is one of the few cemeteries that represent the entire community at the time."

Contributions to Archaeological Research

The cemetery component research represents a unique contribution to mortuary studies, bioarchaeology, historical archaeology, and project planning and administration.

The investigation of as large a cemetery with a majority Hispanic component has never been undertaken in the United States. The vast majority of previous projects in the United States have investigated the cemeteries of non-Hispanic Euroamericans or African Americans. The diverse nature of the cemetery—with multiple demographic groups—is also unique to cemetery investigations, as nearly all other cemeteries have been far less diverse and have not represented the burial population of an entire multiethnic community. The brief use of the cemetery, along with the large sample size, is unusual as well, allowing the researchers to amass a substantial amount of information about the burial practices of a community during a brief span of time. In addition, the cemetery sample was exceptionally large and representative in comparison to other samples.

As important and sensitive as the cemetery component was, significant archaeological components from other periods were also present—the remains of an urban neighborhood postdating the cemetery and prehistoric remains. The prehistory component made important contributions to the study of the forager-farmer transition in southern Arizona, which in and of itself is important globally to the study of human adaptations and cultural developments surrounding the incorporation of farming into foraging lifestyles. The prehistoric component in the project area was small, but it still represents an environmental context that differs from the context in which most previous Late Archaic/Early Agricultural features in the Tucson Basin have been found (see Chapter 3). As such, the prehistoric component adds important data to the growing database on Late Archaic/Early Agricultural period subsistence and settlement in the region and should serve as an important point of comparison for future research. Earlier and later finds for the prehistoric component also add some data useful in understanding the distribution of land-use, resource-procurement, resource-processing, and settlement activities during the Middle Archaic and Middle Formative periods.

Documentation of the postcemetery component was unusually thorough, due to the need to carefully investigate and screen all cultural deposits within the project area in the search for human remains. In addition, intensive archival research was performed to contextualize and interpret this component. Research on the postcemetery component focused on urbanization, residential development, behaviors surrounding the abandonment and erasure of the Alameda-Stone cemetery, and variation in foodways and consumerism during the residential period according to factors such as socioeconomic status, ethnicity, gender, and age (see Chapter 12). An interesting aspect of the postcemetery research was the disparate ways in which archival and archaeological data informed on the use of the project area. Much more archival data could be developed on landowners in the project area than actual residents. The vast majority of users of the project area during the residential period were, by contrast, renters whose residence in the project area was often relatively brief and for whom archival records were less detailed. As a result, most deposits in the project area could not be correlated with particular households, despite the abundance of available archival data.

The archival data allowed us to assess how the project area changed through time from a residential neighborhood to a commercial district and to document more thoroughly the kinds of structures, landscaping features, and utilities that were built, abandoned, and demolished in the project area. The archaeological data allowed us to document in detail the kinds of foods people ate and the household items they used and discarded and the effects of disturbances to the cemetery, but rarely allowed us to make unambiguous comparisons of material culture according to demographic variables. Given the large size and complexity of the component, the scheduling and funding constraints, and the focus of the project on the cemetery component, the major contribution of the postcemetery research is to urban archaeology, as it resulted in the detailed and thorough documentation of a large urban neighborhood. Much future analysis of the postcemetery data and comparison of the results to similar components investigated in other urban environments should make the project results and database an important resource for years to come.

The Organization of the Series

Project results were reported in a four-volume series designed for the project. In addition to these volumes, a research design, an end-of-fieldwork report, and two brief reports on our cultural affinity and military identification assessments were produced. These latter two reports provided information that was needed by Pima County and descendant groups in order for informed decisions to be made regarding the repatriation and reburial of human remains and mortuary objects recovered during the Joint Courts Complex Archaeological Project.

Because of the broad interest in the results of this project, the first volume in this series is the synthesis volume. This volume provides a synthesis of the major project findings for the Alameda-Stone cemetery and the postcemetery and prehistoric components of the project and places them in historic, anthropological, and administrative context. The second volume of the series is dedicated to the Alameda-Stone cemetery. Chapters in Volume 2 provide more-detailed descriptions of the environmental context, project methods, the history and archaeology of the cemetery, mortuary analysis, and osteological analysis. Volume 3 provides detailed description of the findings for

the postcemetery component of the project. Chapters in this volume are organized by lot and provide archival and archaeological information on the history of residential and commercial land use in the project area, disturbances to the cemetery, the archaeological content of postcemetery features and artifacts, and social and economic change among users of the project area. Findings are discussed in terms of themes having to do with socioeconomic status, gender roles, ethnicity, processes of urbanization, and evidence for changes in culinary practices and the organization of production and consumption. The final volume of the series is the cemetery feature descriptions volume, which provides detailed maps and descriptions of each grave pit feature, burial feature, and osteological individual discovered in primary context. The first three volumes are bound. Volume 4 is provided on compact disc and is organized by grid location, according to a regular, systematic grid created for the project area. This organization allows individual feature descriptions to be easily located within the volume according to their location within the cemetery. In addition to these volumes and their associated appendices, a project-specific relational database containing the osteological and archaeological data used in these volumes was created.

The Organization of this Volume

Volume 1 contextualizes and synthesizes the project findings. Chapter 1 has introduced the cemetery and the project in terms of their unique significance, presenting information on the general environmental and historic context, how the project was conducted, and the organization of the series and the volume. Because project planning and implementation were so complex, we devote Chapter 2 to giving a detailed administrative, political, and legal context for the project investigations. Chapter 3 focuses on the prehistoric findings and the significance of those findings to current issues in understanding the prehistory of the Tucson Basin, particularly on the forager-farmer transition that occurred in southern Arizona during the Middle and Late Archaic/Early Agricultural periods. The following chapter, Chapter 4, provides a historic context for the period leading up to the formation of the Alameda-Stone cemetery, beginning with the arrival of the first Europeans in southern Arizona and ending with the Gadsden Purchase, when Tucson became part of the United States.

Chapter 5 provides a historic context for Tucson during the establishment, use, and abandonment of the cemetery and an overview of the archaeology and history of the cemetery. Chapter 6 details the design and results of cultural affinity and military identification assessments for the project. These assessments not only facilitated analysis of excavation results but also greatly facilitated repatriation and reburial, serving as a model for affinity and identification assessments for future cemetery investigations. Historical, contextual, and osteological evidence for diet, nutrition, disease, trauma, medical intervention, and demography are considered in Chapter 7, revealing a burial population that was relatively healthy in terms of diet and nutrition, but heavily affected by disease and trauma, with little consistent access to healthcare and high mortality rates for some segments of the community.

In light of the multiethnic and diverse use of the cemetery, Chapter 8 provides a context for understanding the deathways practiced by different segments of the community in Tucson. Emphasis is placed on Hispanic Catholic deathways and Euroamerican deathways, with a focus on the effects of cemetery reform and the Civil War on mortuary behavior in Tucson. Information on military and fraternal funerals, as well as the deathways of O'odham, Yaqui, and Apache groups, is also discussed, including discussion of aboriginal practices not observed in the cemetery. Chapter 9 synthesizes the mortuary data developed for the project, integrating historical, contextual, and osteological findings.

Chapter 10 of this volume summarizes all the findings from the cemetery context and compares them to the results of investigations of other contemporaneous cemeteries. Goldstein also explores the ways in which the cemetery investigation, and the cemetery itself, are unique in comparison to other studies. In Chapter 11, the repatriation and reburial of remains is discussed. Like the cultural affinity assessments, these efforts represent a new approach that should be followed by other projects. In addition, the chapter highlights the contrasting ways in which different groups from the cemetery were memorialized and reburied.

Chapter 12 summarizes the many findings from the postcemetery component of the investigation, focusing on the major themes of identity, consumption, socioeconomics, urbanization, sanitation, and land use. The final chapter in this volume, Chapter 13, revisits the unique significance the project, presents major findings, revisits project goals and outcomes briefly, and provides recommendations for the future.

CHAPTER 2

Planning is Everything: The Administrative Context for the Joint Courts Complex Archaeological Project

Marlesa A. Gray, Statistical Research, Inc., and Roger Anyon, Pima County Cultural Resources and Historic Preservation Office

Consultation and Compliance Prior to Commencement of Fieldwork: Minimizing Conflict and Controversy

In May 2004, through a local bond election, the voters of Pima County, Arizona (the County), approved $76 million to construct a city/county courts complex on the 4 1/3 acres of land in downtown Tucson described in Chapter 1 as the Joint Courts Complex project area, at the southeast corner of Stone and Toole Avenues (Figure 30). Given the logistics and requirements of the courts and the limited availability of land in downtown Tucson, the selected acreage was considered to be the only available site for the complex. Prior to the bond election, the Pima County Office of Cultural Resources and Historic Preservation advised local officials that the proposed project area was located within the historically mapped boundary of a long-abandoned cemetery (described in this report as the Alameda-Stone cemetery). In addition, it was noted that within the last 100 years several burials had been discovered during private urban development within the proposed project area. Note was also made that it was unknown whether or not additional burials might still remain under the modern streets, warehouses, gas stations, and parking lots. With voter approval for construction, however, the Joint Courts Complex Archaeological Project became a reality.

All too often, historic cemetery excavations become lightning rods for controversy and confrontation. Divergent agendas, poor planning, bad decision making, and inept public relations can derail a project before excavations begin. Friction among the descendants, the public, developers, government agencies, and archaeologists can easily become fodder for front-page news articles and local television reporters, in a critical light, more often than not. Planning for cultural resources compliance on the Joint Courts Complex Archaeological Project began in earnest in November 2004 and continued for 2 years prior to the start of archaeological excavations, on November 6, 2006. The County's overriding concern was to ensure an open and transparent planning process that considered the concerns of all interested parties and individuals. Although the avoidance of cultural resources and presumed remnants of the historic cemetery within the project area would not be achievable, it was believed that avoidance of unnecessary conflict and controversy could be achieved. Consequently, all planning and actions related to cultural resources compliance for the project were inclusive, open, comprehensive, and honest. Anyone with a stake or interest in the project was provided the opportunity to participate. Consultations and communications were frank, direct, and clear, with the objective of having no surprises. As the proponent of the Joint Courts Complex Archaeological Project, the County viewed the prefieldwork planning process as an absolutely critical first step for the overall success of the project.

For the Joint Courts Complex Archaeological Project, compliance with historic preservation and human-burial statutory requirements is entirely under State of Arizona jurisdiction. The project is County-funded through general obligation bonds and is situated on land owned and controlled by the County. There is no federal nexus. As a political subdivision of the State of Arizona, the County must comply with several Arizona statutes, including the Arizona Antiquities Act (Arizona Revised Statute [A.R.S.] Section 41.841, which is administered by the Arizona State Museum (the Museum), and the Arizona Historic Preservation Act (A.R.S. Section 41.861–41.864), which requires consultations with the Arizona State Historic Preservation Office. A.R.S. Section 41.844 concerns human remains and funerary objects found on State and

Figure 30. Location of the Joint Courts Complex Archaeological Project in downtown Tucson, Arizona.

County lands, and this section of the law is also administered by the Museum.

In November 2004, the County owned a number of the parcels within the project area, and by the start of fieldwork in November 2006, the County had completed purchase of the entire project area, except for the roadways, which remained City of Tucson (the City) rights-of-way. The City closed these rights-of-way before November 2006, and through an agreement with the County, gave the County control of the property, with the right to demolish the streets and conduct archaeological excavations beneath them.

In the 2-year period before the start of fieldwork, the County's planning consisted of many concurrent and intertwined processes and actions (Table 1). In the following introductory discussion, the issues are presented as four topics: background studies, consultations regarding burials and the cemetery, noncemetery archaeological compliance, and public relations.

Background Studies

From the outset, the County wanted to gather as much existing information as possible about the archaeology and history of the project area. Consequently, the County contracted with Statistical Research in Tucson, Arizona, to conduct an overview study to determine what, if any, archaeological findings had previously been made in the project area; to determine what kinds of ancient and historic archaeological features and deposits might still be present in the project area; to compile all available information regarding the historic cemetery and all documentation regarding burial discoveries within the project area; and to record the remaining standing structures so that recommendations regarding their potential historic significance could be made. The overview study was also to be used to consult with the Arizona State Historic Preservation Office regarding any cultural resources and historic properties that may be eligible for listing in the Arizona Register of Historic Places, a register that uses the same criteria as the National Register of Historic Places.

The first 6 months of the prefield activities were entirely devoted to the overview study, because no decisions about what to do next could be made without the information that this study would provide. By June 2005, it was clear that records relating to the historic cemetery were scant (O'Mack 2005); even so, it was certain that ground disturbance, particularly the construction of a multistory building, would encounter human remains. Based on this information, the County began discussions with the Museum regarding potential descendant groups, a topic discussed below.

The overview study included standing structures within the project area, which at that time included the modern brick building that was originally a bank at the corner of Stone Avenue and Alameda Street. This building—a fine example of Tucson's modern architecture—was described by Nequette and Jeffery (2002:81) as "both civic in scale and articulated with enough detail to be engaging to the pedestrian." It is included in the "Modern Fifty," a group of buildings deemed worthy of preservation despite their modernity. However, O'Mack (2005) recommended the building not eligible for listing in the Arizona or National Registers of Historic Places, principally because it was less than 50 years old, a position with which the State Historic Preservation Office had some discomfort. Local preservationists were also uncomfortable with the thought that the building might be demolished. The issue became, for a short time, a topic of newspaper reports and the first instance of the proposed Joint Courts Complex Archaeological Project's coming under media scrutiny (see below). The issue of the modern, brick bank building became moot when, for reasons unrelated to preservation, the County determined that the space occupied by the building was not necessary for the project, and it was removed from further consideration and inclusion in the project area.

Research for the overview study revealed that the Roman Catholic Diocese of Tucson (the Diocese) archives included a register of Catholic deaths in Tucson during the period the cemetery was in use. Detailed research of these records, however, was beyond the scope of the overview. In addition, the Diocese had not allowed release of the information in this register. Here is where the first of a series of beneficial interactions with and mutual support of Los Descendientes del Presidio de Tucson (Los Descendientes) began. Mr. Fred McAninch, historian for Los Descendientes, served as intermediary with the Diocese and obtained permission for the release of relevant years' records to the County. This breakthrough enabled the County to issue a second contract to Statistical Research for a detailed study of the Diocese records and other population records, such as censuses. This archival study (O'Mack 2006), begun in February 2006 and completed in August 2006, was conducted during the period of the most-intensive burial consultations with descendant groups.

Unfortunately, despite detailed research for the overview and archival studies, in November 2006, when archaeological excavations began, there was still no definitive information about the extent of the area actually used as the historic cemetery, who had actually been buried there, how many people had been buried there, and how many burials had been disinterred when the cemetery was closed. The archival study provided information for estimating how many people may have been buried there, but there was still no clear indication regarding how many extant burials might be within the project area.

Burial Consultations

Excavation of human burials and the historic cemetery was, by far, the most delicate and sensitive issue in the planning for the Joint Courts Complex Archaeological Project.

Table 1. Chronology of Major Actions Prior to the Start of Archaeological Fieldwork for the Joint Courts Complex Archaeological Project, November 6, 2006

Date	Action
December 2004	Statistical Research, Inc., begins overview study.
May 2005	Pima County reviews draft overview study.
June 2005	Pima County begins burial formal consultation with Arizona State Museum.
July 2005	Statistical Research, Inc., completes overview study.
July 2005	Pima County mails overview study to descendant groups and agencies.
July 2005	Pima County consults with State Historic Preservation Office regarding historic properties.
August 2005	Pima County begins first 30-day newspaper notice.
August 2005	Pima County consults with Tohono O'odham Cultural Committee.
August 2005	Pima County and Arizona State Museum make presentation to Joint Courts Advisory Committee.
September 2005	Pima County consults with four southern tribes' cultural committees.
September 2005	State Historic Preservation Office concurs with Pima County regarding historic properties.
October 2005	Arizona State Museum consults with all tribes and Pima County.
November 2005	Arizona State Museum consults with Lose Descendientes del Presidio de Tucson and Pima County.
November 2005	Pima County Health Department consulted about potential epidemiological issues.
November 2005	Pima County consults with Tohono O'odham Cultural Committee.
January 2006	Pima County submits geotechnical-boring monitoring plan to State Historic Preservation Office.
February 2006	Arizona State Museum informs descendant groups about geotechnical borings.
February 2006	Pima County consults with Roman Catholic Diocese of Tucson.
February 2006	Pima County consults with Tohono O'odham Cultural Committee.
February 2006	State Historic Preservation Office concurs with geotechnical-boring monitoring plan.
February 2006	Statistical Research, Inc., begins archival study.
March 2006	Arizona State Museum consults with Lose Descendientes del Presidio de Tucson, Roman Catholic Diocese, and Pima County.
April 2006	Pima County advertises solicitation for data recovery contract.
April 2006	Arizona State Museum releases draft post-1775 burial agreement.
April 2006	Arizona State Museum consults with all parties regarding draft post-1775 burial agreement.
May 2006	Office of Vital Records determines need for State Permit and Court Order.
May 2006	Pima County reviews responses to solicitation for data recovery contract.
May 2006	Pima County mails Roman Catholic Diocese mortuary records to all tribes.
June 2006	Pima County awards data recovery contract to Statistical Research, Inc.
June 2006	Arizona State Museum finalizes post-1775 burial agreement.
June 2006	Arizona State Museum releases draft pre-1775 burial agreement.
June 2006	Pima County receives final geotechnical-boring monitoring report.
June 2006	Pima County mails final geotechnical-boring monitoring report to all descendant groups.
July 2006	Pima County reviews draft archival report.
July 2006	Pima County negotiates and approves Statistical Research, Inc., data recovery contract budget.
July 2006	Arizona State Museum finalizes pre-1775 burial agreement.
August 2006	Pima County issues notice to proceed to Statistical Research, Inc.; data recovery contract activated.
August 2006	Pima County files Court Order application.
August 2006	Statistical Research, Inc., completes archival report.
August 2006	Pima County mails archival report to all descendant groups and agencies.
August 2006	Superior Court signs Court Order.
September 2006	Statistical Research, Inc., submits draft project treatment plan.
September 2006	Office of Vital Records issues State Permit.

Date	Action
October 2006	Statistical Research, Inc., publishes fact sheet and informational brochure.
October 2006	Pima County submits final treatment plan to State Historic Preservation Office.
October 2006	Pima County mails final treatment plan to all burial agreement parties.
October 2006	Pima County meets with newspaper editorial boards.
October 2006	Pima County issues memo regarding prohibition of photography.
October 2006	Pima County, Arizona State Museum, and Statistical Research, Inc., meet regarding burial agreements.
October 2006	Los Descendientes del Presidio de Tucson and Tohono O'odham visit project area and laboratory.
October 2006	State Historic Preservation Office concurs with treatment plan.
November 2006	Pima County begins second 30-day newspaper notice.
November 2006	Pima County and City of Tucson politicians and administrators visit project area and laboratory.
November 2006	SRI Foundation conducts sensitivity training for all project personnel.
November 2006	Media visits project area and laboratory.
November 2006	Bishop Kicanas visitation and blessing at project area.
November 2006	Statistical Research, Inc., begins fieldwork.

This issue, by itself, had the potential to become a serious impediment to the project if not approached in the correct way. Years before, the repatriation of human remains, excavated by others in the downtown Presidio cemetery, had caused some unease among descendant groups, the same groups that would be consulted as part of the Joint Courts Complex Archaeological Project. In addition, the burials from the Joint Courts Complex Archaeological Project area would be more recent than those from the nearby Presidio cemetery, adding another potential layer of sensitivity to the project.

Under Arizona statute, the Museum is charged with coordinating consultations regarding human remains and funerary objects. From the beginning of the project, the County and the Museum worked closely in planning and conducting the consultations. In mid-2005, the County notified the Museum that the overview study was underway, and the two worked together to devise an overall strategy to take the project through to excavations. The first task was identifying potential claimant descendant groups. It was decided that casting a very broad net and notifying all groups that might have a potential interest in burials within the project area would be best. This would allow descendant groups with an interest in the project to make themselves known early in the process. Groups contacted initially by the County and the Museum included Los Descendientes, the Tohono O'odham Nation, the Pascua Yaqui Tribe, the Gila River Indian Community, the Ak-Chin Indian Community, the Salt River Pima Maricopa Indian Community, the Hopi Tribe, the Fort McDowell Yavapai Nation, the San Carlos Apache Tribe, the White Mountain Apache Tribe, the Pan Asian Community Alliance, the Tucson Chinese Historical Society, the Tucson Chinese Association, and the Buffalo Soldiers Museum in Houston, Texas. As the consultation process continued, other groups were identified and contacted, including the Arizona Department of Veterans' Services, the Diocese, the Church of Jesus Christ of Latter-Day Saints, the Pima County Interfaith Council, and the Jewish community.

Two approaches were taken in the initial contact: a mailing and a newspaper notice. The mailing was a copy of the overview study, along with a letter of explanation regarding the County's intentions. Prior to the mailing, the County contacted a number of the potential descendant groups by telephone or in person, to provide advance notice and a context for the impending arrival of the report and to answer any initial questions. This early contact and advance notification were crucial steps in the effort to have no surprises. Immediately after the potential descendant groups had received the overview report, the County ran legal notices for 30 consecutive days in the two Tucson daily newspapers (*Arizona Daily Star* and *Tucson Citizen*), announcing the County's intent to build a new courts complex atop the historic cemetery. Contact information was provided in the notices, and anyone with a concern or interest in the proposed project was asked to self-identify and invited to participate in the consultation process. As a matter of respect, the newspaper notice was purposefully published following receipt of the overview by potential descendant groups, to give these groups advance information before the public was informed.

Dissemination of the overview and the newspaper notice began a year-long period of intense consultations with descendant groups to negotiate and execute two burial agreements (see Appendix A) under state law. The two burial agreements were necessary as there were possibly two quite distinct burial populations within the project area: historic and prehistoric. Clearly, the historic cemetery would include individuals who died almost 100 years after the founding of the Tucson Presidio in 1775, the first permanent non–Native American occupation at Tucson. The historic cemetery was expected to include mainly

Hispanic and Euroamerican human remains, with a small number of Native American remains and remains of others. In contrast, there was a possibility that prehistoric human remains might be found that would date significantly prior to the arrival of non–Native Americans in southern Arizona. Because of this reality, two burial agreements were executed, one for post-1775 burials and the other for pre-1775 burials.

Given the propensity of modern developments to impact prehistoric burials, the Museum and the Native American tribes had already regularized burial-agreement language, and the tribes had a repatriation protocol in place, as agreed to among the tribes. No such regularized language or protocol was in place for historic burials. Consequently, the bulk of the consultations were directed toward successfully negotiating the post-1775 burial agreement. All consultations were coordinated by the Museum, and almost all the meetings took place at the Museum. Based on responses to the overview mailing and the newspaper notice, it was obvious that the descendant groups with an interest in the project were the Native American tribes and Los Descendientes. The first consultations were with the Native American tribes, starting with an informational presentation in September 2005 to the quarterly joint meeting of the Tohono O'odham, Gila River, Ak-Chin, and Salt River cultural committees. This presentation was followed by a formal tribal consultation at the Museum in October 2005. The initial Museum consultation with Los Descendientes occurred in early November 2005. The Arizona Department of Veterans' Affairs, a major participant in repatriation and reburial activities, became involved in the project shortly after archaeological excavations began.

At both Museum consultations, the descendant groups raised common as well as contradictory issues. Issues of common concern were the project location, the potential excavation of many burials, and why another site could not be found for the Joint Courts Complex. If the project must move forward, all groups also expressed concern that cultural affinity of excavated burials be established with as much certainty as possible, that the human remains be kept secure and in the project area, that all human remains and associated funerary objects be repatriated and reburied, and that the excavations not become a media "circus." One major difference of opinion was that Los Descendientes favored as much analysis as possible, including destructive tests, such as DNA, whereas the Native American tribes were completely opposed to any destructive analysis.

The Native American tribes expressed particular concerns about the location of the project area and the potential excavation of many burials, despite their understanding that most of the burials would not be Native American. These concerns were relayed to the County design-team managers and administrators with a direct stake in the Joint Courts Complex. For the next 3 months, the concerns were discussed and options assessed internally within the County bureaucracy, during which time the Museum-coordinated burial-agreement consultations with the descendant groups were put on hold. Finally, the County decided to proceed with the project. With this decision made, the County design-team managers and representatives of the County's cultural resources office met with the Native American tribes, Los Descendientes, and the Diocese at the Museum in April 2006, a meeting that, in diplomatic circles, would be characterized as frank and open. Los Descendientes preferred to have the burials respected through excavation and reburial in an established cemetery, which they noted would be a much better place than under the streets, buildings, and parking lots of downtown Tucson. The Native American tribes, on the other hand, made it clear that they preferred avoidance and that the excavation of any burials was a cause of distress. They expressed, strongly, their frustration that the project was moving forward. One of the tribes expressed a concern that tribal members may have been represented as Hispanic in the Diocese register of deaths because tribal members have many of the same surnames as do Hispanic individuals. They requested a copy of the Diocese register for the period that the cemetery was in use, to look for names and other information that might help identify tribal members. In May 2006, the Diocese authorized the release of these records, at which time the County mailed a copy to each tribe.

All descendant groups participating in the consultations agreed that demonstrable lineal descendants would have precedence over descendant groups regarding repatriation and reburial. The Tohono O'odham (having taken the lead for the four southern tribes, which also include the Ak-Chin, Gila River, and Salt River communities), the Pascua Yaqui, and Los Descendientes each provided information to identify individuals' cultural affinities for inclusion in the post-1775 burial agreement. In April 2006, the Museum distributed the draft burial agreement to all consulting parties and, late in the month, held a consultation meeting with the parties to review and discuss the draft. Following revisions to the draft, the final burial agreement was circulated for signatures in June 2006.

Essentially, the post-1775 burial agreement established the requirements to determine lineal descendants, the process for establishing cultural affinity, and the conditions regarding the treatment and disposition of burials. The determination of lineal descendancy required that a buried individual have clear identification through an engraved name on an associated funerary object. Lineal descendants were then required to trace descendancy by providing an unbroken chain of official records unambiguously linking them to the deceased. All burials for which lineal descendancy could not be established were to be documented to establish cultural affinity through tangible and observable criteria, a condition specified to ensure that all descendant groups could review the information and have knowledge of how each cultural-affinity decision was made. The conditions regarding treatment of the burials had differing specifications for Native American and Hispanic remains to

accommodate different cultural needs, usually with respect to documentation and analysis methods. Disposition was to be either repatriation, for reburial on a reservation or in an established cemetery of the descendant group's choice, or reburial at All Faiths Cemeteries in Tucson.

Consultation for the pre-1775 burial agreement was simpler, given that such agreements are routine in Arizona. In June 2006, a draft was mailed to the Native American tribes who had claims covering southern Arizona, and the document was made final the following month.

Burial agreements negotiated with descendant groups through the Museum are usually adequate documentation for the archaeological excavations of burials in Arizona. In this case, however, the Museum notified the County that, because excavations would be conducted in a historic cemetery, a state disinterment and reinterment permit might be required. County consultations with the Office of Vital Records in Phoenix determined that indeed this was the case. However, there was one problem. A disinterment and reinterment permit requires that lineal descendants agree in writing that excavation and reburial is permissible, but with no known named individuals in the cemetery and not even the knowledge regarding how many individuals might be buried under the modern urban landscape of the project area, obtaining the permission of descendants was impossible. Officials at the Office of Vital Records conferred with the state Attorney General's office and determined that a court order would be required before a permit could be issued. In early August 2006, the same month the detailed archival report was completed, the County's legal department filed an application for a court order. The presiding judge decided that the application must remain open as a public document available for review and comment, providing another opportunity for public input, before issuing the court order on the last day of that month (see Appendix A). Following receipt of the court order, the Office of Vital Records rapidly issued the permit (see Appendix A). Consequently, in September 2006, the County had fulfilled all its legal requirements in regard to human burials and could begin excavations of the historic cemetery.

Throughout the consultation process, the County maintained its intent to repatriate any named individuals to lineal descendants for reburial and to repatriate any individuals for whom cultural affinity could be established to the appropriate descendant group for reburial. The County also stated its intent to rebury any individuals for whom cultural affinity could not be ascertained. Any descendant group preferring to have individuals with identified cultural affinity reburied by the County could make that request, and it would be honored. In addition, several dozen individuals whose remains had been discovered within the project area over prior decades and curated at the Museum were also included in the County project for documentation, repatriation, and reburial. Some of the tribes made clear that their intent was to repatriate any individuals determined to have cultural affinity with their respective tribes for reburial on their respective reservation lands, to ensure that the burials are never again disturbed. At the April 2006 Museum consultation meeting, the descendant groups, the Diocese, the Museum, and the County discussed the potential for reburial at All Faiths Cemeteries in Tucson, a facility that accommodates burials for individuals of any faith. This, it was agreed, would be an appropriate location for the reburial of individuals not repatriated to lineal descendants or tribes, and the agreement to rebury at All Faiths Cemeteries was incorporated into the post-1775 burial agreement and the court order.

Close to the start of excavations, five additional steps were taken that related to the County's requirements regarding the excavation of human burials. First, the County published another 30-day newspaper notice in the two Tucson daily newspapers, notifying the public that excavations were imminent and providing a final opportunity for public comment before the excavations began. Second, the County and the city issued a memo to all their personnel in high-rise-office blocks near the project area that photography of the project area was prohibited during excavations. This was to satisfy a concern of the descendant groups that unauthorized photography of the project be prohibited. As an additional measure, both the County and the City agreed to turn off webcams on nearby buildings that routinely panned the project area, for the duration of the fieldwork. Third, the SRI Foundation, under the County's contract to Statistical Research for data recovery (see below), provided a full day of sensitivity training for all Statistical Research and County personnel involved in the project. The objective of the training was to ensure that personnel were respectful of the burials and understood the sensitive nature of the work they were about to start. Part of the training included a review of the stipulations in the burial agreements. Fourth, the descendant groups visited the project area and the on-site laboratory to see for themselves where activities would take place and what equipment would be used. Finally, the day before excavations began, Bishop Kicanas (of the Diocese) conducted a visitation and blessing of the project area and the burials within it. To our knowledge, this was the only such ceremony, even though during consultations the County had offered to make the project area available at any time for any visits or ceremonies by any of the descendant groups.

Archaeological Compliance Activities

As a political subdivision of the State of Arizona, the County is required to comply with Arizona antiquities and historic preservation statutes, and this was the case for the Joint Courts Complex Archaeological Project, a County-funded project on County land. Usually, on

County projects, consultations are conducted with the State Historic Preservation Office, but in the case of the Joint Courts Complex Archaeological Project, the archaeological compliance consultations also included concurrent consultations with all the descendant groups. As noted above, the overview study was the basis for the initial archaeological compliance consultation regarding the significance of the subsurface archaeological deposits and the standing structures.

Based on knowledge that the project area was the location of a historic cemetery, the County consulted with the State Historic Preservation Office concerning what course of action should be taken in regard to the conduct of data recovery. Given the urban environment (a project area covered with streets, parking lots, and commercial buildings), it was decided that standard archaeological testing that would potentially disturb burials was not a viable option. Non–ground-disturbing geophysical approaches, such as ground-penetrating radar, were considered as alternatives to testing through excavation. Geophysical approaches were quickly abandoned when it became clear that the nature of the project area—with a high likelihood of abandoned subsurface utilities, abandoned subsurface commercial features, and historical-period trash scattered throughout—would likely preclude any reasonable comprehension of the geophysical signatures without ground-truth testing. In consultation with the State Historic Preservation Office and the descendant groups, the County determined that the only reasonable course of action for the Joint Courts Complex Archaeological Project area was 100 percent excavation. The need for archaeological testing was eliminated, as there was no need to determine what sample of features would be excavated. The commitment to 100 percent excavation was explicitly to ensure that any and all human remains and funerary objects were recovered from the project area.

Prior to the start of fieldwork, the County had to complete two additional tasks related to archaeological compliance: conduct archaeological monitoring of geotechnical borings and select an archaeological contractor for data recovery services. The need for geotechnical borings early in construction planning and design presented a challenge. Ground disturbance was necessary before burial and archaeological consultations were completed. A series of borings, with approximately 6-inch-diameter holes, some of which were well over 100 feet deep, was needed across the entire project area, to assess the structural characteristics of the substrate. Tierra Right-of-Way Services, Ltd., Tucson, was contracted by the County to provide archaeological monitoring services. The geotechnical boring was conducted in May 2006, before the project-specific burial agreements were final. Given that the borings could potentially impact human burials, the Museum consulted with all descendant groups in February 2006, stating that the County would use its existing general burial agreement for limited projects, such as this boring. No objections were raised to this approach, allowing the geotechnical work to occur. Fortunately, no burials were impacted.

Within the County's procurement procedures, archaeological services fall under the rubric of architectural and engineering services, a categorization that dictates the procurement process. Archaeological data recovery services are procured through a solicitation for qualifications to which companies respond with a statement of qualifications. Project costs and budget are not considered, as qualifications are the only factors under review and are the only bases for the competitive selection of a contractor. Information required in the statement of qualifications for the Joint Courts Complex Archaeological Project included the company's and project team's qualifications and experience; the ability of the company to provide the required services; examples of similar, past, representative projects; and project scope of work, research issues, and schedule. For the Joint Courts Complex Archaeological Project, a knowledgeable panel of County employees and individuals not employed by the County reviewed all of the submitted statements of qualifications and individually scored the statements using a set of factors and scores that were provided as part of the solicitation. This review was the first part of the selection process. The two top-scoring companies were then invited to make separate, in-person presentations to the review panel. Before the presentations were made, each company was provided an identical set of questions to address in their presentations. Again, the review panel evaluated the companies based on a predetermined scoring system known to both companies and to the panel. Scoring each presentation was entirely independent of the scoring for the statement of qualifications. Immediately following the presentations, the Pima County Procurement Department (the procurement department) combined the two sets of scores for each company (statement of qualifications and presentation scores) and determined which company of the two scored better overall. The higher-scoring company was selected by the procurement department as the contractor of choice. Only after contractor selection were the budget cost structure, fees, and total cost negotiated between the County and contractor. Once the budget was negotiated, the complete contract was submitted for review and action by the County Board of Supervisors in a regularly scheduled, open, public meeting. Approval by the Board of Supervisors resulted in a signed contract between the County and Statistical Research. Once the notice to proceed was issued, in August 2006, Statistical Research began work on the data recovery project. The competitive process took 5 months.

Within a month of signing the data recovery contract, Statistical Research had a draft treatment plan under review by the County. In mid-October 2006, the final treatment plan was submitted for expedited review to the State Historic Preservation Office and to descendant groups listed in the burial agreement. Concurrence with the plan was provided on October 31. In addition, the

plan was concurrently reviewed by the Museum, and both a Museum permit to conduct excavations and a repository agreement for nonfunerary materials and records were issued by the end of October. Within 3 months of contract execution, Statistical Research, the County, the State Historic Preservation Office, the descendant groups, and the Museum completed all the final archaeological compliance steps, allowing excavations to begin in early November 2006.

Public Relations

Perhaps the most precarious and unpredictable aspect of any historic cemetery excavation project is public relations, and establishing good relationships with all stakeholders was one of the County's primary objectives for the project, from its inception in late 2004. As noted above, a key component of public relations was open and honest consultations with the descendant groups. Besides the descendant groups, other stakeholders included judges and courts personnel, who were expecting a new and modern courthouse; local politicians and bureaucrats, who wanted a controversy-free project; media personnel, who expected to have full and unfettered access to the project area and the archaeological excavations; and the general public, who had a wide range of expectations and issues. Building solid relationships based on trust with these varied groups was critical for a successful project.

For judges and courts personnel, the purpose for constructing the proposed Joint Courts Complex is to provide adequate and suitable space for City and County court functions. Over recent decades, the population has grown dramatically in the City and County, resulting in greatly increased demand on the courts system. Court functions are currently housed in different buildings throughout downtown Tucson, none of which adequately meet the current needs of the courts system. The courts, being independent of local-government administrative functions, formed a committee of judges and other court officials to coordinate with the County administration regarding the design and construction process. The committee of judges and court officials represented stakeholders who would be directly impacted by archaeological compliance requirements. Following publication of the overview study, it was clear that archaeological data recovery and the excavation of the historic cemetery were issues that would affect the budget and schedule for the proposed construction project. Consequently, in August 2005, County cultural resource managers and the Museum held an informational meeting with the committee, to explain the limited knowledge regarding the extent of the historic cemetery and the number of extant burials that might still remain within the project area. The sensitivity of excavating historic human burials was also explained, and it was made clear that once the excavation project began it had to be completed—that there could be no half measures when dealing with a project as sensitive as this one. Partial excavations of the cemetery only to then abandon the project could become a public-relations nightmare. By the end of the meeting, the committee understood the nature of current knowledge; the best estimates of what an excavation project might encounter; that, once started, the project must be completed; and that the impact to the construction funding and schedule could be substantial.

The public-relations focus with the politicians and upper-level administrative personnel was to build positive working relationships and to engender project support from the individuals who interacted directly with the public. These individuals had to be aware of the archaeological project challenges, in particular the sensitivity of excavating historic human burials, because these individuals are often the first to hear from the media and the public. They needed constantly updated information and firsthand knowledge of the project area, in the event that there was a serious public outcry regarding the excavations. Information was transmitted in two ways: personal interactions and internal informational memos. Invitations to visit the project area were sent to the Pima County Board of Supervisors, the City of Tucson Mayor and Council, their executive staffs, and administrators. A number of project area visits prior to the start of excavations afforded many local politicians and administrators the opportunity to gather information, to see the project area, to ask questions, and to gain a full understanding of the project. These interactions allowed them the opportunity to informally discuss the project and assess the potential political consequences and cultural sensitivity of excavating a historic cemetery.

Interactions with the media and the general public were much more muted than ever could have been anticipated. In fact, the first substantive media attention to the Joint Courts Complex Archaeological Project were newspaper articles published in September 2005 that were critical of the County's consideration to potentially demolish the modern, brick bank building—an issue that was defused when the County removed it from the project area. Surprisingly, the original 30-day newspaper notice of the County's intent to excavate human burials published in August 2005, as well as a general newspaper article in March 2006 on human remains discoveries in Tucson that noted the forthcoming archaeological excavations of historic human burials in the Joint Courts Complex Archaeological Project area, elicited no additional media or public response. In August 2006, the first detailed newspaper article regarding the historic cemetery and the planned excavations was published, again eliciting little response and a lack of immediate media follow-up.

During September and October 2006, the County made major steps to prepare for the worst-case scenario. Preparing for the worst involved planning with a local public-relations company, which had been retained by Statistical Research. A public information and outreach

plan was devised. A fact sheet and an informational brochure were published and made available for public distribution. Downtown businesses were contacted and were provided information on the forthcoming archaeological project. The fact that human remains were to be excavated was communicated unambiguously, and a point of contact for additional information was provided. Worst-case scenarios, such as contingencies for legal actions to stop the project, vandalism at the project site, and protests and public action with the resulting media response, were addressed, and preparations were made. A crisis communications plan was outlined, as was a plan of action for public and media engagement. Fortunately, none of the worst-case scenarios occurred, and none of the plans were activated, but the intent was to be ready for anything.

Media engagement included two major tactical moves in October and early November 2006, immediately prior to the start of archaeological excavations. First, the County held separate meetings with the editorial boards of the two daily Tucson newspapers, the *Arizona Daily Star* and the *Tucson Citizen*. County politicians, administrators, and cultural resources staff visited the newspaper offices and explained the upcoming excavation project. In each meeting, the need for the Joint Courts Complex was explained, as was the need to build on this site. The overview and archival studies were provided to the editorial boards; the results of our consultations with descendant groups, including the burial agreements, were outlined; and the fact that a court order and a state permit had been obtained was addressed. Copies of project documentation were provided, and it was made clear that County staff were available to answer any and all questions about the project. These two meetings, with their preemptive full disclosure, diffused any notion that the County had anything to hide and diffused what could have become an adversarial relationship with the print press. The editorial boards understood what the County intended to do, why the County was doing it, how the County intended to conduct the project, and when the project would occur. The result of these two meetings was that local print, radio, and television ran stories in late October about the upcoming project. The news stories were generally factual and conveyed a sense of understanding that the County efforts were as sensitive as possible, given the circumstances.

Three days before the start of excavations, the County invited the media to visit the project area and the field laboratory. All the major local newspapers and television stations were represented, as were a number of radio stations. Also invited were representatives of the descendant groups, Statistical Research, and local politicians and administrators. The visit was part informational and part explanation, regarding the rules of access during excavations. Information provided included the need for the Joint Courts Complex and what kind of facility was envisioned, a synopsis of project area history, a brief review of County consultations and activities, and a review of the equipment and facilities that would be used for the project. For example, explanations were provided regarding the use of the mechanical screen for overburden, the methods of backhoe excavation as a means of finding burial pits that would then be excavated by hand, and the use of the 3-D scanning equipment for field and laboratory documentation of human remains and funerary objects. In addition, it was explained that the burial agreements obligated the County to close the project area to the media and anyone else not directly involved with the project during excavations. The prohibition of photography other than for scientific documentation was made clear, as was the fact that, once excavations began, no press visits into the project area would be allowed. Each media representative was provided an information packet that included copies of the informational brochure, the fact sheet, the overview and archival reports, the court order, the state permit, a contact list for descendant groups, and the photography prohibition. The County's objective was, once again, full disclosure and a fully transparent process.

Conflict and Controversy Minimized

After 2 years of intensive preparations, archaeological excavations began on November 6, 2006, without any major controversy or conflict, even though some descendant groups did not agree that excavation was the best option, preferring instead that the project area and the burials therein be left untouched. Obviously, in a situation such as the Joint Courts Complex Archaeological Project, not all requests could be accommodated, but the process of frank and open consultation provided the opportunity for all descendant groups to participate fully in the process.

On November 3, 2006, the *Tucson Citizen* published an editorial entitled "Our Opinion: County Acting with Sensitivity at Ex-Cemetery" that echoed other media reports. The piece included the following language:

> Pima County officials have a delicate situation on their hands as they prepare to disinter up to 1,800 bodies from a downtown parcel so a courthouse complex can be built. But what could have easily turned into a wrenching emotional nightmare is likely to move ahead smoothly because the county has handled this issue with deep sensitivity and cultural understanding . . . . The courthouse that will be built is needed as soon as possible. But good for the county in ensuring that our ancestors' remains are not trampled in the name of progress [*Tucson Citizen* (*TC*) 3 November 2006].

Sometimes, conflict and controversy are inescapable, even on the best-planned projects. In the case of the Joint Courts

Complex Archaeological Project excavations, all the parties involved in the preexcavation planning and consultation worked diligently to overcome problems, by finding mutually agreeable solutions. Remarkably, the planning process, and the almost 2-year-long excavation season, passed without any major public or political tempest, even though the scale and final costs of the project did raise some eyebrows. Overall, we are convinced that the preparations, explanations, openness, transparency, inclusivity, sensitivity, and blunt honesty about the whats, whys, whens, and hows of this particular project allowed it to move forward without serious conflict or controversy. The County's recommendation to others planning excavation of a historic cemetery is that they place a major effort into prefield consultations.

Planning and Implementing the Joint Courts Complex Archaeological Project

As discussed previously, the first task of the Joint Courts Complex Archaeological Project for Statistical Research was the preparation of a treatment plan that would cover the excavations and all subsequent analyses (Beck et al. 2006). The treatment plan was submitted in mid-October 2006, and concurrence from the Arizona State Historic Preservation Office was received on October 31, 2006. The state's reference number for the project is SHPO-2005-1616, and all fieldwork was conducted under Arizona State Museum Permit No. 2006-149ps. The treatment of human remains discovered in the project area was governed by two separate burial agreements (A.R.S. §41-844, Case No. 06-14 [for historical-period remains], and A.R.S. §41-844, Case No. 06-28 [for prehistoric remains]), Pima County Superior Court Order Case C20064380, and a State of Arizona Disinterment and Reinterment Permit (see Appendix A). The archaeological site that corresponded to the Joint Courts Complex Archaeological Project area, including both the prehistoric and historical-period components, was designated AZ BB:13:682 (Arizona State Museum [ASM]).

In preparation for fieldwork, other tasks occurred while the treatment plan was being written and reviewed. An administrative manual was prepared that covered the policies and procedures governing the project. These included a description of roles for project personnel, daily and weekly protocols, security measures (an important consideration in view of the expected removal of human remains from the project area), and both emergency and nonemergency communications channels. Included in the manual were the Museum's policy on public viewing and photography of human remains, a memorandum from Pima County Administrator C. H. Huckleberry prohibiting any photography of the project area other than for project documentation purposes, and copies of the burial agreements. A health and safety plan for the project was prepared for inclusion in the manual, as was a section on the sensitivity issues surrounding the project.

At each step of the Joint Courts Complex Archaeological Project, Statistical Research sought to honor, in every way possible, the wishes of the County and the Museum that the project be conducted with respect for the human remains and their living descendants. The mandatory sensitivity-training workshop that was conducted prior to the start of fieldwork was attended by nearly 70 persons from the Statistical Research field and laboratory teams, County cultural resources and facilities management offices, the security company that would be present on-site whenever the crew was not actively working, and the janitorial service that was responsible for cleaning the on-site laboratory and office space. The workshop was recorded on DVD and was required viewing for all personnel who were new to the project. Issues covered during the sensitivity training included discussions of varying perspectives on death, identifying stakeholders in the project, and appropriate field behavior (including dressing for respect, photographic policies, and on-site office décor). Both on-site and off-site communications were addressed; these included word choices, joking, discussing the project with friends and family, and responding to visitors and the media. The project area was completely fenced and screened from passersby. During fieldwork, as a matter of privacy, as well as for protection of the in situ remains, shade tents were erected in the field to shield the human remains from view of those who might have been overlooking the project area from neighboring high-rise buildings and from exposure to the elements. Our commitment to sensitivity and respect for those interred in the cemetery ensured the highest level of care and consideration when exposing or removing human remains.

A field and laboratory manual was also prepared prior to the start of fieldwork. The manual underwent substantial revision as the excavations continued and provided every project employee a standardized reference source for information about Statistical Research's quality-assurance procedures, the provenience-designation system, project field procedures (discovery, excavation, all types of site recording [standardized forms, notes, drawings, photographs, and maps], treatment of human remains and artifacts, sample collection, prehistoric methods, and historical-period noncemetery methods), laboratory procedures (cleaning, labeling, and storage), and osteological methods (cleaning, analysis, photography, recording, and scanning).

Finally, on November 6, 2006, excavations in the Joint Courts Complex Archaeological Project area began. During the course of the project, the boundaries of the project area changed slightly, in response to County needs (Figure 31).

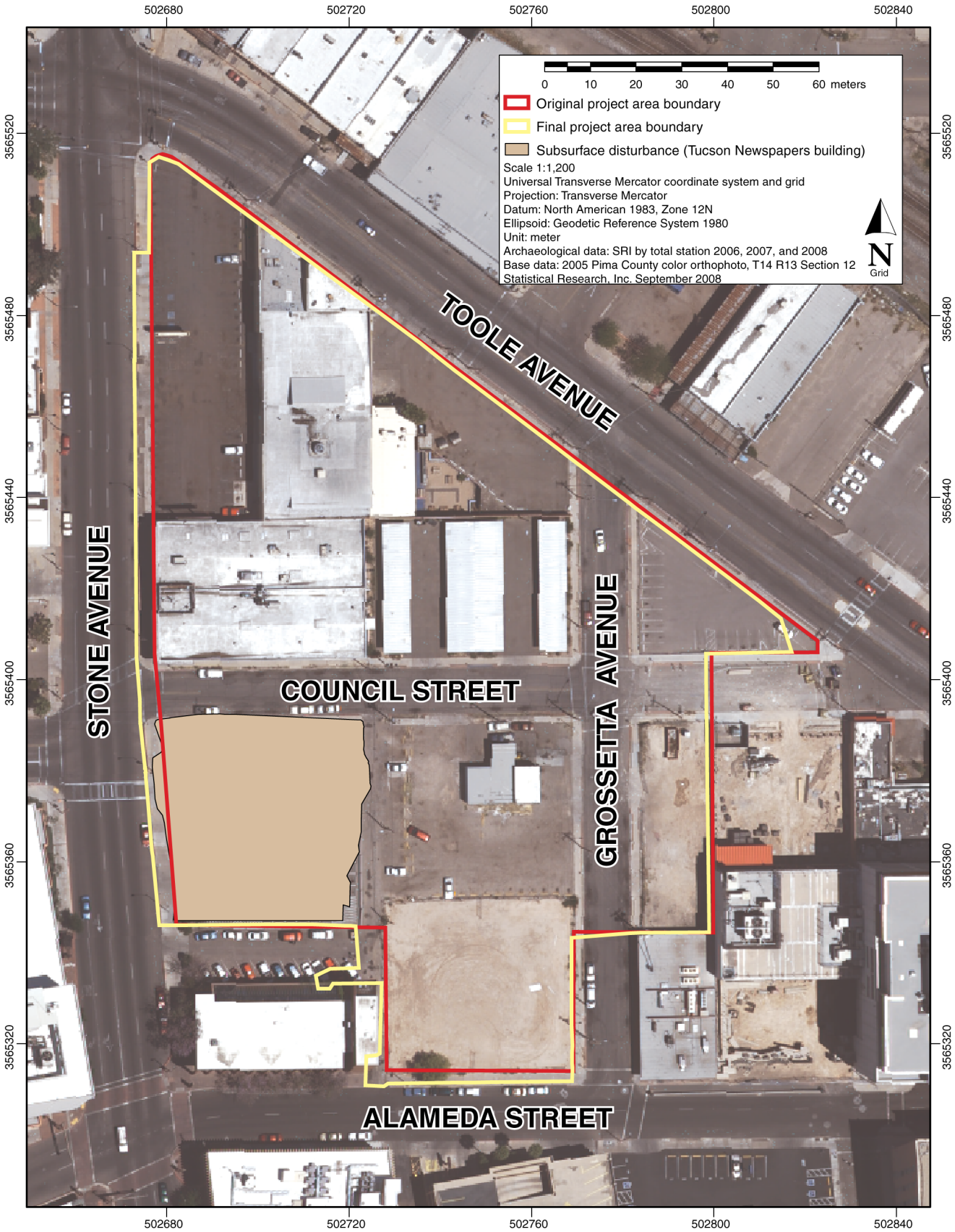


Figure 31. Map of the Joint Courts Complex Archaeological Project area showing the original project area boundaries, the final limit of archaeological excavation, and the limit of subsurface disturbance associated with the Tucson Newspapers building, 1940–1974.

By March 14, 2008, the entire 4.33-acre project area had been fully investigated, except for a narrow utility corridor occupied by buried electrical transmission lines. This corridor, which ran east-west across the center of the project area, was not accessible for archaeological investigation until August 14, 2008, when the transmission lines were disconnected and removed by their owner. Statistical Research was then able to remove the concrete ductwork that held the lines and to excavate the area below, definitively completing fieldwork for the project.

On September 12, 2008, Statistical Research completed all excavations for the Joint Courts Complex Archaeological Project. During the course of the field investigations, we recorded the presence of 1,083 graves, recovered and identified the remains of at least 1,338 individuals, and investigated 3 prehistoric features and 736 postcemetery historical-period features (Figure 32 shows the distribution of graves and other archaeological features). Subsequently, the remains of another 48 individuals that had been previously removed from the project area were analyzed, for a total of 1,386 individuals recorded for the cemetery.

During most of the fieldwork phase, the on-site field and laboratory staff averaged 70 persons, and as the project continued, staff was replaced as necessary. The on-site staff also received substantial support from others in the company, and the preparation of this report involved even greater numbers of laboratory, administrative, and publications personnel. It is estimated that nearly 180 Statistical Research employees have been involved in this project from its inception. In addition, at least 15 subconsultants were employed in various aspects of the project, from demolition of standing structures and mechanical excavation to osteological, pollen, and macrobotanical analyses.

Of tantamount concern during the course of the project has been the safety of the data collected during the project. Because of the massive size of the project and the voluminous amount of data that was retrieved, it was necessary from project inception to electronically record as much of those data as possible. Certainly, standardized, paper field forms and field notes were used on a daily basis to record the excavations; however, much of that information was later entered into the project database (see Chapter 2, Volume 2 of this series), and nearly all of the analysis results were directly entered into the database. Mapping was done electronically and was linked to the aspatial data in the database. Because of the need to protect all of these data, we have used a combination of methods to ensure their safety. The data are stored on project servers, located first on-site and now in Statistical Research's Tucson office. They are backed up nightly and are also stored remotely. All of the paper records from the project—including field forms, notes, hand-drawn maps, and drawings—were scanned into the computer and also copied. One complete set of paper forms was kept on-site, and another was maintained in our Tucson office. The scanned images were backed up, along with the rest of the electronic data. We have been fortunate that nothing has occurred to damage or destroy our records of the project, but if it had, the data would have been protected.

Information on the raw data collected during fieldwork and analysis and where it can be found in the report volumes is provided in Chapter 2, Volume 2 of this series. All of these data (and associated paper and digital records) are curated at Arizona State Museum, where they can be accessed. As discussed elsewhere in the report, human remains and mortuary artifacts not repatriated to project stakeholders were reburied at All Faiths Cemetery in Tucson. The nonmortuary artifacts recovered dated to both the prehistoric and postcemetery periods. All of the prehistoric artifacts are curated at Arizona State Museum. The entire collection of postcemetery artifacts was not curated. Culling of artifacts from certain material classes was done with approval of our client, Pima County, prior to the remaining materials being curated at Arizona State Museum. The Arizona State Historic Preservation Office was also aware of this decision. Federal curation regulations did not apply to this project, although with the exception of the culling of certain historical-period materials, all SRI's work on the project met or exceeded federal standards. A more-detailed discussion of which materials were curated and which were not and a summary of the decision-making process followed are included in the paperwork submitted with the materials to Arizona State Museum. The careful evaluation and treatment of the artifacts and associated data was essential, as the data from this project are truly extraordinary and provide many rich opportunities for comparative research and further analysis.

When an archaeological data recovery project is as large as this one and the subject of the investigations is a cemetery, consistent and reliable communication is vital to the project's success. Throughout the fieldwork phase of the project, Statistical Research submitted daily reports of findings to the County, the Museum, and the descendant groups, thereby ensuring that the mounting numbers of recovered burials would not come as a surprise to any of the stakeholders. During fieldwork, we also submitted two types of monthly reports summarizing the results of the previous month's work. One type was a progress report, submitted as a contractual requirement to the County, that provided a summary of the previous month's work and also a description of any project concerns that needed to be resolved. The second type of monthly report was a narrative of the previous month's work written in a format appropriate for a lay audience. Reports of the latter type, along with copies of the background reports, the burial agreements, maps, and photographs that complied with the burial agreements, were posted on a project Web site maintained by the County, which is still active and may be found at www.pima.gov/JointCourts. Subsequent postings included the end-of-fieldwork report (Hall et al. 2008) and

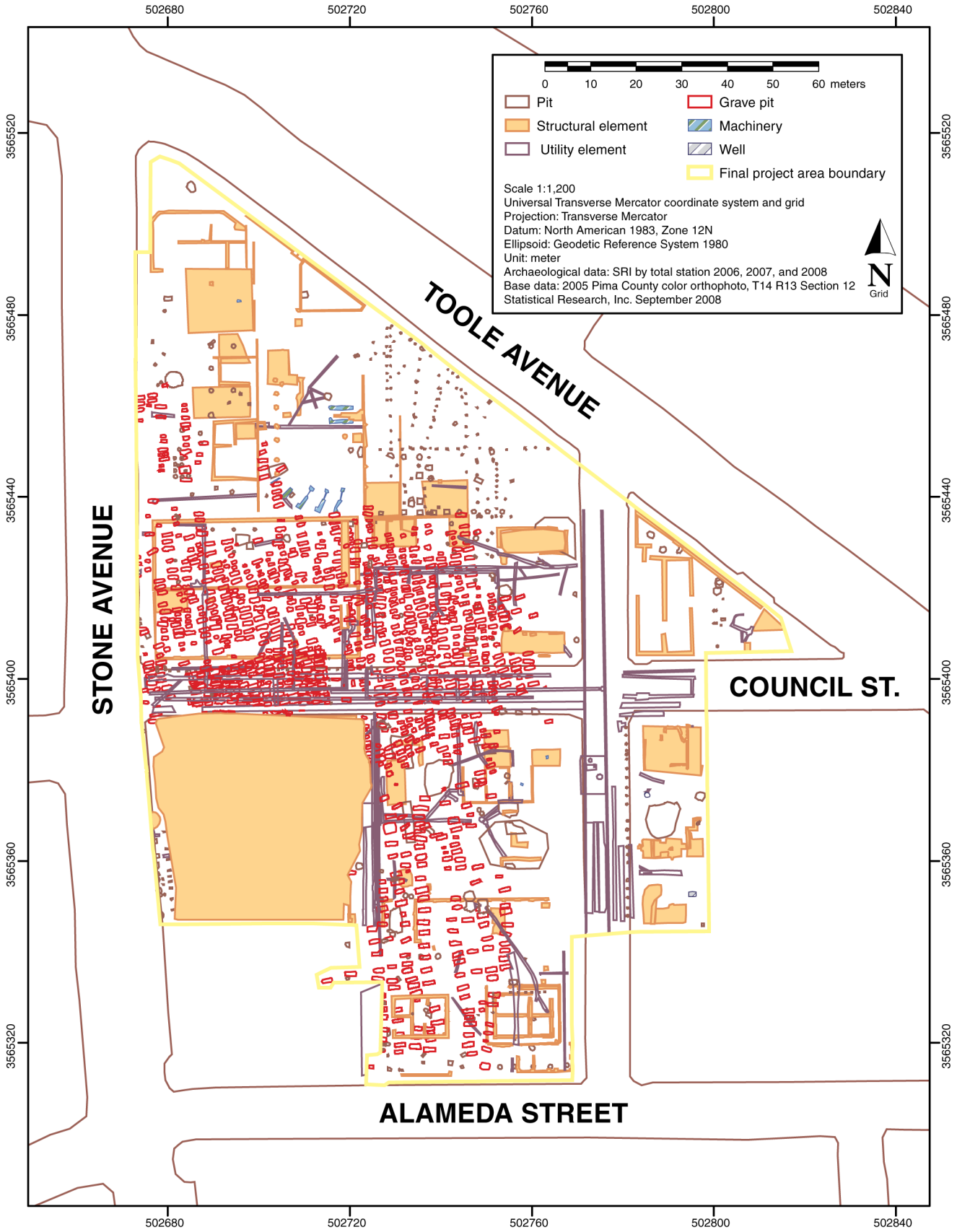


Figure 32. Distribution of graves and other archaeological features in the Joint Courts Complex Archaeological Project area.

two cultural-affinity statements, one for the civilian portion of the cemetery (Hefner et al. 2008) and one for the military section of the cemetery (Heilen et al. 2008).

Cultural Affinity and Military Identification Assessments

The cemetery investigations were unique in the approach to cultural affinity and military identification assessments. These efforts were designed to be as comprehensive, open, and transparent as possible. To that end, not only remains discovered during the current investigations but remains from two previous projects in the former cemetery were analyzed, assessed for cultural affinity, and, ultimately, repatriated and reburied. Remains from previous projects consisted of a burial recovered by Tierra Right of Way—found during trenching for an underground cable—in the project area in 2001 and the remains of 47 individuals recovered during excavation of the Tucson Newspapers basement in 1953 and subsequently curated at the Arizona State Museum.

Because of the multiethnic nature of the site and the large number of descendant groups, a novel approach was developed for making cultural affinity assessments, based on a thorough and careful comparison of contextual, osteological, and historical data. Each line of evidence was treated equally, with no form of evidence taking precedence over another. This was necessary, because biology is not equivalent to culture; many investigations in the past have used biological affinity as a proxy for cultural affinity or have arrived at fairly arbitrary means of determining cultural affinity. Descendant groups were involved in cultural affinity determinations at every step, providing information on burial practices and archaeological expectations in the burial agreements and consulting on affinity determinations. Cultural affinity assessments, described in more detail in Chapter 6 of this volume, were consistent with historical expectations, revealing a majority of Hispanic individuals and smaller numbers of non-Hispanic Euroamericans, Native Americans (including Yaqui and Apache individuals), and one African American. Many juveniles were assessed as indeterminate because of the inability to assess biological affinity in immature juvenile remains and ambiguous contextual and historical evidence. It is likely that the many juveniles were Hispanic individuals, but juveniles of Native American, Euroamerican, and possibly African American affinity were also present.

The identities of many individuals inferred to have been buried in the civilian section were recorded in the Tucson Diocese burial record (dating from 1863–1887), a copy of which was provided to Statistical Research by Los Descendientes del Presidio de Tucson. This record provided a great deal of useful information on who was buried in the civilian section, but did not provide any information on where individuals were located within the cemetery. As a result, we were unable to link any set of remains in the civilian section with a historically known individual. By contrast, the identity and burial location of many individuals in the military section was preserved in available military records from the National Archives and Records Administration in Washington, D.C. This information allowed for a separate military identity assessment to be prepared. This assessment was aided by military burial lists, correspondence, and an 1881 map of the military section that closely matched the results of excavations in the military section.

To assess identity in the military section, archaeologically discovered grave pits were correlated with historically mapped graves, and comparisons were made between historical information on identities (including age, sex, stature, rank, regiment, place of birth, occupation, medical treatments, and cause of death) and related contextual and osteological information derived from correlated grave pits. The identification assessment could not identify the specific remains of any individual in the military section to meet legal standards, however, because sufficient biological information was lacking. Most graves had been exhumed in 1884, when they were moved to Fort Lowell, and only limited osteological and artifactual materials remained. Nonetheless, the assessment confirmed the identification of the military section of the cemetery and succeeded in demonstrating a close correspondence between available military records and what was found archaeologically in the military section.

These cultural-affinity reports were a requirement of the contract and the burial agreements. For purposes of repatriation and reburial, therefore, it was necessary to ascribe cultural affinity, to the extent possible, to the recovered remains (see Chapter 6). In those cases for which a determination could not be made—fragmentary remains or those of young children—the remains were ascribed to the culturally indeterminate category. Many hours of careful thought and discussion went into the cultural-affinity statements, because it was upon these reports that decisions concerning repatriation and reburial were made.

The Joint Courts Complex Archaeological Project Research Goals

Prior to the start of fieldwork for the Joint Courts Complex Archaeological Project, a treatment plan (Beck et al. 2006)

was prepared that included a series of research goals and their related questions. The research goals were defined for the cemetery investigations, the known postcemetery component, and what was considered to be a highly likely prehistoric component and a possible precemetery historical-period component.

Prehistory and Protohistory Research Goals

From nearby excavations in downtown Tucson, we knew that the general area of the cemetery had been the focus of human settlement and activities for thousands of years. Archaic period features have been found in excavations in the Río Nuevo project area, and substantial settlements from the same period are known to cluster along the Santa Cruz River (Center for Desert Archaeology 2001; Gregory 1999; Mabry 1998). Early Formative period farming settlements occupied by pottery-making groups were located in many locales along the Santa Cruz River and elsewhere in the Tucson Basin (Ciolek-Torrello 1998; Huckell et al. 1987; Wallace 2003).

Archaeologists know little about the Pioneer period in the Tucson Basin, as few sites dating to this period have been excavated. Pit structures possibly dating to the Pioneer period were excavated during Statistical Research's investigations at historic Block 180 (Ciolek-Torrello and Swanson 1997). By the Colonial period, large settlements, some with ball courts, flourished in the Avra Valley and the Tucson Basin (Craig 1988; Czaplicki and Ravesloot 1989; Kelly et al. 1978). Settlement expansion into all environmental zones of the Tucson Basin took place during the Rincon phase (Elson 1986), but the Santa Cruz River continued to draw farmers who built large settlements near the floodplain (Doelle 1985; Huntington 1986; Whittlesey and Harry 2004).

The Classic period was a time of unprecedented change in settlement, subsistence, and material culture in the Tucson Basin, as it was elsewhere in the Sonoran Desert (Whittlesey et al. 1994). Though scholars dispute the root causes of these sweeping changes, all agree that the period following the abandonment of prehistoric settlements, usually called the protohistoric period, was a time of uncertainty that remains poorly understood (Ravesloot and Whittlesey 1987).

Following the protohistoric period, during the Spanish Colonial and Mexican periods, Native American lifeways were transformed in unprecedented ways by the arrival of the Spanish. This led to increased conflict among indigenous peoples and between Spanish and Native American groups. Disease, forced conversion to Catholicism, and *reducción* were balanced by the introduction of new crops and domesticated animals. Tucson was a multiethnic community by the late 1700s, consisting of pacified Apache people (*apaches mansos*), Sobaípuri, Tohono O'odham, *gente de razón*, and the Spanish military, all of whom were attacked by raiding Apache groups. Ethnic diversity and social unrest continued through the Mexican period, when land grants took over lands formerly farmed by O'odham families.

Given the nature of previously recorded prehistoric features near the project area and the continuing gaps in our understanding of Tucson Basin prehistory and protohistory, we knew that precemetery Native American features found in the Joint Courts Complex Archaeological Project area had the potential to contribute much to the archaeological study of the wider region. Interestingly, though, the focus of our research questions, based on previous research, was on the transitions surrounding the Pioneer period and on elucidating the generally ephemeral evidence for the Sobaípuri in the Tucson area. We did not anticipate finding evidence of the Middle Archaic and Late Archaic periods.

Precemetery Historical-Period Research Goals (ca. 1776–ca. 1862)

The digging of graves in the cemetery, and the subsequent development of the area for residential and commercial purposes, undoubtedly had a major impact on any cultural features that existed in the project area prior to the 1860s, but at the outset of this project, we believed that it was still possible that features from the Spanish Colonial and Mexican periods may have survived. We doubted that we would find Spanish-related features predating the Tucson presidio (1775), but the project area lay just east of the eastern presidio wall, and we thought that it could have been used by the Spanish military or other presidio dwellers. The same was true for the Mexican period (1821–1854), which saw continued military and civilian occupation of the presidio. The Mexican period was also a time of expansion of civilian residential construction into areas immediately around the presidio, but the extent and timing of this construction were still unclear. The U.S. Army replaced the Mexican Army at the presidio in 1856, but the first known map of Tucson, commonly called the Fergusson map, dates to 1862. This map shows buildings and streets south and west of the presidio but nothing in the vicinity of the project area.

After the Fergusson map, the next-earliest map of Tucson is the 1871 General Land Office map of Township 14 South, Range 13 East, by S. W. Foreman. The Foreman map includes a detailed depiction of Tucson, including streets and buildings, echoing much of what appears on the Fergusson map but showing additional buildings to the east and north of the former presidio. The Foreman map does not show the cemetery at

Stone Avenue and Alameda Street. To determine where the cemetery may have appeared on the Foreman map relative to the depicted buildings, we digitally overlaid the location of the cemetery parcel shown on the 1872 map of Tucson (see O'Mack 2005:Figure 5) onto the Foreman map, using the section corners included on each map. In the overlay, portions of two buildings shown on the 1871 Foreman map fell in the southwest quarter of the 1872 cemetery parcel and therefore within the Joint Courts Complex Archaeological Project area. Foreman's depiction of building locations may not have been reliable, and even if the depiction is accurate, any trace of such buildings in the project area might have long since disappeared. But we were intrigued by the suggestion that there were once precemetery architectural features (presumably adobe houses) within or very close to the cemetery.

Cemetery Period Research Goals

For the cemetery investigations, we proposed to follow a bioarchaeological approach to research based on the methods and models of two subdisciplines of archaeology: human osteology and mortuary analysis. Bioarchaeology includes the study of the biological history of individuals and populations as preserved in their physical remains as well as mortuary analysis, or the study of social, ideological, and cultural identity as revealed in the treatment of the dead. We suggested that the bioarchaeological study of human remains from the cemetery potentially involved at least seven lines of inquiry: mortuary analysis, paleodemography, pathology, dental anthropology, epigenetic-trait analysis, paleonutrition, and behavioral analysis.

The most basic question regarding any cemetery is demographic: who was buried there? A primary goal of our investigations was to reconstruct the composition of the cemetery sample: the age, sex, and cultural affinity of each recovered individual. Documentary sources provided some idea of who might have been buried in the cemetery based on Tucson's demography of the period; our investigations were designed to help us judge the accuracy of that picture or how much it had been altered by the differential removal of burials. Establishing the cultural affinities of individual burials was important for two reasons. First, the multiethnic character of Tucson in the second half of the nineteenth century figured prominently in every aspect of the town's early development. Knowing how the cemetery was used (or not used) by Hispanic, Euroamerican, Native American, and other ethnic groups could reveal much about the nature of relationships among these groups. Second, and as discussed previously, the disposition of the human remains removed from the cemetery would be determined in large part by our ability to establish cultural affinity. Measures of biological distance were suggested as means for addressing questions regarding patterns of marriage among the different ethnic groups living in Tucson.

Analysis of the pathological conditions represented in a burial sample can yield valuable information regarding general health, interpersonal violence, and cultural practices (Ortner 2003; Rogers and Waldron 1995). From documentary sources, we had some information about health problems in Tucson during the period the cemetery was in use. We hoped that the information on skeletal pathologies gathered during data recovery would be an important complement to these sources, providing a tangible means for evaluating the accuracy of reports of infectious diseases and other problems. Smallpox is a notable example: the 1870 U.S. Federal Census Mortality Schedule for Tucson recorded a brief but devastating smallpox outbreak, and we expected to find lesions consistent with smallpox if we encountered burials that could be dated to the same period.

Dental-anthropological analysis can provide valuable information regarding nutrition, idiosyncratic behavior, and cultural practices (Capasso et al. 1999; Hillson 1998; Ortner 2003; Scott and Turner 1997). Furthermore, patterns in the frequency of specific morphological traits can provide clues about population dynamics, such as familial relationships, by comparing trends within and between populations. The potential value of epigenetic- (nonmetric-) trait analysis is well established (Case and Heilman 2005; Hauser and De Stefano 1989), and we proposed to record data on a range of epigenetic traits whenever possible. Although the degree of heritability and significance of such traits is not fully understood, certain traits, such as cleft neural arches, are stable and may exhibit meaningful patterns (Barnes 1994).

Paleonutritional studies are generally syntheses of information from paleodemographic, pathological, and dental-anthropological analyses. Reconstructing the nutritional practices of the individuals buried in the cemetery was proposed as a valuable complement to the study of social organization and cultural practices in the community of the time. Skeletal indicators of behavior include not only specific pathological conditions but also changes in bone geometry, nonpathological bony responses to physical activity, and attrition resulting from specific behaviors (Capasso et al. 1999). Most behavioral indicators are nonspecific and provide no neat link between a bony response and a single activity, but at the level of a population, the frequencies of specific indicators can reveal population-wide behavioral trends, such as those that occur based on a change in technology. Behavioral indicators can further suggest a range of environments responsible for a pattern. Examination of patterns of asymmetry and biomechanical stress may be useful in evaluating the labor-load and physical-activity patterns in a community. For example, documentary sources have suggested a division of labor in nineteenth-century Tucson related partly to cultural affinity: Euroamerican people were, for a time, the dominant group in the business sector, whereas much of the physical

labor of farming and ranching was done by Hispanic and other non-Euroamerican people. It was hoped that skeletal analysis with an attention to behavioral correlates might show that physical workloads differed for individuals of differing ancestry.

To understand more fully how the cemetery was used and by whom, we relied heavily on mortuary analysis—the study of the treatment of individual burials—and what it could tell us about the social and cultural identities of the deceased. We knew that it was probable that most people buried in the cemetery were Hispanic and Catholic, but even among Catholic Hispanic burials, treatment of the dead varied considerably, according to social status, place of origin, personal or family preferences, and the circumstances of death. The same variables were known to apply for other religious and cultural traditions, such as Protestant and Jewish burials or burials made following Native American, Chinese, or African American traditions. Our mortuary analysis was designed to examine the nuances of burial treatment, including the orientation and positioning of the body, the kind of container or wrapping used, the way the body was dressed or ornamented, and the accompanying goods.

While the cemetery was in use, Tucson underwent changes in the availability of commercially produced goods, as southern Arizona was drawn into the mainstream U.S. economy. The railroad did not reach Tucson until 1880, 5 years after the closing of the nonmilitary portion of the cemetery, which meant that burials preserved in the cemetery were not likely to reflect the gross changes in material culture wrought by the railroad. Nevertheless, we suggested in the treatment plan that certain goods probably did become more common in Tucson in the latter years of the cemetery's period of use, by virtue of their increased availability in adjacent regions, such as New Mexico and California, and that this process might be reflected in changes in burial treatment through time in the cemetery. We anticipated that most of the recovered burials would have only wooden coffins and no evidence for the use of embalming fluids. The presence of either a manufactured casket or embalming fluid in a burial would have almost certainly indicated that the deceased was unusually affluent; it would probably also serve as a useful chronological marker. We also expected that personal ornaments and other goods placed with burials would reflect changes in commercial availability through time.

Archaeologically, a basic research task relating to the period the cemetery was in use was to determine the precise boundaries of both the military cemetery and the larger, civilian cemetery. We believed that locating traces of the military cemetery wall would be a valuable aid in interpreting the ages and associations of any burials we found in the southern portion of the Joint Courts Complex Archaeological Project area. An 1870 article found as part of our prefield archival research (Beck et al. 2006:9) suggested that the foundation for the cemetery wall was made of stone and that the wall itself was of adobe, 6 feet high. We believed it was possible that significant portions of the stone foundation still survived.

In addition to remnants of the cemetery walls, we also suggested in the research design that excavations in the project area might reveal features that once marked the boundaries of subdivisions within the cemetery, raising the issue of the cemetery's internal organization. Maps of Tucson created after the opening of the Court Street Cemetery in 1875 show that this successor to the Alameda-Stone cemetery had specific portions reserved for Catholic and Protestant individuals and members of several fraternal organizations. We also found contemporary newspaper references to fences and other boundary markers that were being erected around discrete portions of the Court Street Cemetery, including a Jewish section. No documentary evidence was found for similar subdivisions in the Alameda-Stone cemetery, but given the obvious importance of subdivisions at the Court Street Cemetery, we expected to find similar subdivisions during investigations of the Alameda-Stone cemetery.

Grave markers and their distribution were also considered to be valuable evidence for the internal organization of the cemetery. Judging by repeated newspaper references to the abuse of grave markers in the cemetery after it was officially closed, we anticipated finding at least some grave markers.

Finally, an important, overarching research issue for the period the cemetery was in use is the extent to which the cemetery reflected the dynamic and changing relationship known to have existed between the Hispanic and Euroamerican communities in Tucson in the latter half of the nineteenth century. Sheridan (1986) has characterized the 1860s and 1870s—or essentially the same years that the cemetery was in use—as a period when an important and far-reaching transformation in relations between Hispanic and non-Hispanic people took place in Tucson. We structured the research design to examine how these historically documented changes in relations during the period the cemetery was in use played out in the organization, expansion, and abandonment of the cemetery.

Postcemetery Period Research Goals (1882–1965)

The civilian portion of the cemetery was officially closed by the city in 1875; the military portion remained in use until 1881. The land on which the cemetery was located then sat neglected and apparently unused until 1889, when the City of Tucson subdivided and sold the property; the first architecture appeared in the project area the following year. The evolution in function, from residential neighborhood to commercial district, had implications both for the preservation of archaeological features from the

postcemetery period and for the research issues we proposed to address in data recovery.

We assumed that we would find remnants of house foundations, along with remnants of the foundations of associated minor buildings (e.g., sheds, garages, and washhouses), only some of which appear on the Sanborn fire insurance maps. We also expected to find below-grade features associated with individual residences, such as privy pits, trash pits, and perhaps wells. Water lines were in place in the project area by the time the earliest Sanborn map of the area was created (1901), but wells may have been dug by residents in the years immediately after the cemetery was subdivided. We also hoped to find primary trash features associated with individual residences, including lenticular and sheet middens.

The number of residential features we would encounter was dependent in large part on the degree of disturbance caused by later commercial construction. In portions of the project area, the disturbance was assumed to be complete; the Tucson Newspapers building that stood at the southeast corner of Stone Avenue and Council Street had a full basement, the excavation of which undoubtedly destroyed any evidence of the houses and earlier businesses that once stood there, along with the corresponding portion of the cemetery. At the start of the fieldwork, though, no other basement was known to have existed in the project area, which meant that subsurface disturbances would be limited largely to the trenches dug for commercial wall foundations and utilities. We did not know the extent of excavation for those trenches. The slab floors of commercial buildings, including the buildings still standing at the start of the project, were assumed to have had a limited impact on subsurface residential features.

We expected that the features associated with early commercial buildings would be of interest, in themselves, for the information they could contribute about the history of the project area. Again, we anticipated that remnants of early commercial features would survive in any portion of the project area undisturbed by basement excavations. Of particular interest were the site of the City Laundry on historic Block 253 and the site of the Baum and Adamson Tire and Automotive Company on historic Block 252. At both locations, a single business had been in place for several decades. Full exposure of those areas in excavation was an opportunity to trace the growth and transformation of each business through time, as registered in architectural and other changes to the site.

As a result of its original use as a cemetery, the Joint Courts Complex project area differed from the adjacent parts of downtown Tucson in the relatively late date that it was first developed. An early consequence of this difference was the character of the residential community that first took shape in the project area. Unlike most other parts of downtown, the project area began as a largely Euroamerican neighborhood, with few remnant of the earlier mix of Hispanic and non-Hispanic architecture and culture that characterized most of Tucson. It also was almost exclusively middle class. It had a few fairly impressive, single-family residences on its Stone Avenue side, but nothing as impressive as the private mansions built a few blocks to the west. It also had nothing as humble as the small adobe houses occupied by many Hispanic residents of Tucson at the time. In this sense, the project area was an early, small-scale version of a primarily non-Hispanic Euroamerican, middle-class suburb, tucked into a once-neglected space between the railroad and downtown. At the same time, the interaction of this community's inhabitants with Tucsonans of other ethnicities and socioeconomic statuses was inevitable and constant. Of particular interest from an archaeological standpoint was the degree to which we would be able to reconstruct the lives of not only the most-visible Euroamerican part of the community but the non-Euroamerican people who also lived and worked in the area. We also hoped to find ethnic distinctions within the superficially homogeneous Euroamerican community; the census records show that many of the early English-speaking residents had diverse national origins. One family that settled early in the project area and stayed for many years was Anglo-Mexican, the family of John and Dolores (Ybarra) Brown, at 270 N. Stone Avenue.

Revisions to the Original Research Design

As is the case with well-designed research projects, the results are often expected but sometimes surprising. Research questions posed at the inception of a project are either validated by the collected evidence or they are found to have been irrelevant. Refinements in the research focus are common as more and more information is collected, and new research questions are posed as a result of the increased base of knowledge. The Joint Courts Complex Archaeological Project has been no exception. During the course of the field investigations and subsequent analyses, we discovered that many of our original research goals and related questions could be answered with the available data. Several new questions were formulated for each component of the project, other original questions were revised to look at the data in somewhat different ways, and not surprisingly, several of our research goals were found to have been totally unsupported by the information that was collected.

The greatest diversion from the original research goals of the project was found in the prehistoric component of the project area. As previously mentioned, the prehistoric research goals were to evaluate Pioneer period settlements and later interactions between protohistoric groups. The questions framed for prehistoric groups paid particular attention to the domestic organization of Pioneer period settlements in relation to preceding Early Formative and

subsequent Colonial period settlements. Questions regarding the protohistoric groups focused on the effects of European contact and the transformation and assimilation of these cultures through time. Over the course of the field investigations, it became apparent that few prehistoric and no protohistoric features remained intact. Only three prehistoric features were identified within the project area, none of them dating to the Pioneer or protohistoric periods. These included two pit structures dating to the Late Archaic period and one roasting pit that surprisingly dated to the Middle Archaic period. In light of the paucity of Pioneer period or protohistoric remains, the former research questions became moot for this project, simply for lack of data. New research questions were developed for the prehistory of the project area, in order to address Middle and Late Archaic lifeways from the unique perspective of people living in a nonriverine context—away from the Santa Cruz River—as well as the changing use of the project area throughout prehistory (see Chapter 3, this volume).

Another diversion from the original research design occurred in the lack of supporting data for the precemetery historical-period research question concerning the presence in the project area of adobe houses that predated the cemetery. They were not found, although a well located on the extreme southeastern periphery of the project area—which was not fully excavated because of its placement adjacent to a standing building—may have predated the cemetery. Other pit-like features were found that may also have predated the cemetery, but there was no evidence of the land having been used for settlement in the historical period prior to establishment of the cemetery.

Finally, we were disappointed in our search for the cemetery walls. We found no stone foundations for the walls, and the few remnant patches of adobe melt that initially seemed to be viable candidates for wall alignments could not be conclusively identified as such.

For each section of this report, the authors have addressed the research questions that were ultimately of most value in illuminating the use of the project area through time. However, we have also identified some overarching approaches to organizing our understanding of the prehistory and history of the project area. We discovered that much of the data collected as a result of this project could be examined through one of two lenses: landscape archaeology and identity studies.

Landscape archaeology, as currently practiced, offers a broad umbrella for a variety of different approaches to the study of the culture-versus-nature dialectic. A natural landscape is the land without people, whereas a cultural landscape involves the land with the people who use it in ways that transcend its physical characteristics, embracing "those ineffable qualities of cognition, sentiment, and meaning that link people with the earth" (Whittlesey and Ciolek-Torrello 1998:3). Landscape archaeology provides a way of "unifying disparate elements of a wide-ranging research strategy into a coherent interpretation of past lives and lands" (Whittlesey and Ciolek-Torrello 1998:3). With over 4,000 years of documented human use of the Joint Courts Complex project area, we wanted to explore the reasons—be they geographic, environmental, or cultural—this particular location has continued to attract human interest. We are intrigued by the various forms taken by this human interest in the project area. We found evidence of resource utilization, agriculture, habitation, mortuary use, commercial enterprise, and (with the impending construction of the Joint Courts Complex) governmental use, all occurring in the same 4 acres of land. Notably absent, on the other hand, was industrial development of the property. Why? What factors led to the project area's varied uses through time? In our syntheses of the data collected during the Joint Courts Complex Archaeological Project, we hope to answer some of these questions, by relating the various uses of the project area to the relationships that can be observed for each period between the people and the land.

In our analyses of the cemetery and postcemetery periods, particularly, we also found ourselves increasingly attracted to the idea of presenting our conclusions within the framework of modern identity studies. In short, the study of identity, social and cultural, is directed toward several questions: How do people view their own identities? How do they frame their identities in reference to the identities of others? How does one group of people identify another group of people when the latter group is removed from the former by time, space, and/or background? As we immersed ourselves in these questions as they related to the evidence available from the project area, we found that these are not restricted to abstract concepts for examining past human behavior. We discovered that the relationships among the County, Statistical Research, the various descendant groups, the scholarly audience who will be using data generated from this project, and the general public—whether interested in the project or not—are largely framed by reference to identity, as are the relationships of all of these groups to the land and to the physical remains of past human behavior that were found in the project area.

CHAPTER 3

Prehistoric and Protohistoric Archaeology in the Joint Courts Complex Archaeological Project Area

John D. Hall, Richard Ciolek-Torrello, Stacey Lengyel, and Amanda Cannon

Introduction

One of the more fascinating aspects of prehistoric life in the U.S. Southwest is variation in settlement and land use. Subsistence strategies that were productive at one time or place may not have been so in others. The introduction of domestic plants such as *Zea mays* added economic complexity but also provided a stable resource whose use fostered technological innovation and residential stability. Over time, the stability and predictability of agriculture allowed for the evolution of more sedentary societies, such as the Hohokam culture of southern Arizona.

The excavation of the Joint Courts Complex Archaeological Project area provides an opportunity to investigate changing prehistoric lifeways and land-use patterns in the Tucson area from approximately 4,000 years ago to the present. In particular several excavated features dating to the Middle and Late Archaic periods indicate that the project area was occupied during those intervals. Limited evidence of a Middle Formative period (Hohokam) presence was also established by the recovery of Colonial and Sedentary period ceramics from historical-period grave pit features in the project area. A radiocarbon date on a maize cupule dating to the protohistoric period and several projectile points suggest possible Sobaipuri use of the project area.

The focus of this volume and associated reports is on the historical-period occupation of the Joint Courts Complex and larger Tucson area. But Tucson has a long history of occupation, spanning more than 4,000 years. During the early part of this occupation, Tucson was perhaps the birthplace of village agriculture in the Southwest, and it remained an important center of Hohokam culture during the late prehistoric era. Past archaeological investigations in the historic downtown Tucson area have revealed glimpses of prehistoric occupation heavily disturbed by subsequent historical-period and modern development. Archaeological investigations in Historic Blocks 180, 181, 190, and 192 (Figure 33), all located immediately to the west or southwest of the Joint Courts Complex Archaeological Project area, have documented a prehistoric occupation from the Late Archaic period to the Early-Classic period of the Hohokam chronology (ca. 800 B.C.–A.D. 1250) (Ciolek-Torrello and Swanson 1997; Gavioli and Thiel 2008:50).

Most relevant to the current study are three Late Archaic period pit houses. Features 430, 492, and 650 were excavated as part of the Presidio San Agustín del Tucson Park and Rio Nuevo project (Gavioli and Thiel 2008; Klimas et al. 2006:4.178). Feature 430 was located among a cluster of prehistoric features, including the Hohokam pit house previously excavated by the University of Arizona (Olson 1985). The house was round in shape, 2.8 m east-west by 2.2 m north-south (Gavioli and Thiel 2008:33–34). Twenty-four postholes were found inside the house, 20 of which ringed the inside edge of the pit, with a slight gap in the southeastern side that might represent an entry. In addition, there were four interior postholes that may have supported the roof. A small amount of flaked and ground stone was found on the floor, and many other pieces were found in the fill along with large numbers of fire-affected rock, suggesting that the house was cleared at abandonment and subsequently used as a refuse-disposal area. Charred plant material from this feature produced a radiocarbon date of 1330 +/- 40 B.P. (A.D. 640–770), which would place this structure in the Hohokam Pioneer period. The authors, however, believed that the house dated to the Late Archaic period and that the sample was intrusive (Gavioli and Thiel 2008:33).

Only the western half of Feature 492 was excavated, as the remainder extended outside of the project area (Gavioli and Thiel 2008:34). It was another round structure about 3.2 m north-south and greater than 1.7 m east-west. The pit was

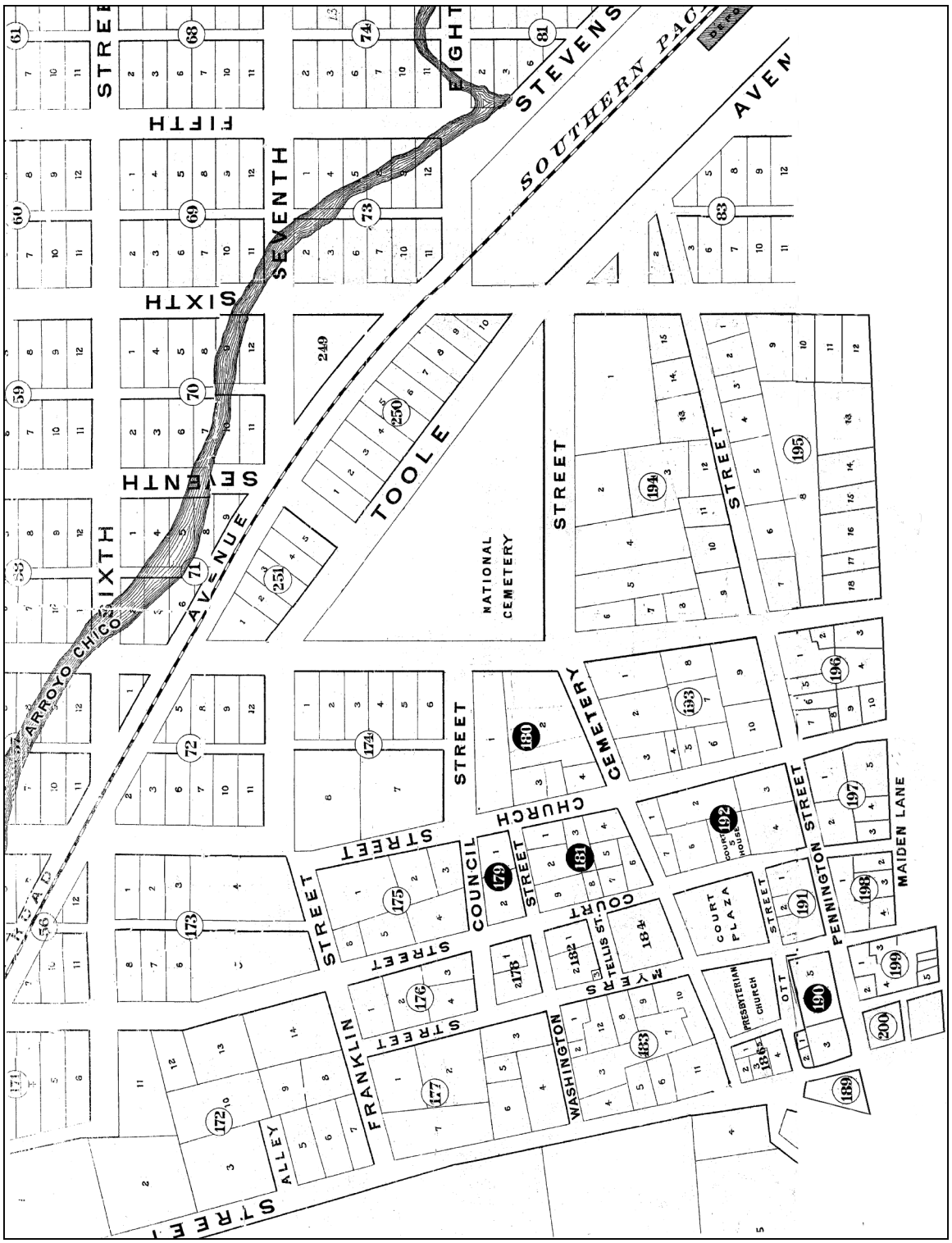


Figure 33. Downtown Tucson area showing locations Historic Blocks 179, 180, 181, 190, and 192 with prehistoric features.

ringed by 17 peripheral postholes but contained no other interior features. The pit was filled with refuse and structural debris, including burned daub and charcoal. Small oxidized patches extended across the entire floor. The floor appears to have been plastered and a double row of peripheral postholes suggest the house was remodeled. A radiocarbon date of 2380 +/- 40 BP (720–700 or 540–390 B.C.) was obtained from charred plant material. These dates suggest an early Cienega phase age older than the pit houses in the Joint Courts area (Table 2). Feature 650 was found in a trench wall and documented only in profile (Gavioli and Thiel 2008:37). Thus, there is little information available about this feature.

A substantial Colonial and Sedentary period (ca. A.D. 850–1150) occupation was identified in the vicinity of the Joint Courts Complex—including Historic Block 180 (Ciolek-Torrello and Swanson 1997), adjacent to the southwest corner of the complex; Historic Blocks 179 and 181 (Gilman 1997; Haury and Fathauer 1974; Mazeny 1981; Olson 1985; Gavioli and Thiel 2008; Thiel and Mabry 2006), immediately west of Block 180; and Historic Blocks 190 (Thiel 2004) and 192 (Thiel et al. 1995), two to four blocks southwest of the Joint Complex Courts area. This occupation included at least six pit houses and nine other pit features, as well as many other structures, pits, a crematorium, and two burials that could not be more precisely dated than to the prehistoric Hohokam (Gavioli and Thiel 2008:Table 3.1). Hohokam groups were actively occupying the Pleistocene terraces above the Santa Cruz River, including the area that is now downtown Tucson during the pre-Classic period. An Agua Caliente phase pit feature (Gilman 1997) and a Pioneer period pit house (Ciolek-Torrello and Swanson 1997) round out the evidence of prehistoric occupation in the downtown Tucson area.

Archaeological investigations at the Joint Courts Complex uncovered evidence that the project area was part of this extensive Colonial and Sedentary period settlement. Although no features dating to this time period were found, ceramic artifacts dating to these periods were recovered from the fill of historical period grave pits. These ceramics provide evidence of Hohokam activities in the project area and suggest that it may have constituted the eastern edge of this prehistoric settlement. More important, however, was the discovery of a Middle Archaic period roasting pit and two isolated Late Archaic period pit structures (Figure 34) that extend the period of occupation for this area almost 2,000 years earlier. Previous investigations have revealed a substantial Late Archaic period occupation in the floodplain of the Santa Cruz River, with only limited evidence that this early occupation extended onto the Pleistocene terraces above the river. The Joint Courts Complex Archaeological Project investigations indicate that this Late Archaic period occupation was more extensive. Finally, limited evidence of protohistoric activities generally associated with the Sobaipuri was also found.

In this chapter, we examine the prehistoric and protohistoric component of the Joint Courts Archaeological Complex Project. In light of the prehistoric remains encountered in the project area, this chapter aims to investigate the settlement and subsistence strategies of the prehistoric inhabitants. Several research questions were developed to help address these issues of prehistoric land use and subsistence, particularly for the Late Archaic period remains that constitute the most robust data set for the prehistoric component of the project. Following the research questions is a brief outline of the analytical approaches that will be used to investigate the data, as well as a brief discussion of current research into the Late Archaic period in southern Arizona. After the research objectives are defined, the chapter reviews the prehistory of southern Arizona, followed by a summary of the prehistoric features and associated materials encountered in the project area. Details regarding these features and the analysis of prehistoric materials recovered from the project area are presented in Appendix B. Finally, the research questions are revisited at the end of the chapter in light of the results of the analyses.

Research Questions

In the original research design for the prehistoric/protohistoric component of the Joint Courts Complex Archaeological Project (Beck et al. 2006:11–12), the research goals aimed to evaluate both Pioneer period settlements as well as later interactions between protohistoric groups. Research questions were developed from previous research in the adjacent Historic Block 180 that contained possible Pioneer period remains (Ciolek-Torrello and Swanson 1997:119–140), in the hopes that features or deposits of a similar age would be discovered in the Joint Courts Complex area.

Questions regarding the protohistoric groups focused on the effects of European contact and the transformation and assimilation of these cultures over time. During the course of the Joint Courts Complex Archaeological Project field investigations, however, it became apparent that few prehistoric and protohistoric remains were intact. Only three prehistoric features were identified within the project area: two Late Archaic period pit structures and one Middle Archaic period roasting pit. In light of the paucity of Pioneer or protohistoric period features, the original research questions became moot, simply for lack of data. New research questions were developed to address the implications of Archaic period features at the site for current understandings of Late Archaic/Early Agricultural lifeways in southern Arizona. Research on and our understanding of this particular time in prehistory have made dramatic strides in recent years, with multiple excavations occurring along the middle Santa Cruz River near Tucson.

Table 2. Late Cienega Phase Radiocarbon Data from Four Sites in the Tucson Basin

Site No.(ASM)	Site Name	Feature ID (Pit Structure)	Sample No.	Material Dated	Corrected Age	Reference
AZ AA:6:19	Coffee Camp	315	Beta-25450	wood charcoal	2080 ± 70[a]	Halbirt and Henderson 1993
AZ AA:6:19	Coffee Camp	315	Beta-25449	wood charcoal	2060 ± 50[a]	Halbirt and Henderson 1993
AZ AA:12:91	Los Pozos	416	Beta-91147	maize	2240 ± 60[a]	Gregory 2001
AZ AA:12:91	Los Pozos	352	Beta-95628	maize	2190 ± 80	Gregory 2001
AZ AA:12:91	Los Pozos	355	Beta-91144	maize	2170 ± 60	Gregory 2001
AZ AA:12:91	Los Pozos	407	Beta-88142	grass stems	2150 ± 50	Gregory 2001
AZ AA:12:91	Los Pozos	337	Beta-91142	maize	2150 ± 50	Gregory 2001
AZ AA:12:91	Los Pozos	812	Beta-91149	maize	2150 ± 60	Gregory 2001
AZ AA:12:91	Los Pozos	819	Beta-95629	maize	2150 ± 80	Gregory 2001
AZ AA:12:91	Los Pozos	898	Beta-91140	mesquite seeds	2140 ± 60	Gregory 2001
AZ AA:12:91	Los Pozos	417	Beta-91148	maize	2140 ± 50	Gregory 2001
AZ AA:12:91	Los Pozos	305	Beta-91141	maize	2120 ± 60	Gregory 2001
AZ AA:12:91	Los Pozos	333	Beta-91145	maize	2110 ± 50	Gregory 2001
AZ AA:12:91	Los Pozos	840	Beta-95630	maize	2110 ± 80	Gregory 2001
AZ AA:12:91	Los Pozos	389	Beta-91146	maize	2090 ± 60	Gregory 2001
AZ AA:12:91	Los Pozos	861	Beta-95632	maize	2090 ± 80	Gregory 2001
AZ AA:12:91	Los Pozos	815	Beta-95631	maize	2060 ± 80	Gregory 2001
AZ AA:12:91	Los Pozos	318	Beta-91143	maize	2050 ± 50[a]	Gregory 2001
AZ AA:12:91	Los Pozos	327	Beta-88141	mesquite pods	2020 ± 50[a]	Gregory 2001
AZ AA:12:746	Santa Cruz Bend	32	Beta-67490	maize	2200 ± 60	Mabry et al. 1997
AZ AA:12:746	Santa Cruz Bend	90	Beta-81060	maize	2180 ± 60	Mabry et al. 1997
AZ BB:13:425	Stone Pipe	84	Beta-81067	maize	2150 ± 60	Mabry et al. 1997
AZ BB:13:682	Joint Courts Complex	19021	NZA-30144	grass stems	2149 ± 25	this chapter
AZ BB:13:682	Joint Courts Complex	3370	NZA-30174	maize	2148 ± 20	this chapter
AZ BB:13:682	Joint Courts Complex	3370	NZA-30157	grass stems	2137 ± 25	this chapter
AZ BB:13:682	Joint Courts Complex	3370	NZA-30170	arrowweed fragment	2123 ± 20	this chapter
AZ BB:13:682	Joint Courts Complex	9021	NZA-30142	saltbush wood	2136 ± 25	this chapter
AZ BB:13:682	Joint Courts Complex	3370	NZA-30155	mesquite seeds	2146 ± 25	this chapter

[a] Indicates determinations that were statistically different from the JCC determinations.

With the discovery of two isolated but contemporaneous pit structures in the Joint Courts Complex Archaeological Project area, we are presented with a unique glimpse of Late Archaic period habitation structures located away from the floodplain, where so much of the current research on this early time period has been focused. Our research questions, therefore, have been reevaluated to suit our prehistoric data set, as well as to add to the growing knowledge of the Late Archaic/Early Agricultural period in the Tucson Basin.

1. Does the Late Archaic period settlement in the Joint Courts Complex Archaeological Project area differ from that along the Santa Cruz River or, alternatively, that located in nonriverine contexts on the bajada surrounding the Tucson Basin?

2. Is there a meaningful difference between our understanding of "Late Archaic" versus "Early Agricultural" terminology in terms of the current research trends that have focused on floodplain agricultural settlements?

3. Are there any material remains (botanical, faunal, shell) that would indicate the implementation of subsistence strategies different from those implemented at settlements along the Santa Cruz River floodplain?

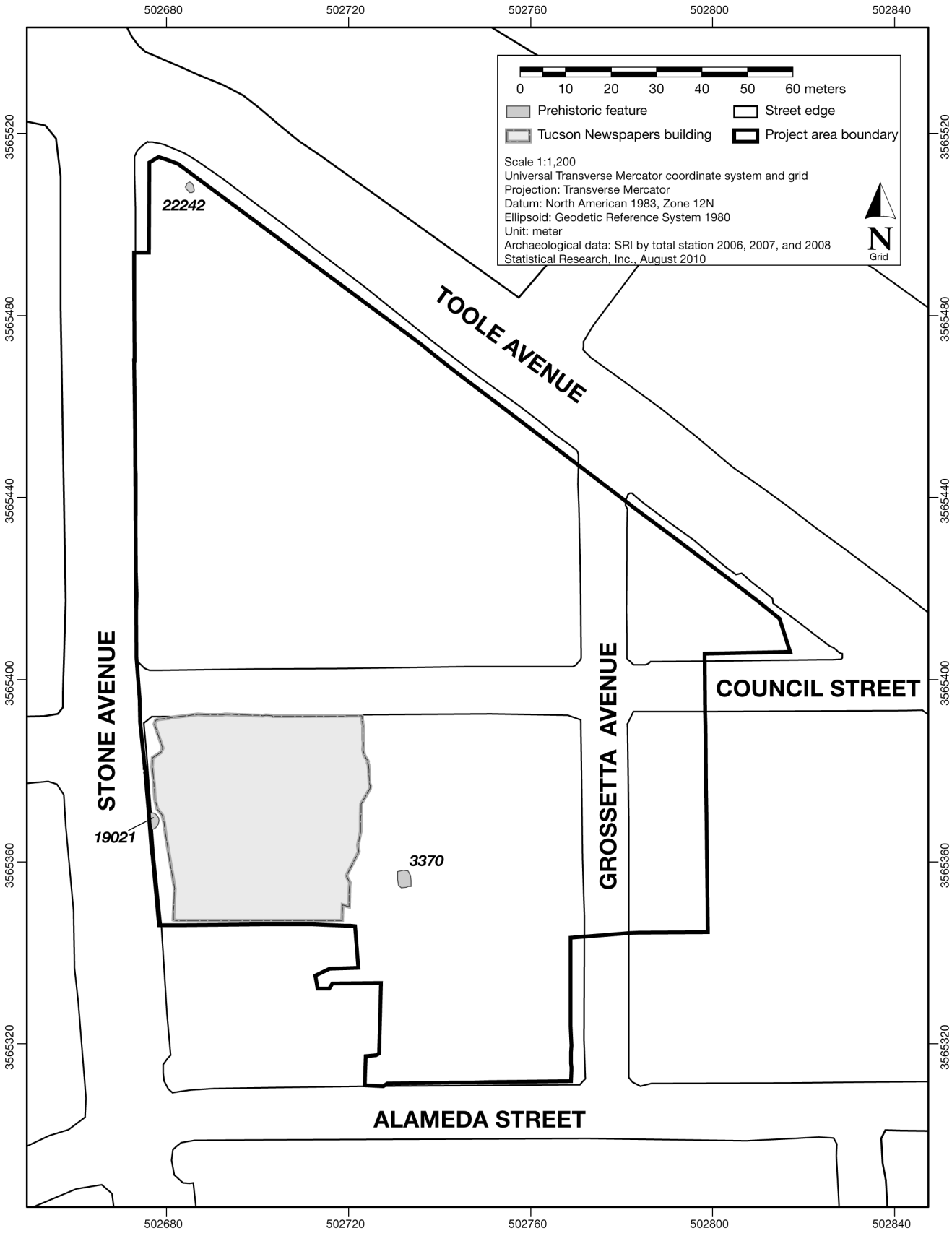


Figure 34. Map of prehistoric features in the Joint Courts Complex Archaeological Project area.

4. Could the Late Archaic pit structures at the Joint Courts Complex Archaeological Project area represent a transitory location between the floodplain habitations found along the Santa Cruz River and nonriverine habitations?

5. What can the prehistoric features and artifacts tell us about the changing use of the project area during prehistory? How is the changing in subsistence strategies from foraging to farming reflected in our data, and how did Native American populations use the landscape through time?

Analytical Approaches

To answer the above research questions, certain key data were required—principally, evidence from macro- and microbotanical remains. This was considered crucial for examining subsistence strategies. Botanical evidence was also important for determining the effective environment of the project area, with regard to the local availability of plants, animals, water, and other resources. Dating was also crucial, especially with the level of chronological information derived from excavations of similar features along the Santa Cruz floodplain and elsewhere. Macrobotanical remains were used as the primary source for dating the prehistoric features. Comparing the prehistoric features and artifacts from the Joint Courts Complex area with contemporaneous habitations in other sites in the Tucson Basin was important in order to identify differences in subsistence. All three prehistoric features in the project area lacked ceramic artifacts, but flaked stone and ground stone artifacts were discovered, making them another key element for determining the functional and technological associations of the Archaic period features. Ceramic artifacts, however, were recovered from other feature contexts in the project area, particularly from the fill of historical-period grave pits. These ceramics, along with small numbers of faunal bone and marine shell, were used to identify the subsistence practices of the prehistoric inhabitants of the project area.

Late Archaic Period Research

As more information becomes available from research and excavations, our definition of the Late Archaic/Early Formative transition has become more complex. Huckell's (1995) investigation of Late Archaic period sites in the Cienega Valley suggests that those sites were subjected to environmental conditions similar to those in the Santa Cruz river valley, where long episodes of favorable conditions persisted, allowing an increased investment in agriculture. Data from the Cienega and Santa Cruz Valleys show that Late Archaic period subsistence and settlement practices included both residential stability and mobility (Diehl, ed. 2005; Huckell 1995). When defining mobility for this period, it is crucial to establish differences between subsistence and settlement organization. Several modes of settlement organization have been proposed to explain the diversity of Late Archaic period subsistence strategies (Diehl, ed. 2005; Premo and Mabry 2007). Generally, settlement for the Late Archaic period is believed to include two main resource areas: the floodplain and the upper *bajada*. Our current understanding of Late Archaic period settlement patterns is, of course, based on the available information from archaeological surveys and excavations. The patterning we have observed archaeologically, however, may not be entirely representative of the distribution of Late Archaic period settlement in the region. Pedestrian archaeological survey in the region has focused on surface manifestations of settlement and land use and thus may be biased toward the discovery of materials that are more likely to be visible on the surfaces of landforms, such as in upper *bajada* settings where Holocene deposits are often thin and exposed at the surface (Heilen 2005). By contrast, intensive excavations have focused on floodplain settings, where Late Archaic materials are often deeply buried. Although resulting in some spectacular and informative finds, the focus of excavation on floodplain settings probably also places limitations on our understanding of the diversity of Late Archaic period settlement and subsistence. An important contribution of the Joint Courts Complex Archaeological Project sample is that, although small, the Late Archaic period component represents a rare instance of habitation features located not in a riverine or upper *bajada* setting but in an intermediate landscape position somewhat distant from the Santa Cruz River but, according to macrobotanical and pollen evidence, not far from a riparian environment (see botanical results, Appendix B).

Our current understanding of Archaic period populations in southern Arizona has depended on the contrast between two major categories of settlement organization: logistical and residential (Binford 1980). Logistically organized settlement implies a permanent (or semipermanent) residence associated with an effort to obtain and redistribute resources for the community by sending task groups to remote areas. Residentially organized subsistence suggests a more mobile strategy, in which the community or its constituents constantly relocates to places where desirable resources can be found. In the one case, resources are moved to the community; in the other, the community is moved to the resources. Neither category of settlement organization is meant to be mutually exclusive, however. Instead, mobility strategies are considered to exist along a continuum between residential and logistical organization (e.g., see Kelly 1992). How Late Archaic period settlement in the Tucson Basin was organized is still ambiguous, though a trend toward greater logistical organization is suggested for the emerging agricultural villages along the Santa Cruz River (Diehl, ed. 2005; Premo and Mabry 2007; Roth 1989, 1996). The Sonoran Desert, in particular,

was conducive to this settlement pattern—alluvial valleys for foraging and farming were relatively close to upland zones, where diverse floral and faunal resources could be obtained. This vertical zonation in resource availability would have allowed Late Archaic period populations to reduce their seasonal resource procurement forays, something that was not possible in other regions of the Southwest (Fish et al. 1990; Vierra 2005). The majority of macrobotanical, macrofaunal, and lithic resources from Las Capas and Los Pozos, large Late Archaic period settlements located along the floodplain of the Santa Cruz River, indicate the use of locally available material; however, some materials may have come from distances of more than 20 km (Diehl, ed. 2005).

Fish et al. (1992a) suggested that Late Archaic period populations in the Northern Tucson Basin practiced two distinct forms of agriculture, including floodwater and irrigation farming in floodplain contexts and dryland agriculture along the upper *bajada*. This would suggest that agricultural "base camps" were established in two different landscape positions, thus capitalizing on both upland and lowland landscape zones according to season, regardless of whether movement was more residential or logistical in nature. Fish et al. (1986) recognized this trend at Tumamoc Hill, a rocky inselberg located immediately west of the Santa Cruz River floodplain, where *Zea mays* was associated with dry farming plots dating to the Late Archaic period. Other large-scale dryland agricultural systems dating to the Late Archaic period have been extensively investigated, including Cerro Juanaqueña in northern Mexico (Hard and Roney 2005), indicating that this method of dryland farming was established in the early stages of developing agricultural practices during the Late Archaic period.

Prehistoric populations likely adopted agriculture gradually as a supplement to the collection of wild resources and may have domesticated plants in part through observing wild-plant reproductive cycles. The gradual shift to agriculture may also have been tied to local environmental and fluvial conditions. During dry periods, populations tended to aggregate near riparian areas where permanent water existed. During these dry periods, floodwater farming or irrigation was still possible, and the early agriculturists could have supplemented their diet with domestic crops. During wetter periods, populations could have dispersed to take advantage of a greater abundance of wild resources while still cultivating domesticated plants. This diversity of subsistence practices helped buffer against seasonal variability and may have increased the efficiency and productivity of hunting and gathering (Wills and Huckell 1994:52). Interestingly, formal canal irrigation was identified along the Santa Cruz River floodplain, indicating that relatively intensive farming occurred as early as 1200 B.C. (Ezzo and Deaver 1998; Diehl, ed. 2005; Mabry 2007).

In general, the Late Archaic period in southern Arizona appears to have been a time of decreasing residential mobility and intensified use of cultivated plants (Wills and Huckell 1994). This is not to say that previous patterns of land use were abandoned entirely, as seasonal camps in upper *bajada* settings continued to be used. These camps likely complemented the more intensively focused settlements of the Santa Cruz River floodplain at sites like Las Capas, Los Pozos, Santa Cruz Bend, and Stone Pipe, where hundreds of habitation structures have been uncovered (Diehl, ed. 2005; Gregory 2001; Mabry 1998a, 2007; Whittlesey et al. 2007). This apparent duality of settlement is consistent with a seasonally organized system in which upland areas were used in fall and winter for gathering wild resources, and large settlements in floodplain settings were used during the summer, when agriculture on the floodplain and the alluvial fans was most productive (Whittlesey 2003). Alternatively, Huckell (1996:345) has postulated the presence of a persistent Late Archaic–Early Formative period hunting and gathering economy located on the fringes of the better-watered Tucson Basin. The Coffee Camp site, for instance, includes a nonriverine Late Archaic period settlement near the Santa Cruz Flats area where agriculture was apparently not practiced (Halbirt and Henderson 1993). Features at Coffee Camp contained an abundance of wild-plant species and an absence of domesticates. A large ground stone collection at Coffee Camp also indicates a small-seed milling economy, which correlates with the botanical evidence. The absence of domesticated plants at Coffee Camp suggests that, instead of a single population moving between different residences, different populations located in different areas were practicing different subsistence strategies dependant on the locally available resources and environmental conditions (Fish et al. 1990, 1992a).

Native American Culture History in Southern Arizona

The focus of human occupation in the Tucson Basin shifted numerous times in prehistory, but it always included at least one section of the Santa Cruz River, and the section that ran just west of modern Tucson was among the most heavily used in prehistoric times. This area holds many of the largest and most-significant prehistoric archaeological sites in the Tucson Basin and was also home to a large Native American population when the area was first visited by Spaniards at the end of the seventeenth century. The mountains that surround the Tucson Basin and the extensive *bajada* slopes that join the mountains to the narrow Santa Cruz floodplain were also long used by Native Americans. The Joint Courts Complex Archaeological Project area, situated on a Pleistocene terrace less than a mile east of the Santa Cruz River (Figure 35), was used

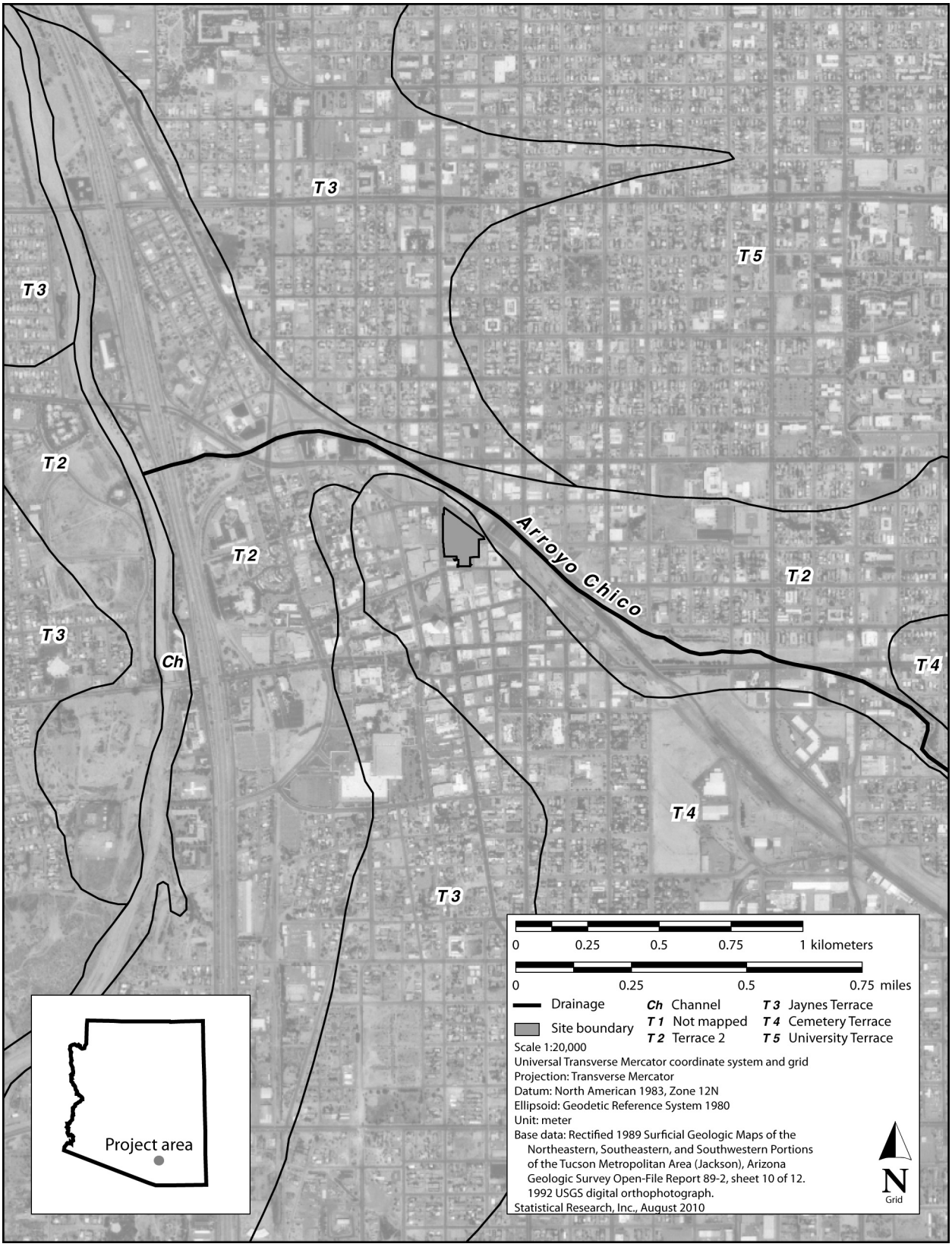


Figure 35. The Joint Courts Complex Archaeological Project area in relation to alluvial terraces and Arroyo Chico.

by Native Americans from the Middle and Late Archaic periods, and there is limited evidence of Formative period activities as well.

The following culture history discussion was compiled from previous reviews of cultural resources (see O'Mack 2005; O'Mack and Klucas 2004; Whittlesey 2000a, 2000b, 2003; Whittlesey et al. 1994) and summarizes the Native American culture history in the Tucson Basin during prehistoric times.

Paleoindian Period

The earliest human occupation of the Americas is generally associated with the Paleoindian period (11,500–8000 B.C.). Paleoindian culture was characterized by a hunting-and-gathering economy and small, highly mobile bands adapted to a climate that was cooler and wetter than today. Paleoindian sites are often associated with the remains of extinct species of mammoths, camels, horses, and giant ground sloths, leading many archaeologists to consider big-game hunting the focus of the Paleoindian economy.

Despite a considerable number of buried Paleoindian sites in southeastern Arizona, most notably along the San Pedro River (Haury 1953; Haury et al. 1959; Haynes and Huckell 2007), very little evidence of a Paleoindian presence has been found in the Tucson Basin. The sparse remains that do exist consist of isolated surface finds of fluted Clovis projectile points (Huckell 1982), which date to ca. 12,000–9000 B.C. (Justice 2002:59). These isolates include points from the Avra Valley, the Valencia site (AZ BB:13:15 [ASM]) (Doelle 1985:181), the San Xavier District of the Tohono O'odham Nation, and the Tucson Mountains (Huckell 1982). The absence of buried Paleoindian sites in the Tucson Basin and along the Santa Cruz River has been attributed to a lack of deep excavations in the heavily aggraded Santa Cruz River floodplain (Huckell 1982) as well as a period of erosional events occurring from ca. 8000 to 5500 B.P., which may have removed these deposits (Haynes and Huckell 1986; Waters 1988a, 1988b).

Post-Clovis Paleoindian materials are all but nonexistent in the Tucson Basin. The Folsom complex, occurring from ca. 9000 to 8000 B.C. (Justice 2002:72), includes another type of fluted projectile point that is believed to follow the Clovis complex. Folsom points have been identified in central Arizona, but not southern Arizona (Huckell 1982:25), indicating possibly different cultural trajectories from Clovis to Folsom times or a decrease in occupation of southern Arizona after Clovis times. Nonfluted Plainview points are believed to occur after the Folsom complex, or ca. 8000–7000 B.C. (Justice 2002:83). Huckell (1982) described two points from two sites just outside the Tucson Basin that resembled Plainview points. One point came from the Tortolita Mountains and the other from the lower San Pedro River valley.

Archaic Period

The Archaic period is much better known in southern Arizona than the preceding Paleoindian period. This is especially true of the later portion of the period and is largely the result of a recent surge in contract archaeology related to development in and around the Santa Cruz River floodplain, especially in the area just west of downtown Tucson. Like the Paleoindian period, the Archaic period was characterized by an economy based on the gathering of wild-plant and animal resources. The Archaic period differs, however, in an apparent greater diversity of plant and animal species that were exploited. This more diverse subsistence base undoubtedly lessened the need for a highly mobile way of life.

The Archaic period has traditionally been divided into three periods: the Early Archaic period (ca. 8500–4800 B.C.), the Middle Archaic period (ca. 4800–1500 B.C.), and the Late Archaic period (ca. 1500 B.C. to A.D. 200) (Huckell 1984:138). Whittlesey (2003:52) has discussed the recent confusion in terminology related to the expanding Archaic database and the terminological dilemmas resulting from the recognition that agriculture is considerably older in the southern Southwest than once believed. The Late Archaic period is now seen as the pivotal time when the intensive use of domesticated plants became an important subsistence strategy in the southwestern U.S. and northwestern Mexico.

Early Archaic Period

The Early Archaic period is the least well known portion the Archaic period in southern Arizona and is especially underrepresented in the archaeological record of the Tucson Basin. In fact, as Huckell (1984:137) has reported, the Tucson Basin has yielded no direct evidence for an Early Archaic period occupation. Once again, it is probably an investigative bias rather than a lack of occupation in the region that has created this gap in knowledge, and the Early Holocene erosion of the Santa Cruz River alluvium from ca. 8000 to 5500 B.C. (Haynes and Huckell 1986; Waters 1988a, 1988b) likely contributes to our lack of information on the Early Archaic period in the Tucson Basin. At present, the Early Archaic period is known in detail only at sites in the Sulphur Springs Valley of southeastern Arizona. There, Sayles defined the Sulphur Springs and Cazador stages of the Cochise culture based on the presence or absence of projectile points at sites along Whitewater Draw (Sayles 1983, based on work first published as Sayles and Antevs 1941). These Early Archaic deposits are characterized by frequent milling stones and flaked stone tools,

excluding projectile points in the Sulphur Spring stage but including a variety of point types in the Cazador stage. More recently, Whalen (1971) challenged the validity of the Cazador stage, suggesting that it and the Sulphur Springs stage are simply variant expressions of the same cultural phenomenon (Waters 1998).

Middle Archaic Period

The Middle Archaic period is slightly better known in southern Arizona and the Tucson Basin. In southern Arizona, the Middle Archaic period includes the Chiricahua stage of the Cochise culture, known from sites in the San Pedro River Valley and Sulphur Springs Valley (Sayles and Antevs 1941). Also included in this time period are the Amargosa I and II stages of the Amargosa tradition, known from sites described by Rogers (1939) in the Papaguería and the lower Colorado River valley.

The economy of the Middle Archaic period was based on the exploitation of a number of environmental zones. Small base camps and limited-activity sites associated with resource procurement and processing are common in upland and *bajada* environments (Huckell 1984:139–140). The data are sparse, but Middle Archaic period peoples probably practiced a seasonally organized procurement strategy that emphasized upland environments in the fall and lowland areas during the rest of the year (Whittlesey 2003:54–55). In contrast to the preceding Early Archaic period, projectile points are common at Middle Archaic period sites, but the large floodplain villages of the Late Archaic period have not been documented for this earlier time period (Huckell 1984:139).

Recent evidence suggests that Middle Archaic groups were actively supporting economically important wild plants through encouragement, protection, and cultivation (Doolittle and Mabry 2006). The Middle Archaic component at Los Pozos, a site on the Santa Cruz River floodplain several miles north of downtown Tucson, has produced a single direct radiocarbon date on maize of 2100 B.C. (Gregory 1999:118). Although no irrigation features were recorded in the Middle Archaic period component at Los Pozos, the presence of maize in an area of such intensive use of the floodplain suggests that the stage was set early for the development of subsequent agricultural strategies. Recent excavations by Desert Archaeology, Inc., for the City of Tucson's Río Nuevo project have uncovered evidence of crude incipient plain ware ceramics in the Middle Archaic period component of the Clearwater Site (AZ BB:13:6 [ASM]). Excavations at this site have also produced some of the earliest dated maize in Arizona, with several features containing maize dated to 2140–2120 cal B.C. (Mabry 2006:Table 19.1). These findings are consistent with other material recovered from sites in and along the Santa Cruz River floodplain, suggesting that maize agriculture and irrigation had a long history of co-development in this area (see also Ezzo and Deaver 1998).

Late Archaic (Early Agricultural) Period

The beginning of the Late Archaic period is marked by an apparent increase of human occupation in southern Arizona, particularly in the Tucson Basin. Current trends in archaeological research have focused on the transition from a foraging-to-farming lifestyle for prehistoric populations during the Late Archaic. Numerous authors have also dealt with the terminology for this transition, including the use of terms such as Late Archaic, Late Preceramic, and Early Agricultural (Gregory 2007; Huckell 1995; Whittlesey et al. 2007). The term "farmaging" has also been suggested to express the complex amalgamation of subsistence and settlement strategies used during this period (Diehl, ed. 2005). Complex social, economic, and subsistence needs are inherent with the adoption of agriculture, although a good understanding of these dynamic relationships is still lacking. Nevertheless, substantially more is known about this period than was known 20 years ago (see Huckell 1984), because of important recent discoveries along the Santa Cruz River floodplain (Figure 36) (Diehl, ed. 2005; Ezzo and Deaver 1998; Mabry 1998a, 2007; Whittlesey et al. 2007) and in the Cienega Valley (Huckell 1995).

The Late Archaic period is now generally subdivided into two phases, the San Pedro phase and the Cienega phase. The San Pedro phase, first defined by Sayles (1941), is estimated to date from 1200 to 800 B.C. (Mabry 2005a) and is characterized by large side- or corner-notched projectile points; shallow structures with oval to egg-shaped floor plans that are basin-shaped in profile and often contain a single, large intramural bell-shaped pit; a ground stone collection reflecting seed milling; a limited collection of shell artifacts; and some anthropomorphic figurines of fired clay (Huckell 1995:118–119). The succeeding Cienega phase, defined by Huckell (1995), dates roughly from 800 B.C. to A.D. 50 (Mabry 2005a), and ends with the appearance of a formal ceramic technology (Whittlesey 2003). Houses of the Cienega phase are typically round in plan with vertical pit walls and level floors. Most houses contain postholes (Huckell 1995; Mabry 1998a), and at the Santa Cruz Bend site, many houses had numerous bell-shaped and cylindrical pits, suggesting an increased concern with storage. In addition to residential structures, an extremely large circular house was found at the Santa Cruz Bend site and was interpreted as an early example of a communal house. The Cienega projectile point is a hallmark of the Cienega phase. Unlike San Pedro projectile points, Cienega points have a distinctive corner notch and are often manufactured from siliceous materials. There is also an elaboration of ground stone manufacture in the Cienega phase. The presence of

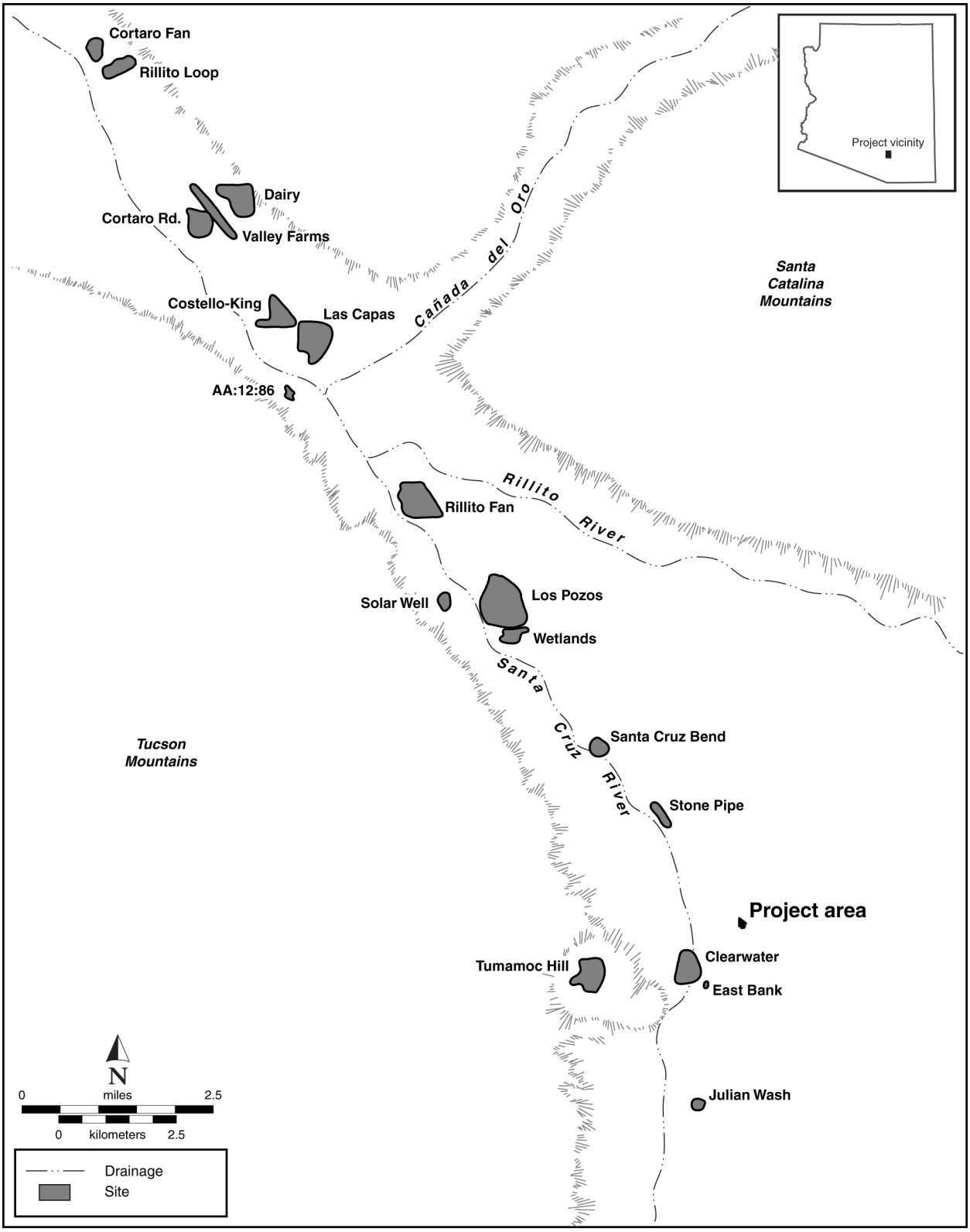


Figure 36. Locations of Late Archaic period settlements in the Santa Cruz River Valley.

marine shell from both San Pedro and Cienega phases indicates that long-distance trade networks were also in place during this time (Mabry 1998a).

Several sites near the Santa Cruz River west of downtown Tucson have evidence of Late Archaic or Early Formative period occupations, and it is likely that many more contain as yet unrecognized components of similar age. This is especially true for sites located on or near the floodplain of the Santa Cruz.

Formative Period

For the purposes of discussing Tucson Basin chronology, the Formative period is usefully divided into three discrete periods: the Early, Middle, and Late Formative periods. The Early Formative period includes the Agua Caliente and Tortolita phases; the Middle Formative period includes the Pioneer, Colonial, and Sedentary periods of the Hohokam culture; and the Late Formative consists of the Hohokam Classic period.

Early Formative Period

As with the Late Archaic period, knowledge of the earliest portion of the Formative period in the Tucson Basin has been greatly enhanced by recent excavations. The Early Formative period began with the adoption of ceramic container technology, an extension of the growing dependence on agriculture noted in the Late Archaic period, and the construction of more formal houses. Although some very early, crude ceramics were recovered from the Coffee Camp site dating from 200 B.C. to A.D. 1 (Halbirt and Henderson 1993), the earliest developed ceramic industry did not appear until around A.D. 200 (Whittlesey 2003). Deaver and Ciolek-Torrello (1995) developed a chronology for the Early Formative period that they saw as pan-southwestern in application. The chronology is based on subdivision into several broad horizons based on changes in material culture as a whole but named for changes in ceramic technology.

The earliest period is the Plain Ware horizon, which in the Tucson Basin equates with the Agua Caliente phase (ca. A.D. 1–425) and is characterized by a thin-walled, sand-tempered, coiled brown plain ware, as well as an expedient lithic technology with remnant Archaic period biface and milling technology. Houses remain quite small, but architecture is suggestive of more intensive occupation and greater investment of labor. A communal house at the Houghton Road site is similar to Early Pithouse period Mogollon communal houses (Ciolek-Torrello 1995, 1998). In addition, subsistence seems to have been a mix of agriculture and hunting and gathering, with a continued use of upland resources. Several recently discovered archaeological sites have been assigned to the Agua Caliente phase, including the Houghton Road site (Ciolek-Torrello 1995, 1998), El Arbolito (Huckell 1987), and the Square Hearth site (Mabry and Clark 1994; Mabry et al. 1997).

The Plain Ware horizon was followed by the Red Ware horizon, corresponding to the Tortolita phase in the Tucson Basin, which Deaver and Ciolek-Torrello (1995:512) have dated to A.D. 425–650. During the Tortolita phase, red-slipped pottery was added to the ceramic assemblage, and various changes in vessel forms occurred, including the introduction of flare-rimmed bowls. This vessel form may have its source in the Phoenix Basin (Whittlesey 2003), whereas other aspects of the Red Ware horizon technology appear more closely tied to San Francisco Red ware of the Mogollon ceramic tradition (Whittlesey 1995). The flaked stone assemblage continued to be generalized, although the Archaic period biface component disappeared from the tool kit (Deaver and Ciolek-Torrello 1995). Changes in architecture during this phase included a general increase in house size and formality of construction, but both large communal structures and small residential houses continued to be constructed. Representative sites of this period include the Houghton Road site (Ciolek-Torrello 1995, 1998), El Arbolito, and the Valencia Road site, Locus 2 (B. Huckell 1993).

The Early Broadline horizon began around A.D. 650 with the introduction of painted ceramics and lasted until around A.D. 700, the beginning of the Snaketown phase of the Hohokam culture (Deaver and Ciolek-Torrello 1995:512). This horizon is poorly represented in the Tucson Basin, and no local phase has been associated with it. The similarity between traditional Mogollon ceramics like Dos Cabezas Red-on-brown and Hohokam Estrella Red-on-gray is the impetus for defining this period as a widespread cultural horizon (Whittlesey 2003:61). The only excavated site in the Tucson Basin to be associated with this horizon is the Dairy site (Altschul and Huber 1995).

Middle Formative Period

The Middle Formative period is characterized as the florescence of the Hohokam culture in southern Arizona, as well as the maximum expansion of Hohokam material culture and settlements. Three periods are defined within the Middle Formative: the Pioneer period, the Colonial period, and the Sedentary period.

Pioneer Period

The beginning of the Pioneer period in the Tucson Basin, dating to around A.D. 700 (the Snaketown phase), is signaled by the appearance of a widespread material culture thought to be intrusive from northern Mexico. According to Deaver and Ciolek-Torrello (1995), Snaketown Red-on-buff ceramics are the horizon markers of this period. It is in this period that traditional Hohokam culture spread

throughout much of southern Arizona. Occupation of the Tucson Basin appears to have been fairly extensive, but few sites have been excavated that can contribute information on the Snaketown phase. A substantial Pioneer period occupation has been documented at the Valencia Vieja site, however (Wallace 2003). In general, changes in technology suggest the complete adoption of a sedentary, agricultural way of life. Investigations at Valencia Vieja also reveal the presence of a large, highly structured town with courtyard groups comprising several large formally constructed houses and distinctive square communal houses arranged around a large circular plaza (Wallace 2003). The Pioneer period in the Tucson Basin ended around A.D. 800 with the adoption of a new ceramic tradition and with the construction of ball courts at large primary villages.

Colonial Period

In the Colonial period (A.D. 800–900), the initial Cañada del Oro phase was characterized by the appearance of ball courts as public ritual structures and possibly courtyard groups, although these were already evident at Valencia Vieja. Dual occupation of the uplands and lowlands continued as the characteristic settlement pattern. It was during the Cañada del Oro phase that the distinct tradition of Tucson Basin decorated Brown Ware ceramics first emerged as variants of the more typical Hohokam Buff Ware (Kelly et al. 1978; Whittlesey et al. 1994:142).

An increase in the number of sites recorded for the succeeding Rillito phase (A.D. 900–1000) suggest population expansion to some investigators (Whittlesey et al. 1994:144). The intensity of use of alluvial fans and floodplain environments increased, but upland areas continued to be important for settlement. With the expansion came a new emphasis on large primary villages, which functioned as community centers fulfilling political and social requirements in highly localized social systems. Primary villages were large, exhibited a great variety and density of associated material culture, and often had one or more public features, namely ball courts. The settlement system focused around the primary village often included one or more hamlets and any number of small farmsteads and temporary camps associated with resource procurement (Doelle et al. 1987:77).

Sedentary Period

The beginning of the Sedentary period, which in the Tucson Basin is equivalent to the Rincon phase (A.D. 1000–1150), saw the maximum expansion of population. Primary villages continued to be important, but settlements were often located along secondary drainages, and a diversity of settlement types and uses of different environmental zones became the norm. Although Rincon Red-on-brown ceramics were the hallmark, there was an apparent florescence of ceramic decorative styles that began in the middle portion of the Sedentary period (Deaver 1989:80–81). This florescence was associated with a major settlement shift that occurred throughout the Tucson Basin. Several large primary villages appear to have been abandoned at this time, and settlement generally became more dispersed (Craig and Wallace 1987; Doelle and Wallace 1986; Elson 1986). The causes for this sudden settlement shift are not entirely clear, and both environmental and social factors have been implicated. The diversification of settlement types in the middle and late Rincon phase, however, reflected a new emphasis on resource-procurement and -processing sites as part of the overall adaptation to the Tucson Basin. Despite the shift in settlement patterns, elaboration of village structure continued, and courtyard groups remained an important organizational form at many communities. At the same time, several Rincon phase sites exhibited a less formal site structure, with some settlements lacking courtyard groups altogether (Whittlesey 2003:69).

Late Formative Period

The Late Formative period in southern Arizona is associated with the Classic period of the Hohokam chronology. The Classic period witnessed a dramatic change in Hohokam settlement patterns, with populations aggregating in a few large primary villages along major drainages, as well as an intensification of irrigation agriculture.

Classic Period

The Classic period in the Tucson Basin is divided into two phases, which have traditionally been defined on the basis of associated ceramics. The Tanque Verde phase (A.D. 1150–1300) was characterized by the presence of Tanque Verde Red-on-brown ceramics (Greenleaf 1975; Kelly et al. 1978). In the subsequent Tucson phase, Gila Polychrome was added to Tanque Verde Red-on-brown (Whittlesey 2003). This latter phase has been dated between A.D. 1300–1450. In addition to the appearance of Tanque Verde Red-on-brown ceramics, the onset of the Classic period has traditionally been defined by widespread changes in material culture, settlement organization, and public architecture. With the Classic period came a new architectural style: rectangular, semisubterranean, adobe-walled rooms became the preferred house forms, although pit houses continued to be used. As in preceding periods, dwellings were often stand-alone structures (Whittlesey et al. 1994:155), although during the Classic period, many were constructed in contiguous groups sharing walled compound spaces (Fish et al. 1992b:20). Platform mounds replaced ball courts as public structures in the Classic period, and there was a marked shift in burial practices from cremation to inhumation.

Initially, the Classic period was thought to have been brought about by the movement of Salado populations into

the Phoenix Basin and points south (Haury 1945). More recently, several investigators have posited that these changes were a result of in situ cultural change with little external influence (Doyel 1980; Sires 1987). As with the rest of the Hohokam area, the situation in the Tucson Basin is not entirely clear. Evidence for a gradual, in situ shift was found at some sites, such as at Punta de Agua, where Greenleaf (1975:52) interpreted the transition between late Rincon and early Tanque Verde Red-on-brown ceramics as a continuum in which changes in vessel shapes and design elements represent a transformation of Rincon Red-on-brown into a new ceramic type. Architectural evidence suggests a similar type of experimentation at several settlements. Several instances of houses-in-pits existing contemporaneously with aboveground or semisubterranean adobe-walled structures have been documented (Jones 1998; Slaughter 1996). By contrast, the sudden appearance of large settlements such as those in the Marana Community in the northern Tucson Basin and the University Ruin in the eastern Tucson Basin is more in accord with population movement into the region (Fish et al. 1992b). Clearly, further research that targets migration and the material correlates of ethnicity are necessary before the question can be put to rest.

Protohistory

Southern Arizona was the northernmost frontier of New Spain for nearly three centuries, from 1539 to the independence of Mexico in 1821, or for most of the Spanish colonial presence in the New World. The remoteness of the region from the center of New Spain meant that the period between initial exploration and actual settlement by Spaniards was unusually long, lasting more than a century and a half. The conventional definition of the beginning of the historical period as the moment when Europeans first arrived applies less to southern Arizona than perhaps to any other part of New Spain. The first substantial European presence, and thus the first substantial descriptions of the region and its inhabitants, did not come until the late 1600s. That is when the Jesuits, most notably Eusebio Francisco Kino, began a program of exploration and missionization in what are now Sonora and southern Arizona—the Pimería Alta, or the upper (i.e., northern) region of the Pima.

The protohistoric period in southern Arizona, linking the end of true prehistory and the beginning of written history, is inconsistently defined and poorly understood. It is a convenient way of referring to Native American cultural developments during a time when European influences—crops and livestock, material culture, and especially disease—were undoubtedly present but largely unaccompanied by Europeans. The first Spanish explorers to cross the Southwest, and presumably Arizona, were Fray Marcos de Niza in 1539 and Francisco Vásquez de Coronado in 1540. Both journeys were poorly documented, the actual routes they followed are uncertain, and neither prompted any further exploration of southern Arizona. The region continued essentially unvisited by Spaniards for the next century and a half. The documentary gap spanning the period between 1539 and the beginning of sustained contact with the Spanish, from approximately 1700, defines the protohistoric period for most archaeologists, although some extend the end date to the establishment of presidios in southern Arizona, beginning in the 1750s (Majewski and Ayres 1997; Ravesloot and Whittlesey 1987; Whittlesey et al. 1994). For additional discussion of the protohistoric period, see Chapter 4.

Prehistoric and Protohistoric Features and Materials in the Joint Courts Complex Area

Three isolated prehistoric features were found in the Joint Courts Complex area. These consisted of a roasting pit dated to the Middle Archaic period and two small pit structures dated to the Cienega phase of the Late Archaic period (see Figure 34) (see Appendix B for further details on these features). In addition, prehistoric ceramics and lithics were found in historical-period contexts. The latter were mixed with historical-period materials, most likely after historical-period features were excavated into deposits with prehistoric refuse.

Middle Archaic Period

Feature 22242 was a large (2.3 by 1.7 m), but shallow (0.25 m) roasting pit (Figure 37) located in the northwest corner of the project area about 10 m from the intersection of Stone and Toole Avenues. The feature contained a large amount of fire-altered rock, equaling approximately 300 pieces. A total of six stone artifacts were recovered from the pit, including a core, an edge-modified flake, three manos, and one indeterminate piece of ground stone. These artifacts were likely placed into the pit after having been exhausted and were subsequently used as thermal mass. The few artifacts present in the roasting pit do, however, provide a limited amount of information on subsistence. The three manos recovered from the pit were all basin manos. Basin manos have been correlated with Middle and Late Archaic ground stone collections from southern Arizona as evidence for wild-plant food economies, as well as early maize subsistence (Adams 2002:120–121).

Figure 37. Photograph of Roasting Pit 22242.

The edge-modified flake may have been used to process animal or plant resources.

A radiocarbon date obtained from mesquite charcoal produced a date of 2620–2460 cal B.C., indicating that the site was utilized during the Middle Archaic period. This roasting pit represents just one of a handful of Middle Archaic aged features documented in the Tucson Basin, and statistical comparisons (see chronological discussion in Appendix B) indicated that it may have been roughly contemporaneous with one or more features excavated at the nearby site of Los Pozos. Although it is possible that the mesquite charcoal dated from the roasting pit reflects scavenged old wood and, therefore, the radiocarbon determination obtained for this feature predates the actual use and abandonment of the pit, any real age difference most likely would be on the order of decades to centuries rather than millennia. Thus, this roasting pit is interpreted as having been utilized during the Middle Archaic period, and it represents the earliest documented occupation in the Joint Courts Complex Archaeological Project area.

A flotation sample from Feature 22242 preserved evidence only of charred mesquite wood fragments. This limited evidence suggests presence of mesquite trees in the vicinity, and that mesquite was likely used as fuel wood, but does not provide any data on what foods or other materials were processed in the roasting pit.

In addition to this feature, a single projectile point recovered from the fill of a historical period grave pit (Feature 7515) corresponds to the Chiricahua type. According to Huckell (1996), Chiricahua side-notched, concave-base projectile points are distributed throughout the Southwest, dating to the Middle and Late Archaic time periods (ca. 4500–1500 B.C.). The Chiricahua projectile point type has at times been confused with similar types, including the Pinto and San Jose projectile point varieties. Further definition of the Chiricahua type has led to the distinction of the Ventana side-notched type (Justice 2002:166–170) to which the Joint Courts Complex specimen is assigned. The presence of a Ventana Side-notched projectile point recovered from the fill of Feature 7515 suggests this projectile point may be contemporaneous with the use of the roasting pit. The two, however, are not closely related spatially; Feature 7515 is about 80 m southeast of the roasting pit.

Late Archaic Period

Two small pit structures (Features 3370 and 19021) dating to the Cienega phase were identified and excavated during the course of this project. Both pit structures generally conform to the small Late Archaic period–style houses; however, significant historical-period and modern disturbances have affected the integrity of these features.

Feature 3370 was located in Locus C within the boundary of the historical-period military cemetery approximately

12 m east of the Tucson Newspapers building's basement. The pit structure measured approximately 3.4 by 3.1 m (Figure 38). It was constructed in a circular pit 0.22 m deep with 11 perimeter posts erected along the inside edge of the pit. No interior or central support posts were evident. Macrobotanical analysis of charred plant remains collected from the upper fill of the structure identified copious amounts of *Gramineae* (grass) stems, suggesting that the roof and walls of the structure were covered with grass thatching that later burned. The floor consisted of the base of the aboriginal pit excavation with no evidence for formal floor preparation. The floor also exhibited evidence of burning with areas of charcoal staining throughout. A shallow basin-shaped fire pit was located in the center of the structure. The pit was slightly irregular in plan view and measured 70 by 60 cm in diameter and 8 cm in depth. The floor contained six additional intramural pits. These included 3 small bell-shaped pits, which ranged in size from 28 to 55 cm in diameter and 30 to 55 cm deep, and 3 small circular basin-shaped pits ranging in size from 20 to 46 cm in diameter and 17 to 42 cm in depth. No formal entry was observed. The entry to this structure would have likely consisted of a gap in the wall.

A total of 33 artifacts were recovered from the floor of this structure, 30 of which were stone artifacts. No ceramics were found in either structure. The stone artifacts consisted primarily of debitage representing both bifacial- and core-reduction technology, 4 cores, a hammer stone, 3 basin manos, 1 flat mano, a palette, a lapstone with ochre staining, a manuport cobble, 2 stone balls, and a piece of fire-altered rock. The remaining artifacts consisted of three pieces of worked marine shell: an *Olivella* shell bead, a cone shell bead, and a cowry shell pendant. Two Cienega-style projectile points were also recovered from the fill of this structure (Figure 39). The base of a third Cienega point was recovered from a historical-period grave pit (F513) in the military cemetery, located about 25 m south of Feature 3370.

The record of plant use within Feature 3370 includes frequent use of cottonwood/willow and mesquite as fuelwood, along with grass stem fragments for other daily needs (see Table B.10, Appendix B). Cottonwood/willow and mesquite wood preserved in half of the flotation and macrobotanical samples examined from this structure, suggesting they frequently served as fuels and possibly construction elements. In addition, occupants of the structure brought in saltbush branches, ironwood, and arrowweed stems to serve other uses. Evidence of foods includes mesquite seeds, implying use of the ripe pods, and maize. The availability of maize cobs to be burned as fuel or tinder implies occupants had access to this domesticated crop, possibly tending maize plots along the Santa Cruz River.

Feature 19021 was also located in Locus C, but immediately west of the Tucson Newspaper Building basement (Feature 10235), with the western half of the structure extending beneath Stone Avenue (Figure 40). It was slightly larger than Feature 3370, measuring approximately 3.6 by 2.0 m. It was also constructed in a deeper pit (40 cm). A series of at least 16 perimeter posts were erected along the inside of the pit edge, which likely supported horizontal cross members, onto which brush, grass, or mats were lashed. No interior or central support posts were used in the construction. The walls likely had an application of mud or adobe along the outside of the thatching, as evidenced by the numerous pieces of burned daub in the fill of the structure. The floor appeared to be unusually hard and well preserved, indicating the floor may have been formally prepared. The floor also exhibited evidence of burning with areas of charcoal staining.

A patch of oxidation was observed along the southern end of the structure, which may represent a hearth area, although no pit was present. The floor contained 5 intramural pits including 3 small (18 by 35 cm diameter), shallow (5 to 29 cm deep) cylindrical-shaped pits and 2 ovate to circular basin-shaped pits ranging in size from 33 to 45 cm in diameter and 14 to 18 cm in depth. No formal entry was observed; however, in the southern end of the structure, a portion of the floor was ramped-up to the edge of the pit wall, indicating a possible entryway. An ephemeral patch of oxidization was located approximately 60 cm to the interior of the structure from this ramp, which suggests this was a possible hearth area. The entry to this structure would have likely consisted of a gap in the wall, and no exterior or protruding entry was observed. The floor assemblage consisted of two multidirectional cores and a basin mano.

Flotation and macrobotanical samples within Feature 19021 preserved evidence of wood and food that may have been used in the structure (see Table B.10, Appendix B). Fires were fueled with mesquite wood. Saltbush and creosote bush shrubs also provided wood for some purposes. The only evidence of food recovered from this structure, however, was a maize cupule dating to the protohistoric period (see Chronometric Studies, Appendix B.1). This maize cupule was collected from the upper fill of Pit Structure 19021 and was likely intrusive to the structure. Rafter Radiocarbon Laboratory determined that the cupule was intact and not contaminated.

The archaeobotanical record of these prehistoric features documents maize in the region during the Cienega phase. Groups living along the Santa Cruz River also gathered mesquite pods as food, leaving the hard seeds behind. Occupants burned maize cobs as tinder or fuel and may well have grown maize plants in the vicinity of their dwellings. Mesquite wood and wood of cottonwood and willow trees all provided fuel and likely raw materials for construction and for making tools. Grass, reedgrass, and arrowweed stems were all sought for various household needs, along with occasional use of ironwood and branches of creosote and saltbush shrubs.

Accelerated Mass Spectrometry (AMS) dates were obtained from *Gramineae* (grass) stems, *Prosopis* (mesquite) seeds, *Pluchea* (arrowweed) stems, and a *Zea mays*

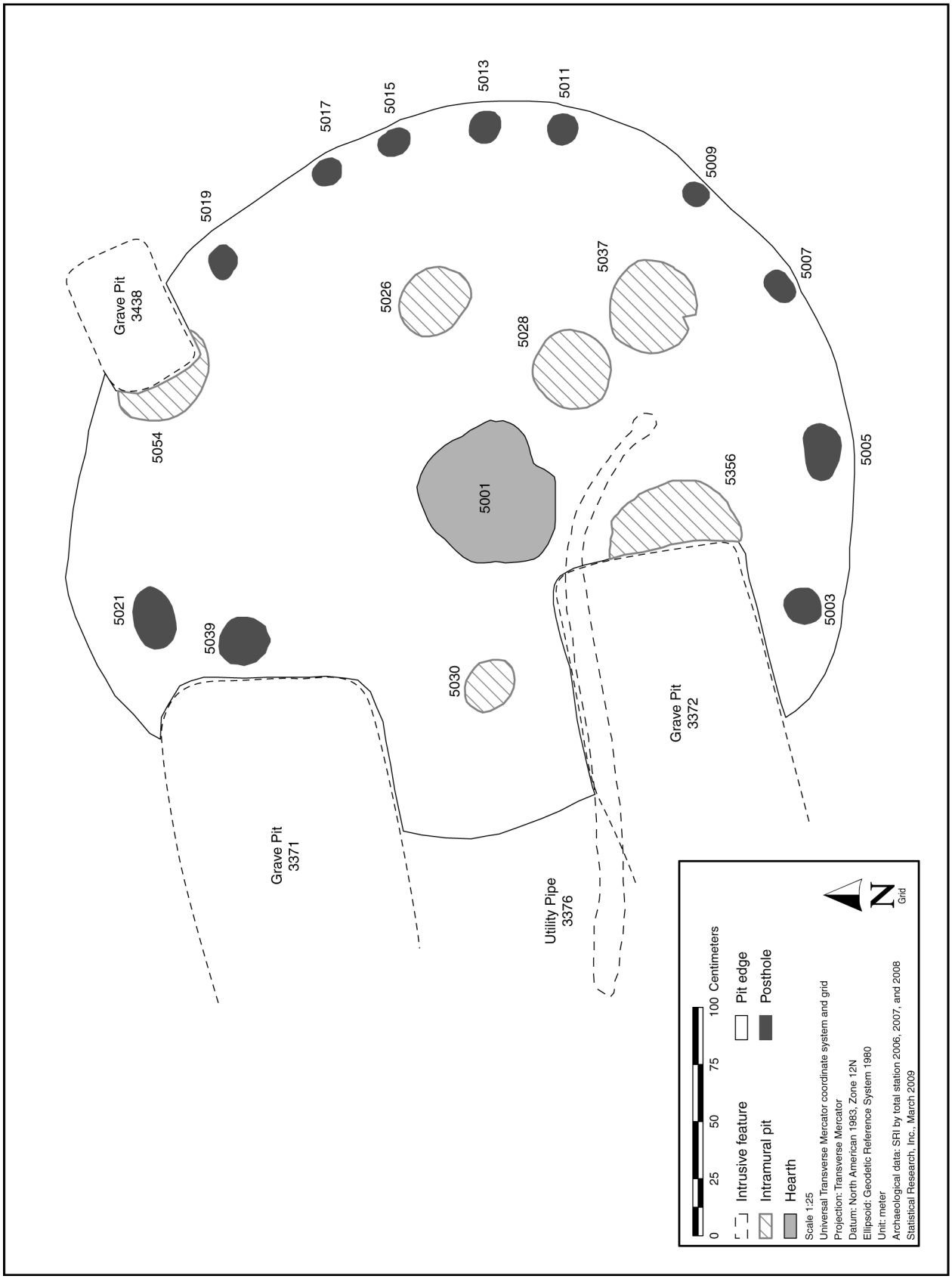


Figure 38. Line drawing of Pit Structure 3370 showing intrusive grave pits and a modern utility pipe.

Figure 39. Projectile points recovered from the Joint Courts Complex Archaeological Project area.

Figure 40. Photograph of Pit Structure 19021 with the west half extending beneath Stone Avenue and a large disturbance from a modern light pole in the center of feature.

cupule from Feature 3370 (see Chronometric Studies, Appendix B.1). These analytical results were combined to provide a date range of 210–110 cal B.C. for this structure. AMS dates were obtained from *Phragmites* (common reed) stems and *Atriplex* (saltbush) stems from Feature 19021. These results were combined to provide a date range of cal 350–110 cal B.C. for the second structure. A third date was recovered from a *Zea mays* cupule fragment; however, the analytical result was a date range of cal A.D. 1440–1640, and was therefore determined to be intrusive into the fill of the structure.

Five prehistoric radiocarbon dates obtained from these two pit structures indicate that the structures were utilized during the Late Cienega phase of the Late Archaic period. The five determinations formed a statistically cohesive group and suggest that the two structures represent a single occupation episode that occurred between roughly 200 and 160 cal B.C. Further comparison with

radiocarbon dates from similarly aged sites in the Tucson Basin suggest that the Joint Courts Complex pit structures were coeval with at least some of the pit structures at Los Pozos and possibly with one or more structures at the Santa Cruz Bend and Stone Pipe sites (see Figure 36). The radiocarbon dates obtained for the two pit structures are also statistically different from the date obtained for roasting pit Feature 22242. The latter feature appears to have been utilized and abandoned at least 2,000 years prior to the structures. A single archaeomagnetic sample was also collected from the hearth of Pit Structure 3370. Because this sample was collected from a feature that predates the existing Southwest master curve, it could not be dated. Furthermore, the sample's relatively poor precision would make calendrical dating impractical even if an appropriate curve segment was available.

A total of 304 stone artifacts were recovered from the two pit structures, including their fill (Table 3). Of that total, 84 percent (n = 256) consist of flaked stone debitage. At first glance, the two pit structures appear to have very similar collections of debitage, though Feature 3370 has quite a bit more (164 to 92) than Feature 19021. When comparing the flaked stone debitage from the two pit structures, a pattern emerges with Feature 3370 having more of a focus on biface reduction, as well as having a much higher percentage of fine-grained materials, both of which indicate a greater propensity toward tool manufacture (Table 4). Overall, the ratio of bifacial flakes to core reduction flakes in Feature 3370 was 0.35 to 1, compared to 0.16 to 1 in Feature 19021. In general, biface-reduction debitage was smaller in overall size than core-reduction debitage; however, artifacts made with finer-grained materials were not smaller than those made with medium- or coarse-grained materials. Twenty-two percent of the flaked stone debitage from Feature 3370 consisted of fine-grained materials such as chert, chalcedony, and fine-grained (aphanitic) rhyolite, whereas only 2 percent of the debitage from Feature 19021 consisted of such fine-grained materials. The higher ratio of chert and chalcedony in Feature 3370 also shows a partiality to imported, fine-grained materials. When investigating both reduction stage and material type for debitage collected from pit structures, 39 percent of the biface-reduction flakes were fine-grained materials in Feature 3370, whereas only 12.5 percent of biface-reduction flakes were fine-grained materials in Feature 19021. The presence of expedient tools, such as edge-modified pieces, is also a characteristic difference between the two pit structures. Feature 3370 contained only one edge-modified piece but had two finished projectile points, whereas Feature 19021 contained four edge-modified pieces and no formal flaked tools.

Floor collections from the two pit structures were also quite different. Feature 3370 had a total of 29 stone artifacts resting on the floor, whereas Feature 19021, contained only 3. This disparity may be a result of the abandonment process, or alternatively the two structures served different functions. Feature 3370 was heavily burned and may have burned unintentionally before the contents could be removed. Feature 3370 may also illustrate a focus on formal tool manufacture and resource processing. The stone artifacts from Feature 3370 also indicate a specialized function. The presence of a palette (Figure 41), a polisher, and a lapstone with ochre staining (Figure 42) indicate the processing of ochre and perhaps other specialized or non-subsistence-based resources. The structure also contained two stone balls (Figure 43), for which a specific function has yet to be agreed upon. Adams (2002:193–194) uses ethnographic information to interpret the function of stone balls as possible gaming pieces, club heads, noisemakers, or racing stones.

Lithic material types represented in the collection include an assortment of igneous and metamorphic rocks, with a high availability present in the Santa Cruz River alluvium as well as the nearby Tucson, Catalina, Santa Rita, and Rincon Mountains. Igneous materials include andesite, basalt, vesicular basalt, granite, rhyolite (both aphanitic and porphyritic), and tuff. Metaquartzite and metasediment were also well documented and comprised the bulk of the metamorphic rocks in the collection, with a few instances of schist and slate. Silica precipitates (cryptocrystalline material) include chert and chalcedony, and these were also well represented in the collection. The cryptocrystalline material represented in the collection is not as easily available near the project area and was likely obtained from quarries in the Tucson and Rincon Mountains, or through trade networks. Sedimentary rocks were not identified in the stone artifacts from this project. Minerals identified in the collection include quartz and mica.

One interpretation of the lithic data for the two pit structures shows two contemporaneous features with apparently different functions or abandonment characteristics. Feature 3370 shows a propensity towards imported materials, bifacial reduction and formal tool manufacture, as well as having a diverse floor assemblage. Conversely, Feature 19021 had few artifacts on the floor; those that were present indicated more of a focus on core reduction of local materials and expedient tools.

Feature 3370, also contained all of the analyzed shell recovered from the prehistoric component of the project area. The collection from Pit Structure 3370 consisted of six marine shell artifacts representing four different marine shell genera in addition to a marine gastropod of unknown taxon (Figure 44; Table 5). Although two of the six specimens were unworked fragments, the collection did not contain evidence for shell-artifact-manufacturing activities, indicating that the occupants of the pit structure were likely shell-artifact consumers rather than producers. It is unknown whether the unworked specimens are fragments of broken shells or fragments of broken ornaments, tools, or manufacturing debris. Additionally, the collection was made up of mostly decorative items, consisting of both relatively common (spire-lopped beads) as well as uncommon (cowry ornaments) types.

Table 3. Stone Artifacts, by Feature

Artifact Type	Cemetery Contexts		Prehistoric Contexts		Total
	Grave Pits	Burials	Roasting Pit	Pit Structures	
Flaked stone artifacts					
Biface (nonprojectile point)	2	—	—	—	2
Core	4	—	1	9	14
Debitage	168	—	—	256	424
Drill	1	—	—	—	1
Edge-modified piece	2	2	1	5	10
Hammerstone	—	—	—	1	1
Projectile point	3	4	—	2	9
Ground stone artifacts					
Ball	—	—	—	2	2
Ground stone (indeterminate)	5	—	1	3	9
Lapstone	—	—	—	1	1
Mano	3	—	3	7	13
Palette	—	—	—	1	1
Polisher	—	—	—	1	1
Manuports					
Unmodified cobble	1	—	—	3	4
Fire-altered rock	5	—	—	13	18
Total	194	6	6	304	510

The marine shell taxa indicate ties with the Gulf of California and possibly the coast of southern California. Although the local population may have obtained the shell directly, it is more likely that they acquired the shell through exchange. As early as the Middle Archaic period, widespread trade networks extended between areas of northwestern Mexico, the Southwest, and southern California (Hayden 1972; Howard 1983; McGuire and Schiffer 1982:240–252; Nelson 1991; Teague 1981:12–18; Vokes 1997). Though the exact procurement and distribution systems of marine shell are not fully understood from prehistoric times, evidence of shell manufacture and exchange has been documented archaeologically that points to major trade routes existing between the Gulf of California and southern Arizona, passing through the central Papaguería. During the Late Archaic period, when Pit Structure 3370 was occupied, trade corridors may have followed the Gila River floodplain and drainages (Hayden 1972; Howard 1983; McGuire and Schiffer 1982:240–252; Teague 1981:12–18). Although used most intensively during the Classic period, another major trade route is believed to have followed Río del la Concepción and the Santa Cruz River through northern Sonora (Nelson 1991; Vokes 2009:396). Other trade routes between the Southwest and California may have passed through the Colorado Desert along the Lower Colorado River region (Ericson et al. 1989; Koerper 1996). Although shell trade between southern Arizona and southern California was less intensive compared to the Gulf of California area, exchange did occur as evidenced by the presence of California coastal shell taxa recovered from Archaic period and Early Formative period sites in the Tucson Basin (Vokes 1997, 1998, 2001a).

Despite the low frequency of shells, the collection consisted of a variety of different worked-shell artifact types. The Dama dwarf olive and cone shell spire-lopped beads were styles that were relatively common throughout the Southwest as well as throughout prehistory. Spire-lopped beads have been recovered from southern Arizona sites dating from the Late Archaic to the Late Classic period (L. Huckell 1993:313; Vokes 1999, 2001a). The cowry ornaments recovered from Pit Structure 3370, on the other hand, were relatively uncommon in southern Arizona sites as well as sites dating to the Late Archaic period. An Annette's cowry ornament was recovered from a Snaketown pit house dating to the Sedentary period (Haury 1976; Seymour 1988:818), and an unmodified Annette's cowry was found at the Yuma Wash site (AZ AA:12:311 [ASM]), dating to the Classic period (Arthur Vokes, personal communication 2009). A site in Phoenix, La Villa (AZ T:12:5 [PGM]), yielded an Annette's cowry punched whole-shell ornament recovered from a pit house dating to the Pioneer period, or approximately A.D. 680–730 (Schroeder 1994).

Although relatively uncommon archaeologically in southern Arizona, cowry ornaments have been recovered from sites in southern California dating to as early as 5500 B.C. (King 1990). Chestnut cowries (Cypraea spadicea), originating along the coast of California and Baja California, dominate most of these collections; however, some sites have yielded cowry species from the Gulf of California (King 1990). Cowries identified in California and the Southwest have been recovered from a variety of domestic as well as ritual contexts, including burials. Cowries held symbolic meaning for many

Table 4. Lithic-Reduction Stage for Debitage in Pit Structures

Feature No. (Pit Structure)	Reduction Stage	Material Type										Total
		Andesite	Basalt	Basalt (vesicular)	Chalcedony	Chert	Metasediment	Quartz	Quartzite (meta)	Rhyolite	Rhyolite (porphyritic)	
3370	biface reduction	—	2	—	7	5	4	—	10	1	4	33
	core reduction	2	10	—	6	6	7	4	24	—	35	94
	shatter	—	7	—	2	9	2	—	11	—	6	37
19021	biface reduction	—	—	—	—	1	2	—	5	—	—	8
	core reduction	2	4	1	—	—	6	—	25	1	11	50
	shatter	—	13	—	—	—	3	—	16	—	2	34
Total		4	36	1	15	21	24	4	91	2	58	256

Figure 41. Broken palette with striations from Pit Structure 3370.

Figure 42. Lapstone with ocher staining from Pit Structure 3370.

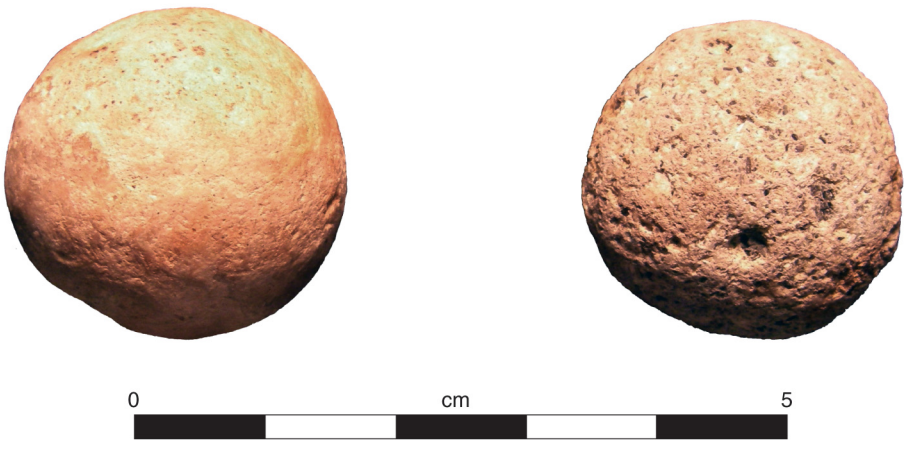


Figure 43. Stone balls from Pit Structure 3370.

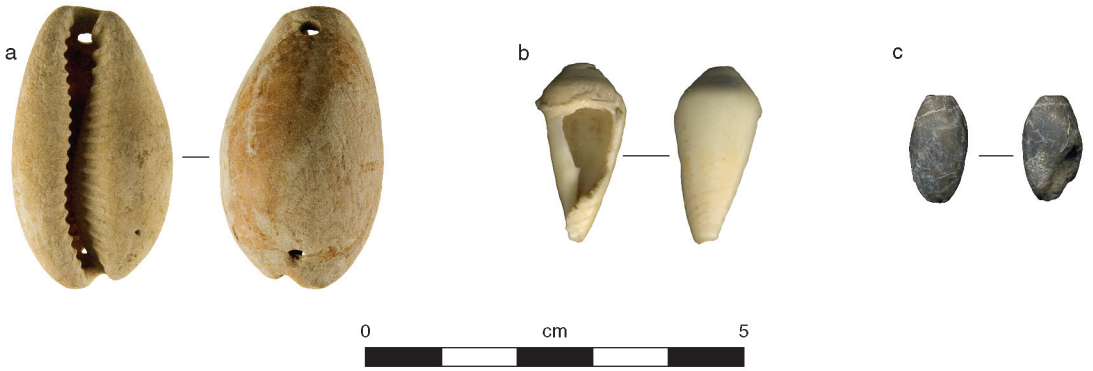


Figure 44. Marine shell artifacts from Pit Structure 3370.

Table 5. Summary of Prehistoric Shell Recovered from Pit Structure 3370

Class	Scientific Name	Common Name	Range	Habitat	Artifact Type	MNI
Bivalve	*Laevicardium elatum*	giant eggcockle	Gulf of California and California coast	Sandy or muddy areas to low-tide line; occasionally found intertidally or at depths greater than 500 m.	unworked	1
Gastropod	*Conus* sp.	cone shell	unknown; however some species found in the Gulf of California	In sand and mud to 15 m.	spire-lopped bead	1
Gastropod	*Cypraea annettae*	Annette's cowry	Gulf of California	On rocks to 30 m.	ornament	2
Gastropod	*Olivella dama*	dama dwarf olive	Gulf of California	In sand and mud to 35 m.	spire-lopped bead	1
Gastropod	unidentifiable	unidentifiable	unknown	Unknown.	unworked	1
Total						6

different cultures, representing life force and fertility, and were often used in birth, wedding, and death ceremonies (Koerper and Whitney-Desautels 1999:88). Considering that cowry shells were relatively uncommon in southern Arizona sites, particularly those dating to the Late Archaic period, the Annette's cowries recovered from Pit Structure 3370 are rare and unique finds. Their rarity, as well as the shell's possible symbolic meaning, suggests questions regarding whether the cowry ornaments were considered high-valued items, perhaps owned by individuals with social, economic, or political standing. Whether the cowry ornaments were worn as decorative ornaments or used in ritual ceremony is unknown.

Prehistoric and Protohistoric Finds in Other Contexts

Although no other prehistoric features were identified in the project area, a large quantity of aboriginal ceramics and lithics were recovered from the project area, including in the fill of historical-period grave pits and even in direct association with burials. A total of 116 historical-period grave pits contained possible prehistoric stone artifacts, totaling 194 specimens (Table 6). These stone artifacts consisted of mostly flaked stone debitage (n = 168, or 86 percent). In general, stone artifacts recovered from these historical-period grave pits are not considered to be associated with the burial feature or the individual placed within the grave pit. These artifacts were found within the grave pit fill and were likely deposited in the grave pit as a result of ground-disturbing activities associated with the digging and filling in of grave pits while the cemetery was in use. In other words, these artifacts were likely on the surface or in subsurface deposits prior to the digging of the grave pit in which they were found and are not associated with historical-period land use in the project area. Stone artifacts associated with burial features, on the other hand, are considered to be in their primary context. A total of 6 stone artifacts were analyzed from burial contexts (see Table 6). Unlike the stone artifacts found in historical-period grave pit fill, these artifacts likely represent objects

Table 6. Stone Artifacts From Cemetery Contexts, by Material Type

Feature Type	Material Type	Biface	Core	Debitage	Drill	Edge-Modified Piece	Fire-Altered Rock	Ground Stone (Indeterminate)	Mano	Manuport	Projectile Point	Total
Grave pit	basalt	—	2	31	—	—	5	2	1	—	—	41
	chalcedony	—	—	10	—	—	—	—	—	—	—	10
	chert	—	—	39	1	—	—	—	—	—	2	42
	igneous (indeterminate)	—	—	2	—	—	—	—	—	—	—	2
	metasediment	—	—	13	—	1	—	—	—	—	1	15
	quartz	1	—	5	—		—	—	—	—	—	6
	quartzite (meta)	—	1	24	—	1	—	—	—	1	—	27
	quartzite (ortho)	—	—	—	—	—	—	—	1	—	—	1
	rhyolite	1	1	8	—	—	—	—	—	—	—	10
	rhyolite (porphyritic)	—	—	36	—	—	—	3	1	—	—	40
Total grave pit		2	4	168	1	2	5	5	3	1	3	194
Burial	chalcedony	—	—	—	—	1	—	—	—	—	—	1
	chert	—	—	—	—	1	—	—	—	—	3	4
	tuff (welded)	—	—	—	—	—	—	—	—	—	1	1
Total burial		—	—	—	—	2	—	—	—	—	4	6

that are associated with the individual. Edge-modified flakes, both produced from fine-grained, imported material (chert and chalcedony) were associated with two burials (Features 18922 and 28765). Projectile points were associated with two other historical-period burial features (Burials 3417 and 28544). Burial 3417 (located within Grave Pit 3244) contained a complete Sobaipuri point (see Figure 39e), and Burial 28544 (located within Grave Pit 13699) had three nearly complete Sobaipuri points (see Figure 39b–d) (see Volume 4 for location and more detailed discussion of these contexts).

Sobaipuri points are characterized as triangular arrow points with deep concave bases and serrated blade margins (Justice 2002:272). The Sobaipuri tradition is associated with the protohistoric and historical-period Sobaipuri and Tohono O'odham of the Santa Cruz and San Pedro River Valleys of southern Arizona (Doelle 1984; Justice 2002; Sheridan 1996). Certain ambiguity arises with the Sobaipuri projectile points from this project when comparing them to other late-prehistoric and protohistoric points from southern Arizona. Several varieties of side-notched arrow points are described by Justice (2002:289–319), including the White Mountain side-notched type that is characterized by a deeply notched, concave base and often an additional pair of side notches. This description closely resembles the projectile point recovered from Burial 3417 (see Figure 39e). As others have pointed out (Ravesloot and Whittlesey 1987; Russell 1908; Vint 2005:15) projectile points were sometimes reused by later groups, which could help explain the ambiguity of defining a strict typology for Sobaipuri points. The presence of Sobaipuri points in association with historical-period burials excavated during the Joint Courts Complex Archaeological Project leads to a decidedly unambiguous conclusion that the points were used historically; however, their original manufacture date or cultural affiliation remains a mystery. In other words, it is problematic to say for sure whether these particular projectile points were manufactured during protohistoric or historical periods, or whether they were used by either Apache or Tohono O'odham groups. Two Desert Side-notched points were recovered from historical-period contexts in the adjacent Block 180; one of these was found embedded in a historical-period burial (Harry 1997:503). This style of point was manufactured between the late prehistoric and the early historical period, indicating that aboriginal-style projectile points were commonly found in early historical-period contexts in southern Arizona.

A total of 487 prehistoric sherds were also recovered from the project area, and most were very small. Only 56 (11 percent of total) decorated sherds were present, and most could not be typed (see Table B.6). The typed sherds included two Cañada del Oro Red-on-brown (A.D. 700–800), including one bowl rim; two Rincon Red-on-brown (A.D. 950–1100), including one bowl rim; and one Rincon Black-on-brown (A.D. 950–1100) from an indeterminate form. No Rillito Red-on-brown (A.D. 800–950) sherds were recorded, although one sherd was classified as Cañada del Oro or Rillito Red-on-brown, and one bowl rim was classified as Rillito or Rincon Red-on-brown. No Tanque Verde Red-on-brown (A.D. 1150–1300) sherds were recorded. Forty sherds, including one bowl rim, could only be identified as indeterminate red-on-brown; two sherds, including one jar rim, could only be identified as indeterminate red-on-buff; and seven sherds could only be identified as indeterminate painted types. Sixty-seven sherds (14 percent of total), including one jar rim, were identified as indeterminate red slipped wares. It is possible that at least some of the latter are historical-period Native American (Papago) sherds that lacked typical attributes of Papago ware. Plain ware ceramics were the most common ware in the collection, as they make up 71 percent of the sherds. The 344 plain ware sherds included 5 bowl rims, 3 jars with necks, and 3 neckless jars (*tecomates*). The sherds were not typed, but their major inclusions—sand, mica, and phyllite—were recorded. Fifty-eight percent of the sherds had only sand inclusions, 32 percent had sand and mica inclusions, 9 percent had only mica inclusions, and 1 sherd had sand and phyllite inclusions. Twenty sherds were classified as various indeterminate wares. All were body sherds. Eight were classified as indeterminate buff wares, 1 was classified as an indeterminate brown or buff ware, and 11 were typed as indeterminate brown or red wares.

The sample of decorated and datable prehistoric sherds was very small (n = 7), and they were not associated with any prehistoric features. All of the decorated sherds were recovered from the fill of historical-period grave pits. However, the small sample suggests a nearby occupation during the Colonial (A.D. 700–900) and Sedentary (A.D. 900–1100) periods. There were no preserved sherds dating to either the earlier Pioneer period or later Classic period. These dates are in accordance with the findings of the adjacent Block 180, where the pit houses were tentatively dated to the pre-Classic (late Pioneer to Sedentary periods) based on sherds present in the fill of pit structures and one archaeomagnetic sample (Whittlesey 1997:422).

As noted above, nearly all of the prehistoric sherds were from the fill of historical-period grave pits. For instance, 401 of the 487 sherds came from the fill of 194 different grave pits. The other 86 sherds came from a variety of feature types, including four privies, three cesspits, four trash deposits, one trash pit, two utility trenches, and one posthole. Two adjacent cesspits both contained a large number of Papago sherds along with a few prehistoric sherds, mostly plain ware. These plain ware sherds may have come from the fill of a disturbed historical-period grave pit, Feature 3041, which was partially cut through and reburied at the base of one of the cesspits. Feature 3340 was a trash deposit adjacent to these two cesspits. It contained just 1 Papago sherd but had 62 prehistoric sherds; however, most of the sherds were from a single red ware jar, possibly an unusual Papago Red rather than a prehistoric red ware. The fill of Trash Deposit 3340 and the upper fill of

Cesspit 3042 both contained mostly construction debris, probably from the cleaning out and demolition of nearby structures, so the prehistoric sherds may have been swept up from the surrounding area during this general clearing and cleaning episode.

The amount of historical-period and modern disturbances in the project area created an environment where surficial and buried prehistoric artifacts became displaced by later, intrusive features. Postcemetery feature excavations were common during the residential use of the project area; however, the most pervasive ground-disturbing activities were the cemetery excavations. Prehistoric ceramic and stone artifacts, therefore, were periodically recovered from grave-pit contexts. Our assumption, based on observations made during fieldwork, was that sediment removed during the excavation of a grave pit was placed back into the same pit after internment of the individual. This assumption also considers that the project area was situated on the outskirts of town and was not subjected to extensive landscaping and construction activities that occurred after the cemetery was abandoned. The prehistoric artifacts in historical-period grave pits are therefore intrinsic to the site and have been simply displaced within the grave pit. It was also concluded that the prehistoric artifacts present in the fill of grave pits represented a close approximation of the original horizontal position of the artifacts, despite vertical displacement within the boundary of the grave pit. Therefore, the historical-period grave-pit features in the project area became a proxy for interpreting the distribution of prehistoric artifacts present on or near the surface of the site that would have been indecipherable otherwise.

The project area is situated on a stable Pleistocene terrace. Any human activity within the project area would have normally been detectable by surface indicators due to very little deposition during the Holocene and the fact that cultural deposits are often shallow and visible at or near the surface. The urban setting of the project area and the amount of disturbance that occurred during historical-period use of the project area removed these surface indicators from our investigation. Analyzing prehistoric artifacts from historical-period grave-pit contexts should bring to light the spatial distribution of artifacts that formerly rested on or near the surface of the site. The spatial patterning of historical-period grave pits containing prehistoric artifacts may also serve to identify the location of prehistoric features and activity areas that were obliterated by later disturbances. This investigation of prehistoric artifacts in historical-period contexts is purposefully limited to cemetery features (grave pits) despite the numerous other postcemetery period features in the project area. Small numbers of prehistoric artifacts were, in fact, discovered in postcemetery contexts; however, the general assumption for this investigation was that historical-period grave pits retained the approximate location of the prehistoric artifacts from the surface. Postcemetery historical-period features did not follow the same assumption as historical-period grave pits, and it was demonstrated that postcemetery features such as privy and cesspits included refuse from outside of the project area.

A similar scenario was identified by Ciolek-Torrello and Swanson (1997:516) in the adjacent Block 180, where prehistoric artifacts were identified in historical-period feature contexts. Ciolek-Torrello and Swanson used diagnostic ceramics from these disturbed contexts, as well as ceramics recovered from less ambiguous prehistoric contexts, to establish a tentative chronology of prehistoric occupation of Historic Block 180 based on the ceramic evidence (see also Whittlesey 1997). This discussion will attempt to replicate this process of determining chronology based on ceramic evidence; however, the possibility of being able to discern the locations of prehistoric activity areas in this manner is unique to this study, given the extensive and regular distribution of historical-period grave pits. Several limitations are inherent in this study, however, including the interpretation of "activity areas" based on the spatial patterning of artifacts in historical-period grave pits. For instance, the assumption that artifacts on the surface of the project area were in their original position after being discarded in prehistory can be questioned and disregards natural and cultural formation processes (cf. Schiffer 1987:17–18). Because the project area is situated on a stable Pleistocene terrace with generally level topography, very little erosion would have occurred within the last few centuries. Also, the project area lay outside the limits of early Tucson and was probably undeveloped until about 1862, when the U.S. Army used the project area for a military cemetery (see discussion of Cemetery Area 1, Chapter 5, Volume 1 of this series). Therefore, the low potential for natural or cultural transformations should bolster the information potential of artifacts recovered from historical-period grave pit contexts.

The distribution of prehistoric artifacts has been plotted across the project area to show the relative density of these artifacts within historical-period grave pits. The resulting contour maps show the relative density of ceramic and stone artifacts across the project area (Figures 45 and 46). A further attempt to define more specific or chronologically sensitive information was unproductive. For instance, plotting the distribution of bifacial-reduction debitage versus core-reduction debitage failed to provide any meaningful spatial patterning because insufficient numbers of these artifact types were present in historical-period grave pits. This process was repeated for other artifacts types, including flaked and ground stone tools and diagnostic ceramics, which also proved unsuccessful.

As expected, a high density of stone artifacts was identified in historical-period grave pits on the west side of and adjacent to Pit Structure 3370, a Late Archaic period feature that was intruded upon by multiple historical-period grave pits. Lower concentrations of stone artifacts were also found in historical-period grave pits to the south and northeast of this feature, emphasizing the importance

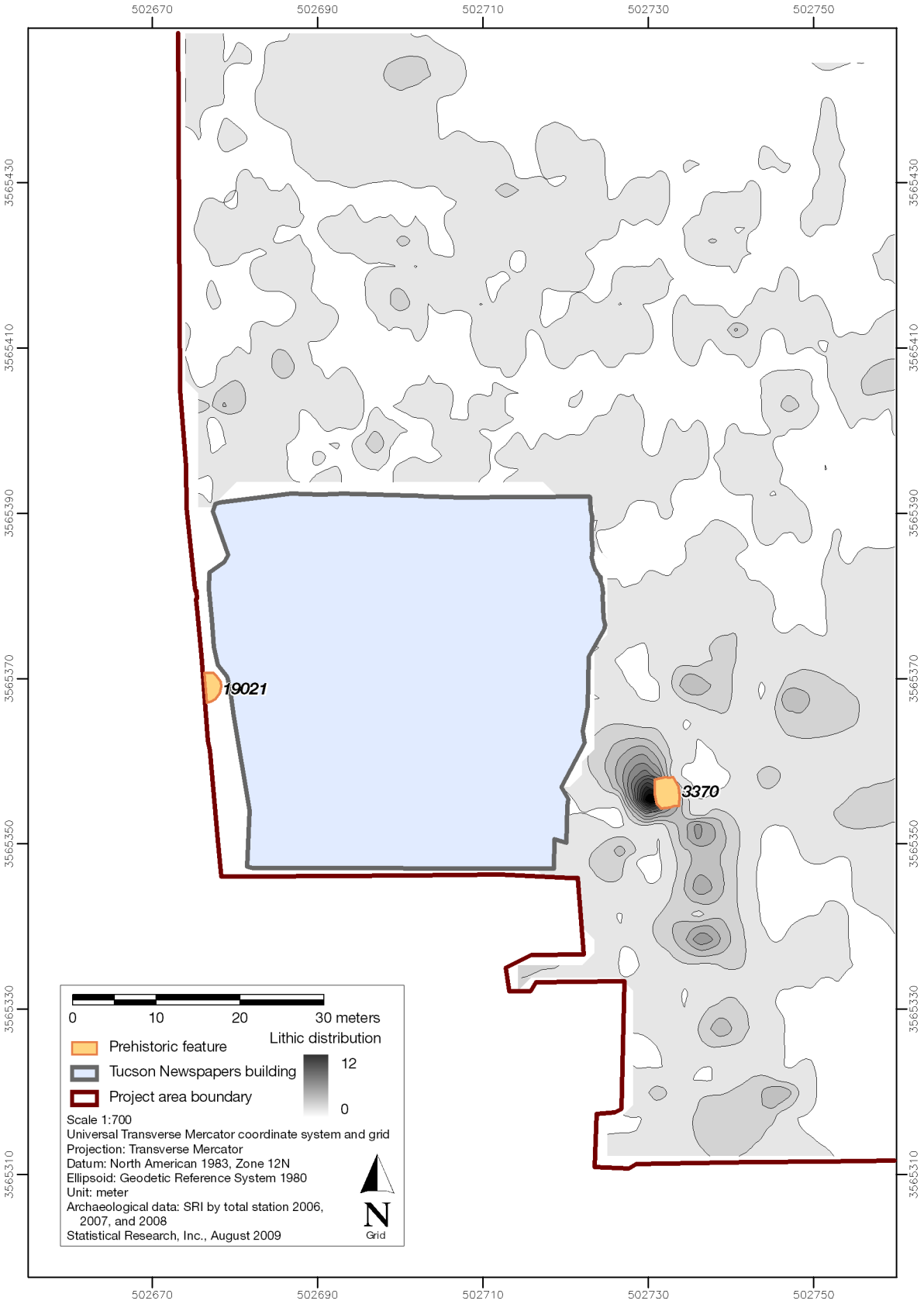


Figure 45. Contour map showing distribution of prehistoric stone artifacts recovered from grave pits in the Joint Courts Complex Archaeological Project area.

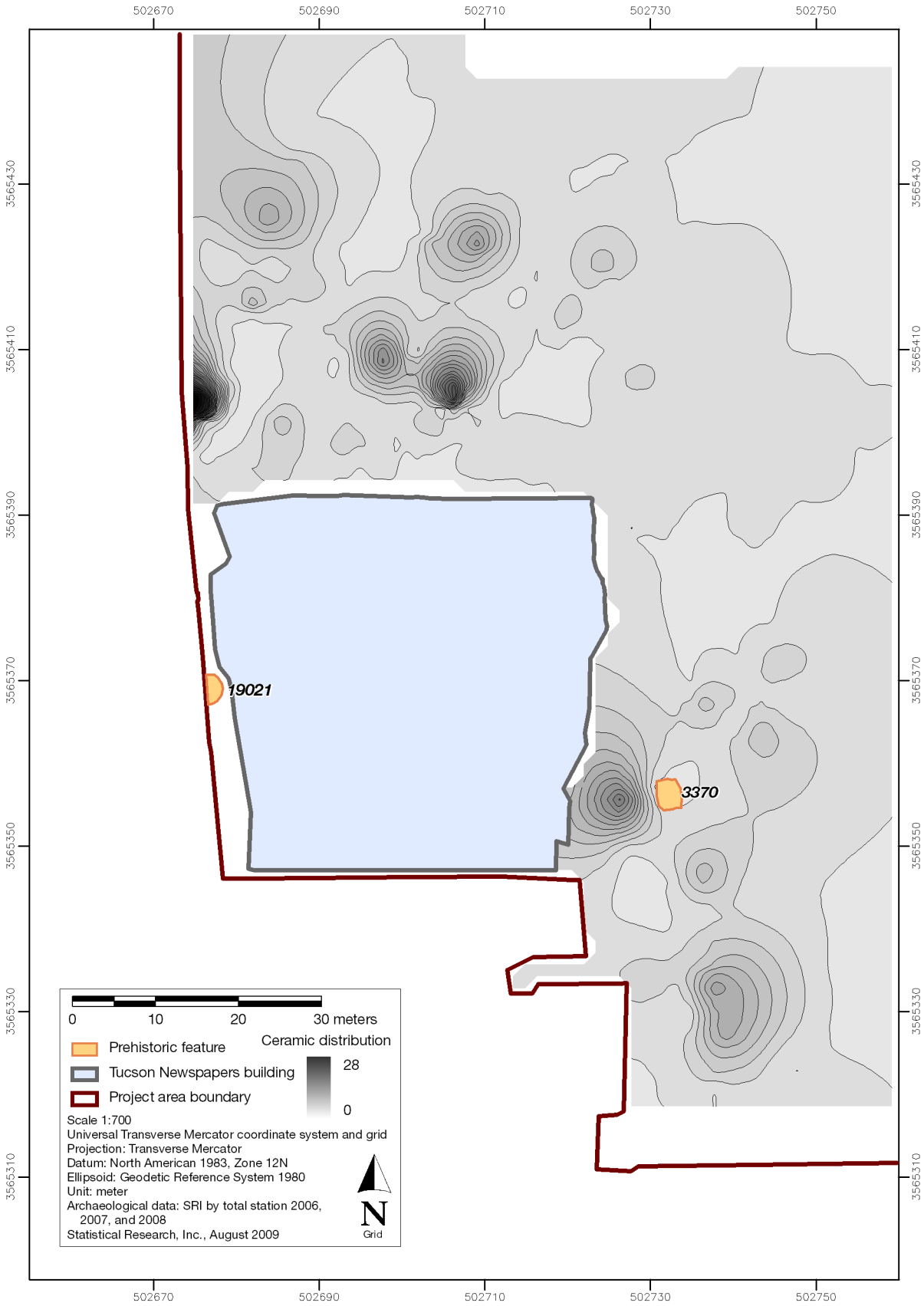


Figure 46. Contour map showing distribution of prehistoric ceramic artifacts recovered from grave pits in the Joint Courts Complex Archaeological Project area.

of this association. Indeed, the concentration of stone artifacts in historical-period grave pits surrounding Pit Structure 3370 is likely associated with the original occupation of the pit structure, including possible extramural activity areas (see Figure 45). Similar concentrations are not evident near the two other prehistoric features, although the sampled area around Pit Structure 19021 was greatly constrained by Stone Avenue and the excavation of the basement of the newspaper building. Ceramics exhibited a different distribution. The highest concentrations were located north of the newspaper building, with lesser concentrations west and south of Pit Structure 337 (see Figure 46). In particular, the area of high ceramic concentration shown on the map along Stone Avenue to the northwest of the newspaper building represents two adjacent historical-period grave pits that contained a variety of ceramics, including a sherd from a Rincon Red-on-brown vessel, as well as several plain ware, red ware, and buff ware ceramics totaling 44 sherds (see Table 3.B.2). The number and variety of ceramics from these two grave pits suggests a possible Sedentary period artifact scatter or perhaps an extramural storage or refuse pit that was disturbed when the grave pits were dug in the 1860s or 1870s. In Historic Block 180, Ciolek-Torrello and Swanson (1997:516) identified large numbers of Sedentary period (Rincon) ceramics associated with a prehistoric Hohokam occupation; these were mixed with the fill of historical-period trash deposits. Perhaps the concentration of ceramics in the Joint Courts Complex Archaeological Project area was associated with the Sedentary period occupation in Block 180, located a few hundred meters to the southwest, or to an obliterated prehistoric feature in the project area. Another historical-period grave pit (Feature 13581), just east of this concentration, also shows a high concentration of ceramic artifacts, primarily plain ware sherds. Feature 10190, a historical-period grave pit located immediately to the west of Pit Structure 3370, also had a high concentration of sherds from a possible Rincon Red-on-brown vessel; however, these sherds were not temporally related to the pit structure.

The prehistoric feature contexts were limited to the Middle and Late Archaic periods in the project area. However, this artifact distribution shows a continuum of Native American use of the project area from the Middle Archaic (ca. 4000–1500 B.C.) through the Sedentary period (ca. A.D. 900–1100). An ephemeral protohistoric period use of the area was suggested by a single radiocarbon date from a corn cupule and the presence of four Sobaipuri projectile points. Although the corn cupule was clearly intrusive into a Late Archaic period context, its context of use could not be determined. Furthermore, although Sobaipuri points are usually considered to be hallmarks of the protohistoric occupation of southern Arizona, all the points were found in historical-period graves and are clearly associated with historical-period use. As one can see from Figures 45 and 46, several areas within the cemetery show dense concentrations of prehistoric artifacts. These concentrations are interpreted as possible surficial activity areas or places that once had subsurface features that were obliterated by the cemetery or newspaper building excavations. The results of this spatial study have not unequivocally proven the existence of any new or previously unrecognized prehistoric features; however, the evidence suggests that several prehistoric activity areas were present in the project area and were disturbed by historical-period grave-pit digging, while the cemetery was in use. The areas in the southern portion of the project area are likely associated with Pit Structure 3370, and areas to the north are associated with a much later Sedentary period occupation, possibly associated with similar aged features in adjacent blocks of downtown Tucson.

Addressing the Research Questions

Based on the above results, the prehistoric context of the Joint Courts Complex Archaeological Project area can be placed into a temporal, environmental, and cultural framework. By contrast, the results shed little light on the protohistoric period use of the area. Previous research on Middle and Late Archaic period settlements in the Tucson Basin can be used to categorize the prehistoric features in the project area and to help to determine where these settlements fit into broader Archaic period subsistence and settlement patterns. The presence of maize (*Zea mays*) from the macrobotanical and pollen analysis indicates the inhabitants of the project area had access to this domesticated crop, though in limited amounts. The data obtained from pollen assemblages also indicated a strong similarity to a riparian environment. High instances of Chenopodiaceae-*Amaranthus* plant remains are indicative of riparian or channel margin zones. This suggests that the prehistoric occupation in the Joint Courts Complex Archaeological Project area was more closely tied to a riparian environment than to a *bajada* environment.

Below, we revisit the research questions presented at the beginning of this chapter and attempt to answer the questions using data generated from the above analyses.

Question 1: Does the Late Archaic period settlement in the Joint Courts Complex Archaeological Project area differ from that along the Santa Cruz River or, alternatively, that located in nonriverine contexts on the bajada surrounding the Tucson Basin?

The discovery of the Late Archaic period component in the Joint Courts Complex Archaeological Project area was

thought to be unique and could potentially offer a valuable insight into the lifeways of Late Archaic period people in the Tucson Basin. The physical setting of the project area was our initial source of inquiry for the Late Archaic period features. Investigation into the environmental context shows these features occur on the T4 Cemetery Terrace (see Figure 35), a stable Pleistocene landform that was quite different in landscape position than the Late Archaic period settlements discovered in deep alluvial deposits along the Santa Cruz River floodplain (see Figure 36). The Late Archaic period component of the project area was initially thought to represent a nonriverine settlement, although our analytical data shows a slightly different picture. It becomes important at this juncture to make finer distinctions of the environmental context for these prehistoric features. For instance, one of the initial research goals for this project was to evaluate riverine versus nonriverine settlement types. Following our analysis of pollen and macrobotanical samples (see Appendix B), the prehistoric features were found to have a botanical signature very similar to a riparian zone. Therefore, a distinction must be made between a riverine setting and a floodplain setting. The prehistoric features in the project area have an arguably riparian botanical assemblage, despite being located on a Pleistocene terrace.

The Late Archaic component in the project area consisted of two pit structures located approximately 50 m apart with no associated extramural features. Additional features may have been present in the area of the newspaper building but destroyed by historical-period construction. This distribution is markedly different from the dense habitation areas identified at other Late Archaic period sites such as Las Capas, Los Pozos, and Santa Cruz Bend, even taking into account the extensive disturbance in the project area (see Figure 36). As discussed above, the two pit structures are statistically contemporaneous, falling into the Late Cienega phase (ca. 200–160 cal B.C.). The single dated pit house, Feature 492, from Block 181 dated earlier in the Cienega phase (ca. 720–700 B.C. or 540–390 B.C.) and was probably not occupied contemporaneously. Chronological analysis revealed an unexpected Middle Archaic component, as well, with a roasting pit (Feature 22242) dating to ca. 2620–2460 cal B.C. In prehistoric sites along the Santa Cruz River, the Middle Archaic and Late Archaic (Cienega phase) occupations are stratigraphically distinct (Gregory 1999, 2001; Mabry 1998a, 2007; Whittlesey et al. 2007). The prehistoric resources for the Joint Courts Complex Archaeological Project, on the other hand, rest on the same stable Pleistocene landform; therefore, these two components (as well as later Formative period materials) exist on a shared surface. This distinction was important geologically and culturally. Geologically, we were able to recognize prehistoric features close to the surface without having to initiate any deep excavations or interpret disparate cultural horizons. The project area remained stable for centuries, allowing us the opportunity to view the changing settlement patterns on a common geological horizon through time. It is most likely that only recent historical-period activity impacted the project to a degree that previous human activity was obscured.

The prehistoric features identified in the project area do have similarities to other nearby sites.. Analysis of the radiocarbon dates from the prehistoric features identified several statistically indistinct dates from other sites along the Santa Cruz floodplain. Numerous features at Los Pozos, Santa Cruz Bend, Stone Pipe, and Coffee Camp are contemporaneous to the two pit structures in the project area. Table 2 shows that there were indeed a variety of contemporaneous settlement locations for this time interval. With the chronometric data obtained from the Joint Courts Complex and Presidio Park projects, the land-use patterns of Late Archaic period populations can be expanded to include occupations on adjacent terraces away from the floodplain settlements that have held most of the attention in recent years (see Gregory 1999, 2001; Mabry 1998a, 2007; Whittlesey et al. 2007). Previous discussions of Late Archaic period settlement patterns (Fish et al. 1986, 1992a; Premo and Mabry 2007; Roth 1989, 1996; Whittlesey and Ciolek-Torrello 1996) emphasized a bimodal settlement strategy, with Late Archaic period populations utilizing floodplain and upper *bajada* areas. The data from the Joint Courts Complex Archaeological and Presidio Park projects, however, suggests an intermediate settlement area with close access to riparian resources.

Late Archaic period populations may have had good reason to occupy such intermediate landscape positions. A dense concentration of Late Archaic period settlements was positioned along the floodplain of the Santa Cruz River to take advantage of a stable drainage for constructing and maintaining canals suitable for early agricultural practices (Ezzo and Deaver 1998; Gregory 2001; Mabry 2007; Whittlesey et al. 2007). Brief periods of intense flooding in the Santa Cruz River channel, however, would have had serious implications for these early farmers. Waters (1988a) recognized damage to prehistoric irrigation features in the San Xavier reach of the Santa Cruz River at the beginning of the Sedentary period resulting from flooding episodes, and suggested that intense floods and channel entrenchment would have seriously affected the ability of prehistoric farmers to continue irrigation agriculture. Similar conditions may have affected earlier Late Archaic period farmers along the Santa Cruz River. During intervals of major flooding, channel migration, or arroyo formation, Late Archaic period farmers living along the floodplain may have had to abandon their residences and fields in search of higher ground, i.e., Pleistocene terraces like that at the Joint Courts Complex.

The architecture of Late Archaic features identified in the project area also exhibits similarities to pit structures along the Santa Cruz floodplain. Analysis of 63 excavated Cienega phase structures at the Santa Cruz Bend site by Mabry (1998a) identified five classes of pit structures,

based on floor area, posthole arrangement, intramural pit volume, etc. These classes of structures along with other artifact and spatial data were used to infer different functions of pit structures. For example, drawing from a large sample of Late Archaic period sites in Southern Arizona, particularly the Tucson Basin, Mabry reports an average intramural pit volume for Cienega phase pit structures as 0.30 m^3. The two Late Archaic period pit structures in the project area have an intramural pit volume of 0.27 m^3 (Feature 3370) and 0.15 m^3 (Feature 19021), indicating slightly less intramural storage volume. Of the six intramural pits in Feature 3370, three were bell-shaped, further indicating a focus on storage in this pit structure. By contrast, the two structures excavated during the Presidio Park project contained no intramural features. Mabry (1998a, 2008) interprets the shift from extramural to intramural storage as a shift from public to private ownership. Mabry believes the gradual shift to an agricultural economy brought about a similar shift from communal to more private storage (cf. Wills 1992). The lack of extramural pits in the project area is perhaps indicative of this shift, although the extensive historical-period disturbance in the project area, may have removed evidence of extramural pits.

Question 2: Is there a meaningful difference between our understanding of "Late Archaic" vs. "Early Agricultural" terminology in terms of the current research trends that have focused on floodplain agricultural settlements?

Due to the ever-increasing amount of archaeological data for the Late Archaic period, there has been a concerted effort to conceptualize the cultural and environmental processes at work during this period. This had led to numerous lexicons being introduced to describe the Late Archaic period. As cultural change exists in many forms, it is sometimes helpful for archaeologists to qualify these changes (Altschul 1995). For instance, the Late Archaic period in southern Arizona has been divided into the San Pedro and Cienega phases, based on chronology, technology, settlement patterns, and material culture. These phases also mark the emergence of some of the earliest maize agriculture in the Southwest, together with a greater investment in irrigation farming. Hence, this Late Archaic period has been referred to as the Early Agricultural period by some investigators (Huckell 1990, 1995). The Early Agricultural period has been used in reference to sites containing the material culture, domestic organization, and botanical evidence that define the emergence of agriculture in southern Arizona. Conversely, contemporaneous sites in the same area may be referred to as Late Archaic based on the lack of these defining cultural components (cf. Gregory 2007; Mabry 1998a:12). It seems problematic, however, to assign one temporal category to settlements with evidence of agriculture while assigning contemporaneous settlements to another temporal category (see Whittlesey et al. 2007:20). The complexities of Late Archaic period subsistence in the southern Arizona have sustained a growing database of knowledge, which has in turn allowed for a similar flourishing of terminology. For instance, the term "farmaging" was conceived by Diehl, ed. (2005:181) to indicate the complex relationship between foraging and farming activities during this period. Along this same line, other sources have used the term "preagricultural" to refer to Archaic period sites or deposits where cultivated plants are absent (Wills 1992). The earliest definitions of the Archaic period adopted the term "preceramic" to refer to the time before prehistoric ceramics were produced (Sayles and Antevs 1941). More-specific terminology has been put forth to define the Late Archaic, such as the Late Pre-ceramic period (Whittlesey et al. 2007). This may be equally confusing with documented evidence of ceramic effigies and crude ceramic containers from sites in the Tucson Basin and elsewhere in the Southwest (Gregory 2001).

For the purposes of this study, the term Late Archaic is used to define this time period, the Late Cienega phase (ca. 400 B.C.–A.D. 50) being a further distinction within this period (Mabry 2005a). This distinction is indicated by the chronological data obtained for the pit structures in the Joint Courts Complex Archaeological Project area, which are contemporaneous with other Late Cienega phase settlements. The archaeological nomenclature of this time period reflects the overall trends of data. The Late Archaic period is indeed one of the more complicated cultural temporal categories in the Southwest, and the emerging data from different sources tends to bring about unique perspectives, thus enabling the use of unique terms.

Question 3: Are there any material remains (botanical, faunal, shell) that would indicate the implementation of subsistence strategies different from those implemented at settlements along the Santa Cruz River floodplain?

As discussed above, the botanical remains from the prehistoric features in the project area indicate the environment resembled a channel-margin, or riparian context, based on the dominance of Chenopodiaceae-*Amaranthus* in the pollen assemblage. This is contrary to the initial expectations that the prehistoric occupation was not in a riparian setting. This finding, however, should not be surprising as similar evidence for a riparian setting was provided by pollen analysis of prehistoric features from the adjacent Block 180 area (Ciolek-Torrello and Swanson 1997). Late Archaic period populations in the Tucson Basin likely did not depend on early maize as an economic staple, which produced smaller cobs and lower yields than later prehistoric varieties (Diehl 2005a; Whittlesey and Ciolek-Torrello 1996). In terms of energy returns, unprocessed maize was outranked by many animal resources and, when processed into flour, by several highly ranked wild-plant resources as well, including pinyon, oak, mesquite, and saguaro. As a result, early maize was probably not as heavily depended upon as in later periods and was consumed mostly as roasted or boiled immature ears and kernels or as parched

and popped dried mature kernels (Mabry 2005b; Whittlesey and Ciolek-Torrello 1996). At Las Capas and Los Pozos, multiple lines of evidence suggest minimal maize processing and limited agricultural dependence during the Late Archaic period (Diehl 2005b; Diehl, ed. 2005; Mabry 2005b). The introduction of maize into prehistoric diets, therefore, did not cause immediate cultural or economic changes or the complete replacement of existing lifeways (Diehl 2005a, 2005b; Gregory and Nials 2005). The presence of maize in both pit structures indicates the inhabitants were engaged in agriculture, or were at least obtaining this crop from fields along the floodplain of the Santa Cruz or other well-watered locations. Conversely, botanical evidence from the contemporaneous settlement at Coffee Camp (Halbirt et al. 1993) indicated an absence of domesticates and a preponderance of *Prosopis* (mesquite) and *Trianthema* (horse purslane). Coffee Camp, like the Joint Courts Complex area, is located in an intermediate position between the Santa Cruz River (in this case in the Santa Cruz Flats about 11 miles west of the Santa Cruz River, 6 miles east of the Sawtooth Mountains, and about 30 miles northwest of Marana) and the lower bajada, strengthening this distinction between floodplain and nonriverine settlements. According to Halbirt et al. (1993:102–103) the pollen record for the Late Archaic period component at Coffee Camp shows the inhabitants were utilizing a greater diversity of plant types compared to the later, Early Formative period occupations at the site. The environment at Coffee Camp during the Late Archaic period likely consisted of open mesquite grassland, and the inhabitants seemed focused on the processing of mesquite. As the flow patterns of the Santa Cruz River shifted, the pollen record at Coffee Camp began to show similarities to a riparian ecosystem. Early Formative period occupations at Coffee Camp utilized a much smaller variety of plant resources, however, including those that are found in a more riparian environment (Halbirt et al. 1993).

Faunal remains were very limited for the prehistoric component of the project area. Only two identifiable elements were recovered from prehistoric contexts that pertain to the occupation of the project area. The Middle Archaic period feature contained a deer-sized long-bone fragment, indicating that inhabitants of the area during that time were hunting animals of this size and consuming them or parts of them in this location. The presence of this bone in a roasting pit further suggests this feature was used to cook the animal. Identifiable faunal bone from the Late Archaic period component consisted of a medium-sized bird bone, possibly from the taxonomic family of water fowl (see Table B.7, Appendix B). This animal was likely found along the Santa Cruz River and may have been hunted by the occupants of the project area. More commonly exploited animals during the Late Archaic period include the taxonomic orders of Lagomorpha (rabbit) and Artiodactyla (deer), though the presence of bird species is not uncommon.

An interesting aspect of the material culture studies was the identification of a variety of marine-shell jewelry from the floor or near floor fill of Pit Structure 3370. Two shell beads were classified as *Conus* and *Olivella* shells, and two shell ornaments were classified as cowry shells (see Table 5). As discussed above, cowry shells (*Cypraea annettae*) have not been previously identified in Late Archaic period contexts in southern Arizona; however, the trade of these marine shells was established prior to this time in California and the Great Basin (McGuire and Schiffer 1982; Nelson 1991). In comparison, a variety of marine shell was recovered from Las Capas and Los Pozos including *Conus*, *Olivella*, and *Laevicardium* (cockle), as well as a variety of freshwater types (Urban and Whittlesey 2007; Vokes 2001b). In general, the collection of marine shell from Pit Structure 3370 is representative of the types of worked shell from other Late Archaic period sites in southern Arizona, except for the presence of the cowry type.

Based on the above evidence, the prehistoric setting for the project area compares favorably with that of the Santa Cruz floodplain. Riparian plant types dominated the pollen assemblage—albeit to a lesser degree than on the Santa Cruz floodplain—and the plant species utilized by the inhabitants of the project area were very diverse (see discussion below and the pollen and macrobotanical discussions in Appendix B). Artifact types were also analogous, and those recovered during the course of this project are indicative of the economic strategies utilized during the Late Archaic period in southern Arizona. However, we have no evidence for extensive cultivation or consumption of maize or other cultivated plants at the site.

Question 4: Could the Late Archaic period pit structures at the Joint Courts Complex Archaeological Project area represent a transitory location between the floodplain habitations found along the Santa Cruz River and nonriverine habitations?

In our initial investigation of the prehistoric component at the Joint Courts Complex Archaeological Project area, it was postulated that these prehistoric features were located within a nonriverine setting. The current channel of the Santa Cruz River is located about 1 km west of the project area (see Figure 35). Therefore, the project area is not situated in a floodplain environment, although it is easily within walking distance. Previous research into Late Archaic period settlement patterns have focused on a bimodal settlement pattern (Premo and Mabry 2007; Roth 1989, 1996; Whalen 1971), which included a dichotomy of upland/lowland resource zones in southern Arizona (Shackley 1996). Lowland settlements in the Tucson Basin are defined as those located along the floodplain of the Santa Cruz River, whereas upland settlements are characterized as upper *bajada* settlements (Premo and Mabry 2007; Roth 1996). The pollen assemblages from Late Archaic period floodplain settlements are dominated by Chenopodiaceae-*Amaranthus,* whereas the assemblages from contemporary upland or bajada settlements

are dominated by sunflower (Other *Compositae*) and bursage (*Ambrosia*) (cf. Davis 1998, 2004a, 2004b; Roth 1989:71–79; Turner and Brown 1994:194–197). For example, Davis and Holloway (2007:Table 15.4) investigated features at Las Capas, along the Santa Cruz River and reported a combined pollen percentage of 66.5 percent Chenopodiaceae, 5.4 percent sunflower (*Compositae*), and 2.7 percent bursage (*Ambrosia*). By contrast, cultural features at the La Paloma site, an upland Late Archaic period site investigated by Dart (1986) in the foothills of the Santa Catalina Mountains, contained only 11.9 percent Chenopodiaceae-*Amaranthus*, but much higher percentages of *Ambrosia* (27.5 percent), and *Compositae* (25.9 percent) (Fish 1986:Table 7.1). The pollen assemblages obtained from the prehistoric pit structures in the Joint Court Complex project area suggest an intermediate setting. Like the pit structures located along the Santa Cruz floodplain, the pollen assemblage from the Late Archaic period features in the project area was dominated by Chenopodiaceae-*Amaranthus,* but with a much lower combined presence of 39.7 percent. Low frequencies of cattail and willow pollen further indicate a mesic or riparian environment for the project area. By contrast, a combined presence of 27.4 percent sunflower is identical to that of La Paloma, whereas, at 4.5 percent, the combined presence of bursage is more similar to Las Capas (see the pollen analysis in Appendix B). Pollen assemblages in Formative period prehistoric features in the adjacent Historic Block 180 were even closer to those from Late Archaic period riverine settlements, with an even higher combined percentage of 51.3 percent of Chenopodiaceae-*Amaranthus*, whereas *Compositae* constituted only 6.4 percent of the assemblage (Cummings 1997). The levels of Chenopodiaceae-*Amaranthus* in the Block 180 features, however, may have more to do with processing and consumption of the weedy plants rather than the natural pollen spectrum of the area. Thus, comparison of pollen frequencies from Late Archaic period features in the project area with those from contemporaneous sites along the Santa Cruz River floodplain suggests that the environmental setting of the project area was somewhat similar to that of riverine settlements, but with a higher representation of pollen types associated with upland environments. Botanical signatures suggest the project area was either relatively close to a riparian environment or, alternatively, that plants collected from a riparian environment were brought to the site.

Another possibility is that the secondary drainage called Arroyo Chico, which ran immediately north of the project area, may have been characterized by a riparian environment during prehistoric times. It is unlikely that Arroyo Chico was utilized in a similar fashion to the Santa Cruz River, where irrigation canals were constructed to support agriculture. Instead, Arroyo Chico likely served as a riparian natural-resource-procurement zone, where animal and plant resources would have been more abundant. In fact, geomorphic maps of the Tucson Basin indicate that Arroyo Chico was an eastward extension of the Santa Cruz River floodplain (see Figure 35), and as such could have provided many of the same resources to the residents of the project area as the Santa Cruz River floodplain, albeit without the irrigation potential. Current research into settlement and subsistence patterns during the Late Archaic period has advocated for moving away from an upland–lowland (riverine versus nonriverine) dichotomy and refocusing attention on "widely distributed micro-niches" in both environmental settings (Mabry and Doolittle 2008:61–65). This supports other observations that the integration of cultigens into the prehistoric economy was geographically and temporally uneven in the Southwest (Doleman 2005; Matson 1991; Vierra 2008, 2010).

Archaeological and geomorphological studies along the Santa Cruz River have shown the floodplain environment to have been fairly suitable for agriculture during the Cienega phase. With the stability of the Santa Cruz channel and predictability of flow, Late Archaic period populations were able to sustain larger and more permanently occupied villages with increased agricultural yields. Huckell (1998a:51) postulates that the Santa Cruz floodplain was broad and vegetated during the Late Archaic period, allowing prehistoric populations to live there and irrigate their fields safely. Consequently, large Late Archaic period settlements have been identified throughout the Santa Cruz floodplain, whereas Late Archaic period features are much rarer on the adjacent Pleistocene terraces. Only three other Late Archaic period features (also pit structures) have been documented away from the floodplain in the Tucson area, all in the nearby Historic Block 181, located northwest of the intersection of Church and Alameda Streets (Gavioli and Thiel 2008). These houses, together with those found in the Joint Courts Complex Archaeological Project and perhaps others that lie undiscovered on nearby blocks, suggest that a village may have been located on the Pleistocene terrace above the Santa Cruz floodplain as early as the Cienega phase.

The settlement trend for the Late Archaic period appears to have been dynamic during a time of tremendous economic flexibility (Wills 1988, 1992). Disparate settlement locations are more likely indicative of expanding resource zones rather than transitory locations between *bajada* and riverine locations. When environmental conditions were favorable, populations would have had the ability to expand their settlement locations to include areas where riparian and more upland resources were available. The project area may represent individual households or task groups using the site as a short-term or seasonal occupational locale, or base camp, to conduct a variety of subsistence tasks including hunting and gathering from riparian environments. This evidence is in accordance with the "farmaging" pattern, which encompasses a diverse subsistence strategy (see also Wills and Huckell 1994). The location of this occupation away from either a riverine or an upper

bajada environment is at odds with the bimodal settlement patterns recognized in previous studies and indicates that intermediate settings were also exploited.

Question 5: What can the prehistoric features and artifacts tell us about the changing use of the project area during prehistory? How is the change in subsistence strategies from foraging to farming reflected in our data, and how did Native American populations use the landscape through time?

The prehistoric features identified in the project area are limited in number but are informative as to the changing use of the project area during prehistory. The first chronological stage is represented by a roasting pit (Feature 22242) that dates to the Middle Archaic period (ca. 2620–2460 cal B.C.). This feature may represent the earliest dated feature in the downtown Tucson area (Homer Thiel, personnel communication 2009). Roasting pits are generally associated with resource processing, such as the cooking of consumable plant or animal material. One would expect a feature of this nature to be found within a larger habitation area, with associated storage pits or pit structures. This was not the case, however. Because Feature 22242 was located at the northern tip of the project area, there may be additional Middle Archaic age features situated outside of our purview or disturbed by the historical-period activities in the project area. The Middle Archaic period is not as well known as the Late Archaic period in the Tucson Basin, and evidence of occupation is generally limited to just a few habitation sites along the Santa Cruz floodplain (Gregory 1999) or upland sites where resource procurement was the main focus (Huckell 1984). In any case, the presence of Feature 22242 demonstrates that groups were using this terrace above the Santa Cruz floodplain to process economically important materials. The presence of a Ventana Side-notched projectile point recovered from the fill of a historical-period grave pit (Feature 7515) leads one to postulate that this projectile point may be contemporaneous with the use of the roasting pit, despite not being spatially related. Justice (2002:167) provides a date of ca. 3500–1800 B.C. for Ventana Side-notched projectile points, which overlaps the calibrated date range for Feature 22242.

Evidence from other Middle Archaic period occupations along the Santa Cruz River floodplain points to people initiating the transition to a more agricultural based economy by favoring certain wild plants and beginning the cultivation of domestic plants (e.g., *Zea mays*). Evidence from contemporaneous sites in southern Arizona also shows a more diverse resource procurement strategy focused on *bajada* settlements, where small limited-activity camps were used to exploit wild resources. If our assumptions are true for the Middle Archaic period, that small groups were exploiting different environmental zones on a seasonally based procurement strategy, then Feature 22242 could represent a small link in the chain between the emerging cultivation along the floodplain and the hunting and gathering strategy of the *bajada* settlements.

The roasting pit did not contain any indication of domesticated plants; therefore, it was likely used for the processing of wild-plant and/or animal resources. Several manos were recovered from the fill of the pit, suggesting the inhabitants were processing wild-plant materials and then discarding (or recycling) the ground stone within the pit for use in the roasting process. In addition to macrobotanical evidence of mesquite, sunflower (Other *Compositae*), Chenopodiaceae-*Amaranthus*, and spiderling (*Boerhavia*) were well represented in the pollen record for Feature 22242. Chenopodiaceae–*Amaranthus*, in particular, has been indicated as an economically important plant during the Middle Archaic period in southern Arizona (Mabry 2005b:119). The presence of the deer-sized animal bone recovered from the roasting pit indicates that the feature was perhaps used to cook this animal. It remains unknown if this animal was obtained in the vicinity of the project area and processed locally, or if the animal was hunted some distance away and portions of the carcass were later transported to the project area for cooking. While living near the floodplain environment, the Middle Archaic period people surely had to diversify their diet by hunting and gathering despite their proximity to the wealth of riparian resources along the Santa Cruz River. Feature 22242 was, however, located along the margins of Arroyo Chico, which may have had a diversity of resources similar to that of the Santa Cruz. The presence of Feature 22242, as well as the Ventana Side-notched projectile point found in the project area, supports the trend of mobility expressed in Middle Archaic period subsistence.

The next chronological stage for the Joint Courts Complex Archaeological Project area is the Late Cienega phase, represented by the two pit structures (Features 3370 and 19021). These pit structures, however, were not associated with any extramural storage or roasting pits. The lack of extramural features, however, may be the product of sampling bias resulting from the significant amounts of historical-period disturbance. For instance, the Tucson Newspaper basement (Feature 10235) completely removed a significant portion of the project area, including nearly all of the approximately 50 m of space between the two pit structures (see Figure 34). Although Gavioli and Thiel (2008) identified many prehistoric extramural pits in the Block 181 area, none were assigned to the Cienega phase, although many were not dateable. However, the location of Late Archaic period structures in the project area suggests a sparser distribution of domestic features in relation to the denser contemporaneous settlements along the Santa Cruz floodplain, such as the Santa Cruz Bend and Los Pozos sites. The numerous intramural pits present in the Joint Courts Complex structures, as well as the lack of extramural features, may indicate an increase in overall individual storage. The Presidio Park features do not conform to this pattern, although the single date pit house, Feature 492, is older than the pit houses in the Joint Courts Complex area. The larger settlements along the Santa Cruz floodplain tended to have a large number of extramural activity areas, such as

storage, cooking, processing, and trash disposal. These extramural activity areas are believed to indicate an increase in agricultural intensification and sedentism (Mabry 1998b:242). The absence of these activity areas in the project area suggests a slightly different settlement pattern than the nearby contemporaneous floodplain villages. If smaller Late Archaic period groups were located at a distance from the larger settlements along the Santa Cruz River, then perhaps individual storage and a greater protection of resources was more important than in the larger settlements. One hypothesis posed by Bradley Vierra (personal communication 2008) is that the larger settlements along the Santa Cruz River floodplain were occupied during periods of drought when wild resources would have been marginal. Populations would, therefore, congregate toward sources of permanent water and make greater use of wild and cultivated plants in these locations, initiating the eventual transition to a greater dependence on agriculture. Conversely, periods of increased precipitation would have allowed populations to move away from channel-margin sites and exploit a greater diversity of resources in different environments. In fact, periods of flooding along the Santa Cruz may have prompted occupants of floodplain villages to seek higher ground. The Late Archaic period component in the project area may indeed represent this theorized dispersion. Located on a higher terrace than the floodplain settlements, this settlement would have been better protected from flooding while still providing access to a riparian setting.

Concentrations of ceramics in the project area indicate a further occupation of this location during the Hohokam Colonial and Sedentary periods. Although these artifacts provide little insight into the occupation of the project area during this time period, they do suggest that the large contemporary Hohokam settlement documented on the adjacent Block 180 and nearby Blocks 179, 181, 190 and 192 may have extended into the project area. The lack of features dating to this time period may indicate that the project area represented the eastern edge of this settlement. Alternatively, such features may have been present but destroyed by historical-period excavations. The prehistoric ceramics found in the project area suggest a well-established Hohokam occupation during the late Colonial and Sedentary periods in the vicinity, possibly on the western edge of the project area, though the historical-period and modern activities of downtown Tucson have removed most traces of this occupation.

An additional chronological stage was determined through the analysis of radiocarbon dates from Pit Structure 19021. A maize cupule returned a date of cal A.D. 1440–1640, about a millennium and a half after the pooled radiocarbon determinations for the pit structure itself (see chronometric studies, Appendix B.1). This maize cupule was collected from the upper fill of Pit Structure 19021 and was likely intrusive to the pit structure. Rafter Radiocarbon Laboratory determined that the cupule was intact and not contaminated; therefore, it represents a new chronological component for the project area. The resulting date indicates the presence of maize in the project area during the protohistoric period. The presence of four Sobaipuri points may provide additional evidence of protohistoric period occupation in the project area; however all were recovered in direct association with mid-nineteenth-century burials. Thus, it is more likely that these projectile points are associated with the later historical-period use of the project area rather than protohistoric period use. Ethnohistoric information indicates that the Santa Cruz River was heavily used by the Sobaipuri people during the protohistoric period. Several large protohistoric villages were described by Kino in the late 1600s, including San Xavier del Bac, San Agustín de Oyaut, San Cosme de Tucson, and San Clemente, all located along the middle Santa Cruz River, east of the Tucson Mountains (Burrus 1965, cited in Doelle 1984:200; see Ciolek-Torrello and Swanson 1997:Figure 1.4). Unfortunately, apart from short-term seasonal camps or isolated burials, little archaeological evidence of these settlements has been found (Doelle 1984:197–200; Ciolek-Torrello and Swanson 1997:26). Dates contemporaneous with the Joint Courts Complex Archaeological Project date have been obtained at sites on the Santa Cruz flats in the northern Tucson Basin, including a roasting pit at the Gecko site that produced a radiocarbon date of A.D. 1425–1652 (Henderson 1993a) and several structures at Los Rectangulos that produced archaeomagnetic dates ranging from A.D. 1300 to 1620 (Henderson 1993b). One Sobaipuri settlement, San Agustín de Oyaut, existed across the river from the project area when the Spanish first visited the region in the late 1600s (Doelle 1984). The maize cupule recovered from the project area may be associated with the inhabitants of that settlement or of other *ranchería* settlements located on the east side of the river.

More substantial material evidence of O'odham groups comes from the presence of historical-period Papago Red and Plain ware sherds that were recovered from the fill of privy and cesspits in the project area (see Appendix I, Volume 3 of this series). This evidence, however, is more likely indicative of ceramics used by Hispanics and Euroamericans (non-O'odham people), rather than actual O'odham settlement in the project area. The Tohono O'odham developed an important cottage industry producing numerous ceramic vessels that were used by virtually all households in Tucson by the end of the nineteenth century (Fontana et al. 1962). Historical-period Papago ceramics are discussed in greater detail in the following chapter.

Conclusions

The Joint Courts Complex Archaeological Project provides a glimpse into Archaic period lifeways in the Tucson Basin

during an important period in prehistory—the forager to farmer transition. The result of the analysis of prehistoric materials from the Joint Courts Complex Archaeological Project demonstrates a trend of Late Archaic settlement strategy that is significant for the prehistory of the Tucson Basin and southern Arizona. This settlement pattern suggests that during the Late Archaic period groups were exploiting a variety of landscape zones, likely dependent on population pressure, climatic conditions, and available resources.

The prehistoric chronology of the Joint Courts Complex Archaeological Project was established through radiocarbon dating of three prehistoric features, as well as through the analysis of ceramic artifacts recovered from historical-period grave pits. The prehistoric occupation of the project area spanned the Middle Archaic period (ca. 2620–2460 cal B.C.), the Late Archaic period (ca. 200–160 cal B.C.), and, possibly, the protohistoric period (ca. cal A.D. 1440–1640). Additionally, ceramic evidence indicates a Hohokam presence in the project area from the Colonial (A.D. 700–900) and Sedentary (A.D. 900–1150) periods. The Late Archaic period component represents the bulk of the prehistoric data recovered from the Joint Courts Complex Archaeological Project area; therefore it constitutes the majority of the research conducted for this chapter. Evidence from the stone artifact analysis indicates the Late Archaic period inhabitants of the Joint Courts Complex Archaeological Project area were engaged in bifacial tool manufacture and maintenance, likely associated with resource procurement and processing. The presence of ground stone tools and a variety of macrobotanical remains, including Chenopodiaceae-*Amaranthus* and *Zea mays*, also indicates the processing of wild (and possibly domesticated) plant resources. The presence of three Cienega projectile points and the remains of large mammal and bird bone indicate some form of hunting as well. The inhabitants were also engaged in nonsubsistence-based activities, represented by items such as stone balls, a palette, and an ocher-stained lapstone. Long-distance trading was indicated by the presence of several varieties of marine shell ornaments originating from the Gulf of California, including two cowry shell ornaments that have rarely, if ever, been recovered from Late Archaic period contexts in southern Arizona. The pollen spectrum identified from samples recovered from the prehistoric features indicates a connection to a riparian habitat, and the Late Archaic period inhabitants of the project area were likely linked to the floodplain environment of the Santa Cruz River, where larger Late Archaic period settlements have been documented. The possibility exists that the adjacent Arroyo Chico may have provided a riparian setting similar to that of the Santa Cruz River, but more data are required to substantiate this hypothesis.

Previous studies into the settlement patterns of Late Archaic groups in the Tucson Basin focused on two primary resource zones: the floodplain and the upper *bajada*. The floodplain environment is where large Late Archaic period settlements have been identified, and the inhabitants were practicing early agriculture. The upland, or *bajada* settlements are believed to be more limited resource procurement zones. The landscape position of the prehistoric features in the project area does not fall conveniently into this bimodal settlement model. As previously mentioned, the pollen assemblages obtained from prehistoric features in the project area more closely resemble those found in a riparian setting, indicating the inhabitants were either tied to the floodplain of the Santa Cruz River or perhaps a similar riparian environment existed along Arroyo Chico. The Late Archaic period features in the Joint Courts Complex and Presidio Park project areas may represent a small group functioning along the edges of a riparian environment. Other possibilities exist, such as that during periods of abundant precipitation, Late Archaic period populations were able to expand into new areas, and the Late Archaic period features in the downtown Tucson area may represent this hypothetical expansion of settlement. Additionally, the early Cienega date for the Presidio Park feature in conjunction with the Middle Archaic and late Cienega dated features from Joint Courts Complex area suggests a continuous, albeit spotty, occupation of the Pleistocene terrace above the Santa Cruz River throughout the Middle and Late Archaic periods.

CHAPTER 4

Life in Southern Arizona and Tucson before the Opening of the Alameda-Stone Cemetery

Michael Heilen, with contributions by Scott O'Mack

As is discussed in Chapter 3 of this volume, settlement occurred in the vicinity of the project area for thousands of years prior to the establishment of the presidio of Tucson. Native Americans resided in the Tucson Basin at least as early as the Middle Archaic period and continued to live in the vicinity of the project area into the historical period and up to the present day. This chapter sets the stage for understanding the historical, demographic, and cultural context of Tucson as a changing, multiethnic, frontier settlement. In this chapter, we discuss the effects of European colonialism on Native American demography, settlement, and economy in southern Arizona; the Spanish mission system; the early settlement and development of Tucson as the site of a Spanish presidio and mission; and changes that occurred during the Mexican period (1821–1856). This chapter covers the protohistoric (1539–1700), Spanish Colonial (1700–1821), and Mexican periods, ending with a brief discussion of the Gadsden Purchase (1854) and the transfer of military and political control of Tucson from Mexican to American hands.

Protohistory

The first Europeans to arrive in the American Southwest were Spanish explorers who traveled through the region in the sixteenth century. The early Spanish *entradas* into southern Arizona were fairly brief and transitory, but they began a long process of technological and biological transfers and ecological transformations that continued for hundreds of years. The first Spanish-affiliated individuals to possibly enter the current state of Arizona were Alvar Núñez Cabeza de Vaca and his party of three companions, among them a North African named Estevan. Cabeza de Vaca and his party were shipwrecked off the Gulf Coast of Texas in 1528 and could have passed through parts of New Mexico and southeastern Arizona before reaching a Spanish slaving expedition in Sinaloa. Alternatively, his party may have traveled along a more southerly route, south of the current international boundary between the United States and Mexico.

Later Spanish journeys in the region more certainly passed through parts of Arizona, but they passed far to the east and southeast of Tucson through a portion of the San Pedro River valley before continuing east and northeast into New Mexico. The first of these was a 1539 expedition led by Fray Marcos de Niza. The expedition was commissioned by Antonio de Mendoza, the newly minted viceroy of New Spain, to gather information about the region and to confirm the existence of the Seven Cities of Antilia, a series of fabulously wealthy and sophisticated cities reported to be located somewhere in northern New Spain.

Estevan, who developed years of experience as a shaman and slave traveling among Native American groups as a member of Cabeza de Vaca's party, accompanied de Niza but was killed by Zunis after he had struck ahead of the expedition. Fray Marcos de Niza reported that he followed Estevan's route and found at Zuni a large and wealthy city named Cíbola. Based on de Niza's report, Mendoza commissioned another much larger expedition the following year, led by Francisco Vásquez de Coronado. With 300 Spaniards, more than 1,000 Native American guides and porters, and 1,500 horses, mules, and cattle, this *entrada* would have certainly left an impression on Native American groups living in the region, although it too did not pass near Tucson. Over the course of 2 years, numerous parties were sent out from the Coronado expedition to explore parts of Arizona, but none of these focused on southern Arizona (Sheridan 1995).

The failure to find any cities of fabulous wealth during the Coronado *entrada* led to the discrediting of de Niza and lack of interest in further exploration or settlement of the region until the late seventeenth century. The early Spanish presence in the region probably contributed to

the acquisition of a few European goods or tools, advance knowledge of some aspects of European lifeways, and the early spread of foreign diseases. Some scholars have argued that the devastating impact of European diseases effected sweeping changes in Native American settlement, culture, and economy in southern Arizona, even before Europeans had established a regular presence in the region, more than a century and a half after these early *entrada*s (Reff 1991; Seymour 2007, 2009). Because of a lack of sustained contact with the Spanish and the absence of a documentary record, many archaeologists define the period from 1539 to approximately 1700 in southern Arizona as the protohistoric period (Majewski and Ayres 1997; Ravesloot and Whittlesey 1987; Whittlesey et al. 1994).

At the time of the earliest Spanish contact, there were two major indigenous groups in this area. One group was the Piman-speaking O'odham, a more-or-less agricultural people. The other group was the Apache, highly mobile hunter-gatherer-raiders who spoke Athabaskan languages. The Spaniards referred to the northern region of the O'odham, comprising much of southern Arizona today, as the Pimería Alta. The O'odham lived in villages and *ranchería* settlements where they could perform agriculture; they also occupied camps in the foothills and mountains to collect cactus fruits and other wild resources. The Apache lived in more-mountainous areas mostly to the east and north of the Pimería Alta and farmed very little, entering the Pimería on frequent raiding expeditions. The Spaniards sometimes referred to the O'odham as *pimas altos*, the upper Pima, and they recognized linguistically related groups living farther to the south in Sonora as *pimas bajos*. Still farther south were the Opata of the Sonora River valley and the Sierra Madre and the Yaqui of the Yaqui River valley. Zuni from the Colorado Plateau in northern New Mexico also sometimes traveled into the Pimería Alta on trading expeditions. To the west of the Pima, closer to the Colorado River, lived the Yuman-speaking Maricopa (O'Mack 2005).

The Spaniards described some areas of the Pimería Alta as *despoblados*, or unpopulated areas. These included an area between the headwaters of the Río Sonora to the headwaters of the San Pedro River and a second area north of the Gila River, encompassing much of the central mountains of Arizona. Whether these areas were truly uninhabited or the Spaniards simply did not observe signs of settlement is uncertain (Bolton 1948; Di Peso 1953; Reid and Whittlesey 1997).

A Sustained Spanish Presence

By the late seventeenth century, European missionaries began to establish missions and *visitas* in the Pimería Alta, bringing with them livestock, cultivars, and a variety of technologies that were quickly adopted by many Native American groups. Spicer (1962:119) estimated there may have been approximately 30,000 Piman speakers living in the Pimería Alta at this time, of whom the Spaniards recognized four distinct groups: the Pimas of the southeastern Pimería Alta, the Soba of the Altar River valley, the Sobaipuri of the San Pedro River and Santa Cruz River valleys, and the Papago of the western and northwestern Pimería Alta. The Spaniards also came to recognize O'odham living along the Gila River as Gila Pima or Gileños (Bolton 1948; Erickson 1994; Underhill et al. 1979).

Cattle and sheep introduced by the missionaries began foraging the semidesert grasslands of the Santa Cruz River valley and other valleys of the region, and a variety of drought-adapted cultivars were incorporated into native agricultural production. Winter wheat was perhaps the most important of these new cultivars, as it enabled Native Americans to grow a winter crop, which had not been possible with native cultivars, and they were able to double or triple crop some of their agricultural fields (Sheridan 1988). The direct cultural or ideological impact of Europeans on the native peoples, however, was probably relatively weak, as missionaries only stayed briefly in major settlements; they could not regularly involve Native Americans in religious rituals and instruction or enforce the more sedentary settlement patterns and lifestyles they considered fundamental to the development of "civilized" society. Although Native Americans accommodated the Spanish presence to some degree and co-opted aspects of the invaders' culture and technology, they continuously and actively resisted Spanish hegemony and continued to follow traditional settlement patterns. Seasonal moves between winter and summer *ranchería* settlements, as well as the use of short-term camps to collect cactus fruit and other native plants, remained a regular feature of native land use. Native ceremonies, curative practices, and ways of thinking remained fundamental to everyday cultural practice, although such behaviors were maligned and suppressed by Spanish colonial authorities. Although now incorporating foods from livestock as well as new cultivars, the diet of many Native Americans remained rooted in traditional foodways, and by and large, Native American lifeways remained synchronized to the rhythm of life in the Sonoran Desert.

As the European presence in southern Arizona began to grow, in what was at the time the northern frontier of the Spanish empire in the Americas, the Jesuits established missions and presidios at strategic locations in what is now northern Sonora, Mexico, and southern Arizona, as well as in other areas of the Spanish borderlands, including the modern-day states of Texas, New Mexico, California, and Sinaloa and Chihuahua, Mexico (Figure 47). The exact nature and plan of these settlements varied between areas, but their main goals were to establish a military, cultural, and religious presence

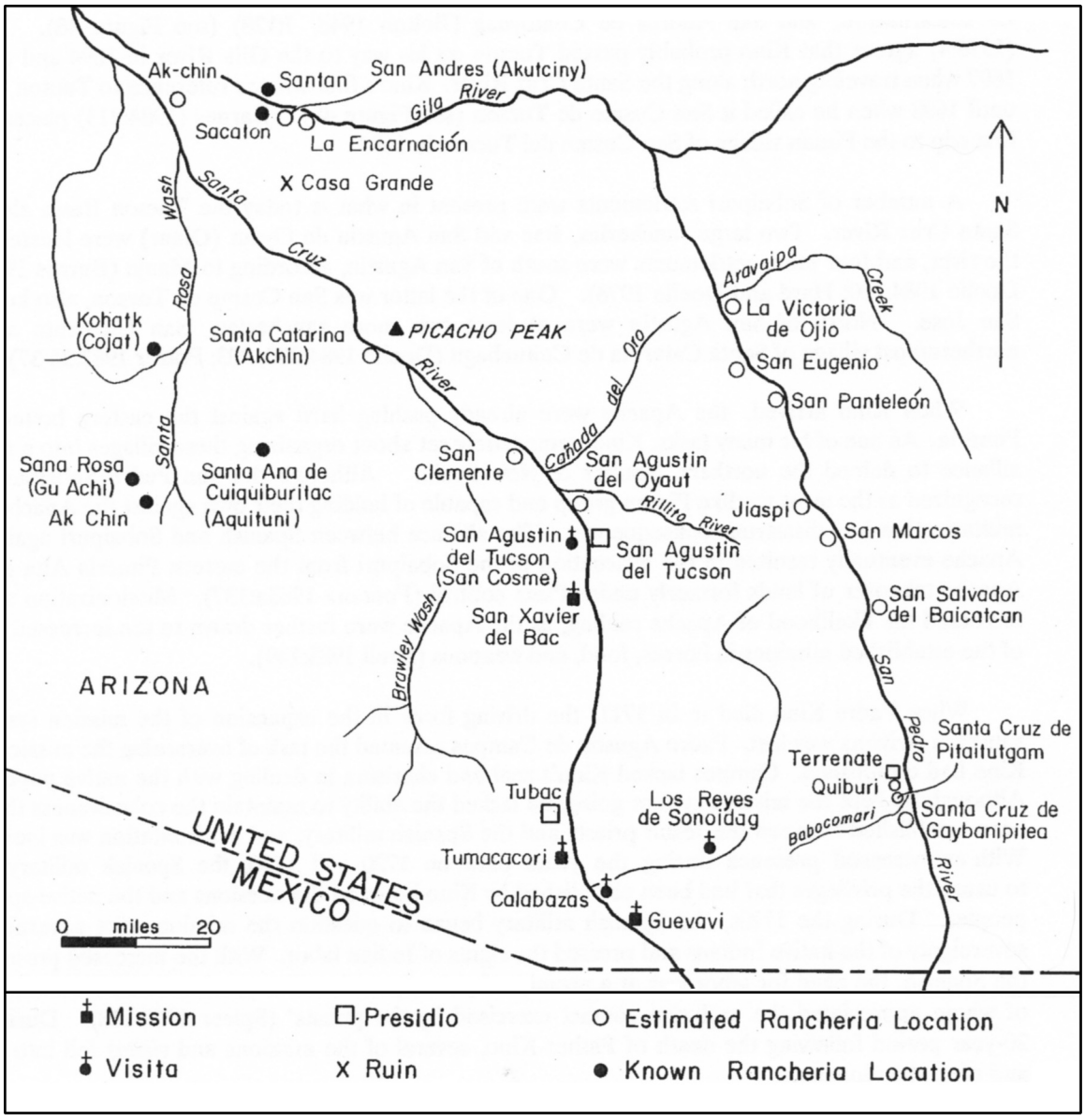


Figure 47. The missions, presidios, and native *rancherías* of the Spanish Colonial period.

along the 2,000-mile northern frontier. Missionaries and presidio authorities sought to convert Native Americans to upstanding, docile, and sedentary Catholic populations and to check the threat of marauding, highly mobile, and warlike Athabaskan groups to the north, represented in southern Arizona by the fearsome Apaches. Apaches had terrorized settlements in the region at least since the Europeans' arrival, and they continued to pose a constant threat to the security and welfare of both Euroamerican and Native American settlements and resources. Areas of southern Arizona and northern Sonora showed promise for mining, cattle-raising, and agriculture, and some of the more agriculturally based groups in the region, such as the different groups of O'odham, were considered generally peaceful and receptive to the Spanish presence.

The individual most credited with establishing a missionary presence in southern Arizona was Eusebio Francisco Kino. A tall and charismatic Jesuit priest raised and educated in Italy, Kino arrived in southern Arizona in 1691, a decade after landing in Mexico. Earlier in his career, Kino had accompanied an unsuccessful military expedition to establish a Spanish settlement in Baja California and was subsequently given the opportunity to expand Jesuit operations into the Pimería Alta. Kino soon established a series of missions along the major rivers of the region, using the Mission Nuestra Señora de los Dolores (est. 1687) as his base of operations (Ortega Noriega 1985).

By 1700, Kino and his fellow Jesuits had established the mission known as San Xavier del Bac at an existing Native American settlement near Black Mountain, approximately

9 miles south of Tucson. At this site, much later in the century, Franciscan missionaries and O'odham residents built one of the finest examples of Spanish Baroque architecture in the American Southwest, the church and *convento* complex of San Xavier (Figure 48). Tucson and another Native American settlement north of San Xavier became a *visita* of San Xavier del Bac. By the end of the eighteenth century, the Spanish presence in the region had become strong enough for the establishment of a mission at Tucson, which came to be known as San Cosme de Tucson and later, San Agustín de Tucson. This mission was located on the west side of the Santa Cruz River near the base of A Mountain. Under the direction of the Irishman Hugo O'Connor, the Spaniards also established in 1775–1776 a presidio at Tucson on the opposite side of the river from the mission site. The mission complex at Tucson was built fairly quickly, although it was used for only a short time; to the chagrin of the Spanish authorities, the presidio took much longer to build, but it was used to protect the settlers of Tucson for many decades, throughout the remainder of the Spanish and Mexican periods.

As Tucson came to be occupied by a growing numbers of Spanish soldiers, settlers, and their families, the town became a multiethnic frontier community occupied by Euroamericans, African Americans, and Native Americans—including Tohono O'odham, Akimel O'odham, Sobaipuri, Yaqui, and peaceful Apache. The town was at the furthest frontier of the Spanish empire in North America and remained remote throughout the Mexican period, from 1821 through 1856, when Tucson was part of Mexico. Huddled in adobe buildings in and around the presidio, soldiers and settlers built a life in Tucson centered around ranching and farming and protecting the settlement from Apache incursions.

Native American Culture History

Some scholars have argued that the impact of novel European pathogens on Native American populations resulted in nearly universal demographic collapse in the Americas (Crosby 1986; Dobyns 1983). Dobyns (1983), for instance, has argued that the Native American population declined as much as 90 percent or more in North America during the 1500s. Other scholars have instead argued for sustained losses in population due to repeated epidemics during the Colonial period and also claim that impacts varied depending on environment and social organization (Kealhofer and Baker 1996). The spread of epidemic disease closely followed Spain's advance into the northern frontier and was facilitated by the concentration of Native Americans at mission settlements as well as by interaction among missionaries and soldiers and frequent travel between settlements in the region (Quebbeman 1966). Whether punctuated or sustained, massive and widespread demographic collapse would have had dramatic cultural consequences and may have resulted in major cultural change among indigenous groups between the protohistoric and historical periods (Dunnell 1991; Silliman 2004).

Social organization, kinship reckoning, and settlement patterns were probably altered by the ravages of disease, as traditional patterns of household and community organization became difficult or impossible to sustain (Reff 1991). Settlement and land-use patterns may have also changed as people formed new communities and moved away from older one, practicing subsistence patterns that their diminished numbers and altered population structure could accommodate. Because of widespread cultural changes, Seymour (2007, 2009) has argued that the Sobaipuri-O'odham of the San Pedro and Santa Cruz River valleys lived in more-nucleated, permanent settlements at the time of contact, rather than the more dispersed and more fleeting *ranchería* settlements that later came to characterize them and other O'odham groups.

By the time the Jesuits began expanding their operations into the Pimería Alta in the late seventeenth century, Native American groups had undergone more than a century of change beginning with the arrival of earlier Spanish explorers in southeastern Arizona. Kino estimated a population of around 6,000 O'odham living in the Santa Cruz River valley in 1697 but reduced this estimate by half just 3 years later. House counts at some settlements in the region also declined with repeat visits. Although shifting settlement could in some cases account for fluctuating population levels, many population estimates at settlements in Sonora were lowered over time. Reff (1991:232) has argued that the reduction in "house counts and population figures probably reflect ongoing population loss from disease, particularly chronic infectious maladies, which appear to have been quite common during the closing decade of the seventeenth century."

Likely diseases included smallpox, yellow fever, typhus, measles, and malaria. Manje (1954: see also Reff 1991) estimated that the population of Sonora had decreased by 90 percent by the early eighteenth century. Similar rates of population decline have been inferred for other Native American populations as a result of European-introduced diseases (Dobson and Carper 1996; Jennings 1976; Verano and Ubelaker 1992; Wood 1979). Infants, children, and pregnant women may have suffered the highest mortality risk (Reff 1991:233, 240). In times of disease, infant mortality rates could have been as high as 50–75 percent, with newer mission communities experiencing the worst effects (Reff 1991:238; see also Jackson 2005:349). The high death rate almost certainly affected household composition and size. As a result of epidemic disease, households were now smaller and probably consisted of "a husband and/or wife, one or two of their children, and one or more

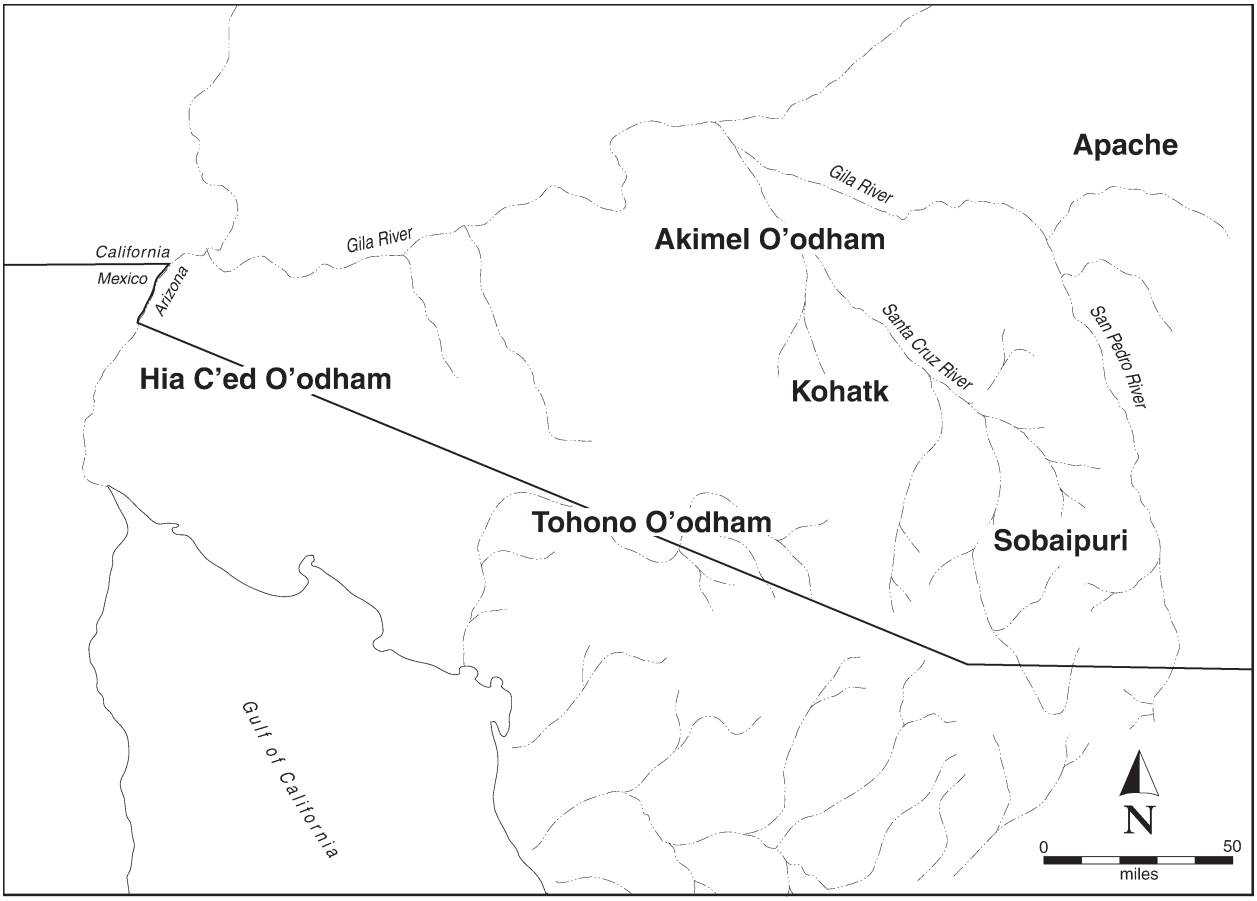


Figure 48. Distribution of Native American groups in southern Arizona during the early historical period.

relatives (e.g., mother, aunt, cousin, nephew) who were left homeless by previous epidemics" (Reff 1991:242).

In northwestern New Spain as a whole, epidemics of smallpox, influenza, measles, dysentery, typhus, and cholera occurred during nearly 1 of every 3 years between 1697 and 1851 (Jackson 1983:409). In a similar fashion, periodic spikes in the number of deaths recorded in church burial records from central New Mexico suggest that between 1793 and 1846 the population was struck by devastating disease epidemics approximately every 4 years (Baca 1995). The drastic effects of disease, changes brought about through the introduction of European technologies, cultigens, and domesticated animals, and the heightening of interethnic conflict must be acknowledged when we attempt to describe the history and anthropology of indigenous groups living in the region during the historical period.

Native American Ethnography and History

The views scholars have developed about Native American groups in southern Arizona are somewhat essentialized and lack a diachronic perspective in that they represent a synthesis of bits of historical and ethnographic information acquired through the centuries, much of it tainted by some observer bias. We cannot expect that each of these groups rigidly followed the lifeways ascribed to them, or that their cultural patterns were static and uniform geographically and temporally. Further, the effects of disease, population movement, and the introduction of new foods and technologies, would have certainly resulted in changes to traditional settlement and subsistence patterns. Nonetheless, we provide a brief description of each group to familiarize the reader with the groups that have been recognized and what is understood about their subsistence and settlement patterns. The following sections on Native American ethnography and history are excerpted from O'Mack (2005:12–21), with some additions by the author.

Groups that were living in southern Arizona at the time of contact or who had moved into southern Arizona during the historical period include the Apache, Yaqui, and five groups of O'odham: Tohono O'odham, Akimel O'odham, Hia C'ed O'odham, Kohatk, and Sobaipuri (Figure 49). Among the O'odham, the Spaniards recognized the Pima, Sobaipuri, Soba, and Papago (Tohono O'odham). The Sobaipuri came to be absorbed into other groups. In more

Figure 49. Mission San Xavier del Bac, view to the northwest. Photograph by Leo Goldschmidt, 1887.

modern times, anthropologists have recognized many different dialect groups, which "besides sharing distinctive patterns of speech, also shared historical and other traditions that set them apart from one another" (Fontana 1989:47). The O'odham also distinguished themselves in terms of their settlements and according to relationships among parent and daughter villages (Hoover 1935). These finer distinctions are largely absent in historical descriptions.

Akimel O'odham

The Akimel O'odham were first encountered by Kino at Casa Grande in 1694. Kino visited the Akimel O'odham several times into the early eighteenth century as did another Jesuit, Ignacio Javier Keller, in 1736. Contacts with Akimel O'odham, however, remained infrequent until the 1840s and consisted mostly of trading between Akimel O'odham and Europeans either at the presidio at Tucson or at their settlements near the Gila River (Russell 1908).

When Euroamericans began to travel along the Gila Trail, en route to California, during the 1840s, they came to depend on the Akimel O'odham for food and protection. The Akimel O'odham continued to provide supplies and military assistance after the Gadsden Purchase in 1854. By the late nineteenth century, however, Euroamerican settlers began to displace the Akimel O'odham by denying access to prime farmland and water for irrigation, despite the fact that these skillful farmers and warriors had been the chief suppliers of grain for the region and had protected Euroamericans from hostile groups (DeJong 1992; Russell 1908).

During the historical period, the Akimel O'odham lived in widely spaced pole-and-thatch houses in settlements referred to as *rancherías* by the Spaniards. They raised indigenous crops of corn, beans, melons, squash, cotton, and gourds as well as cultigens introduced by the Spaniards, including wheat and sorghum. They may have diverted water from the Gila River using irrigation ditches, but whether they practiced irrigation agriculture prior to the arrival of the Spaniards is unclear (see the discussion in Whittlesey [1998]).Wild foods, including saguaro fruit and mesquite pods, formed an important complement to cultigens and were relied on when crop yields were reduced by water shortages or damaging floods (Rea 1997; Russell 1908). Cattle, horses, burros, mules, and poultry introduced by the Spaniards were important components of domestic production (Russell 1908).

When they were studied ethnographically in the early twentieth century, the Akimel O'odham were considered to derive around 50 percent of their diet from agriculture (Castetter and Bell 1942; Hackenberg 1974; Russell 1908; Underhill 1939). In contrast to other O'odham groups in southern Arizona, the Akimel O'odham are considered to have been the least residentially mobile, residing in one village year-round, but still engaging in long trips to hunt wild game and to gather wild-plant foods and mineral resources (Rea 1997).

Tohono O'odham

The Tohono O'odham, referred to as the Papagos by the Spaniards, occupied a large area in the north-central Pimería Alta. The Tohono O'odham lived in lowland settlements during the summer months, practicing *ak chin*, or runoff, farming along the alluvial fans emanating from the bases of the mountains and using brush dams to divert and spread rainwater across fields (Nabhan 1983). Because of high locational and temporal variability in the availability of rainwater, multiple fields were maintained in different locations to minimize the risk of crop failure. Winters were spent in upland settlements near springs in the mountains or at wells, hunting, gathering wild foods, and repairing and maintaining tools. Duplicate sets of household items were maintained at each residence. Castetter and Bell (1942:57) estimated that collected plant foods and game constituted 75 percent of the Tohono O'odham diet, with saguaro, mesquite, prickly pear, and cholla being among the most important plants. Fontana (1983) described the Tohono O'odham settlement pattern as a "Two Villager" pattern; seasonal camps were also used to collect saguaro fruits for dried foods and wine. Saguaro wine was used in an annual ceremony symbolically aimed at renewing life and ensuring summer rains, effectively forming the beginning of the agricultural cycle each year (Underhill et al. 1979).

The Tohono O'odham lived in pole-and-brush houses, slept on grass mats, and carried out many of their daily activities outdoors under ramadas. The house, or *ki*, was a dome-shaped structure similar to Hohokam pit houses. Although best known for their beautifully detailed baskets made of devil's claw and grass, the Tohono O'odham were also excellent potters. In the late nineteenth and early twentieth centuries, their large manure-tempered ollas were used in virtually every household in Tucson, regardless of ethnicity. Several painted pottery types were made, including red-on-brown, white-on-red, and black-on-red (Fontana et al. 1962; Whittlesey 1986). Saguaro syrup in narrow-necked jars was regularly traded to the Akimel O'odham in exchange for wheat and other goods (Russell 1908).

Tohono O'odham villages consisted of extended patrilineal families. Marriages were arranged with people from other villages, and the wife would usually move into her husband's home, helping her mother-in-law with daily tasks (Underhill 1939). Sometimes the husband would move in with the wife's family, however, if they needed help. Although polygamy was allowed, close relatives could not marry (Erickson 1994). When villages became too large, daughter settlements would split off, retaining close social and ceremonial ties to the mother village.

Although the Tohono O'odham were not aggressive, they were accomplished warriors and generally successful at defending themselves from Apache and other attacks. In general, they maintained amicable relations with most of their other neighbors, including the Seri to the south, the Lower Pima and Opata to the southeast, the Akimel O'odham to the north, and the Cocopa and Yuma peoples living along the lower Gila and Colorado Rivers to the west. The Tohono O'odham traded with most of their neighbors, exchanging food items, hides, sleeping mats, pottery, and baskets. Songs, ceremonies, and labor also were traded on occasion for food and goods (Erickson 1994).

Because the Tohono O'odham were closely related to the Akimel O'odham in language, culture, and economy, there was much trading, sharing, and intermarriage between the two groups, and especially between the northern Tohono O'odham villages and the Akimel O'odham. The Akimel O'odham, distinguished by permanent houses and large, irrigated fields, were wealthy in comparison to the Tohono O'odham. Tohono O'odham sometimes worked in Akimel O'odham fields during times of shortage, and food was often shared freely between the two groups.

Hia C'ed O'odham

The traditional lands of the Hia C'ed O'odham extended from the Gila and Colorado Rivers in the north through the Sierra Pinacate region of Sonora, to the Gulf of California, and southward to Seri country. The Hia C'ed O'odham have also been called Sand Papago, Areneros, Areneños, and Pinacateños. Other O'odham have called them Hiá Tatk Kuá'adam, sand-root eaters, and Otomkal Kuá'adam, desert iguana eaters. Although this O'odham group was declared extinct in the early 1900s and consequently denied rights to their traditional lands, approximately 1,300 individuals today identify themselves as Hia C'ed O'odham (Rea 1998).

The Hia C'ed O'odham were divided into northern and southern groups, the latter sharing land and cultural similarities with the Seri in Mexico. The northern group interacted with Yuman-speaking peoples and shared similarities with them. The Hia C'ed O'odham were the most linguistically distinct among the O'odham, speaking faster and using exclusive terms, but they were still easily understood by all other O'odham (Erickson 1994).

The Hia C'ed O'odham lands were the driest and hottest of the Pimería Alta and the least densely settled. With only a few places suitable for farming, which they carried out using the *ak-chin* system (Rea 1998), most of the Hia C'ed O'odham lived as hunters and gatherers ranging over a large area in small family groups. The Hia C'ed O'odham were distinctive for their heavy use of native fish that could be harvested from tidal pools along the Gulf of California. As a consequence of the lack of arable lands and sparse settlement, the Hia C'ed O'odham remained generally isolated from the influences of Spanish culture, as other areas were explored for ranching, farming, and mining. These same characteristics also kept Apache raids to a minimum (Erickson 1994).

The Hia C'ed O'odham suffered greatly during the 1850s and 1860s, when disease devastated the population. Miners at Ajo and ranchers at Quitobaquito encroached on some of their most desirable lands during this time, but the people managed to survive and found employment constructing the railroad through the Gila River basin. Today, they remain scattered. Most live among Tohono O'odham but have never completely assimilated into the main body of O'odham people. In Mexico, the southern Hia C'ed O'odham met a similar fate, having been relocated by the government from the western end of O'odham lands to Quitovac and other inland areas. They, too, have merged with other O'odham people (Erickson 1994).

Kohatk

The Kohatk, also spelled Koahadk and Kwahatdk, were distinguished among Tohono O'odham as a distinct dialect group (Erickson 1994), although they were closely related to the Akimel O'odham through intermarriage and trade (Erickson 1994; Rea 1998). Kohatk settlements extended as far south as the Tohono O'odham reservation between modern Ajo and Tucson (Erickson 1994). They lived mostly in villages located between the Picacho Mountains and the Gila River villages of the Akimel O'odham, in an area today known as the Santa Cruz Flats. Important villages were Kohatk, near the Slate Mountains; Ak Chin, near Picacho; and Santa Ana de Cuiquiburitac, east of the Santa Rosa Mountains (Fontana 1987; Russell 1908; Whittlesey et al. 1994:250). The Kohatk moved between *ak chin* fields on the lower Santa Cruz River and adjacent washes to fields along the Gila River as opportunities allowed (Dobyns 1974; Rea 1998). They seem to have been neither "desert people" nor "river people," but O'odham who regularly moved between and used both environments (Whittlesey et al. 1994:252).

The documentary history of the Kohatk is confusing, including references to their village locations (Whittlesey et al. 1994:249–251). What little is known of their cultural ecology parallels the practices of the other O'odham groups (Rea 1998), although they were noted for bringing cattle to the area in the 1820s (Ezell 1961; Rea 1998; Russell 1908; Whittemore 1893). Some desert settlements were sustained by artificial reservoirs, and Dobyns (1974:325) has pointed out that the Kohatk also dug ditches as necessary to water their fields. Little is known about Kohatk social organization, and the relationship between the Kohatk and their environment is poorly understood. If, as documentary sources suggest, the Kohatk were intermediate between Akimel and Tohono O'odham in economic organization and settlement

practices, it may be appropriate to view them as socially intermediate as well (Whittlesey et al. 1994:255).

Kohatk material culture was generally similar to that of other O'odham. Historically, they were known as excellent potters (Russell 1908:124). The Akimel O'odham obtained many painted vessels from the Kohatk in exchange for Pima wheat and other foodstuffs. Apparently, Kohatk pottery was highly polished and more often decorated than other O'odham pottery (Fontana et al. 1962:107–109).

The Kohatk experienced little influence from the Spanish presence, although there were early attempts at missionization (Fontana 1987). Increased pressure from Apache raiding after Mexican independence forced the Kohatk to abandon their villages along the lower Santa Cruz River and take refuge among the villages of neighboring O'odham. Fontana (1987) indicated that the remaining Kohatk people settled across the Gila River from the Sacaton community, a village that eventually became known as Santan. Other members moved to the Salt River reservation. By the early 1900s, the Kohatk had lost identity as an independent group and had been assimilated into Akimel O'odham and Tohono O'odham communities (Rea 1998).

Sobaipuri

Little is known about the Sobaipuri, who were once the most populous O'odham group in the vicinity of the Santa Cruz and San Pedro River valleys (Sheridan 1995). Although the Sobaipuri were the group described in Kino and Manje's accounts of the late 1600s, there is little if any overlap between the documentary and archaeological evidence for the Sobaipuri occupation of southern Arizona. There are several reasons for this. Most importantly, the Sobaipuri intermixed with Tohono O'odham and other Piman-speaking peoples, to the extent that by the 1800s they had lost most of their social and ethnic identity. The documentary evidence itself is also difficult to interpret and understand. Sobaipuri *rancherías* were easily moved, and because the Spanish names for villages, including saints' appellations, moved along with the villages, maps made at different times may show several places with the same names. It is difficult, therefore, to match an archaeological site with the location of a named Sobaipuri village.

With this caution, what we know of the Sobaipuri is that they once lived in the well-watered valleys of the Santa Cruz and San Pedro Rivers, farming and producing "plentiful crops" of "calabashes, frijoles, maize, and cotton" (Bolton 1948:I:170–171). Chroniclers of the Coronado expedition noted the Sobaipuri use of turquoise and body painting or tattooing of their faces and bodies. They came to be known, consequently, as Rsársavinâ, meaning "spotted." The Sobaipuri had few interactions with the Spaniards until the latter part of the seventeenth century. They maintained trade relations, however, with the Spaniards in the Río Grande Valley and presumably also with the Spaniards of the Pimería Baja. In the early eighteenth century, the Spaniards enlisted the Sobaipuri for military purposes; they provided an armed buffer against raiding Apache (Di Peso 1953). The Sobaipuri were fierce warriors, aggressive and accustomed to war because of their proximity to and frequent encounters with the Apache (Erickson 1994).

From the late 1600s to approximately 1762, the landscape of the Santa Cruz and San Pedro River valleys was characterized by *rancherías,* larger villages, irrigation canals, wells, and cultivated fields (Griffith 1992). Sobaipuri villages appear to have been occupied briefly, and settlement locations shifted rapidly. Seymour (1989:215) has suggested that the suitability of the floodplain for farming was the major determinant in locating villages. Seymour (2007, 2009) has also argued that Sobaipuri villages were once larger and more nucleated than later *rancherías*, prior to the devastating effects of Old World diseases on the population. Inferred Sobaipuri sites in the San Pedro River valley were located on ridges and terraces above the river. There were at least 14 *rancherías* along the San Pedro River when Kino and Manje visited there in the late 1600s (Whittlesey et al. 1994:237). Approximately 100–500 people lived in each of these villages. South of Santa Cruz de Gaybanipitea (Di Peso 1953), more than 2,000 people lived in numerous small villages. Although villages had existed between the *rancherías* of Quiburi and Cusac, they were abandoned by the 1700s.

The Tucson Basin was densely settled, apparently because of intensive agriculture (Doelle 1984). The stretch of the Santa Cruz River between San Xavier del Bac and San Clemente (thought to be located near Point of the Mountain, at the northern end of the Tucson Mountains) was the center of Upper Pima culture at the time of Spanish contact, with an estimated 2,000 residents (Doelle 1984:207). Other important villages were San Agustín de Oaiur (also spelled Oyaur and Oyaut), San Cosme del Tucson, and Valle de Correa in the north, and Guevavi, Tumacácori, and Calabazas in the south (Whittlesey et al. 1994:234–236).

Sobaipuri living along the Santa Cruz and San Pedro Rivers had a long history of intermarriage and cooperative action when the need arose. When Kino arrived, the Apache were already pushing hard against the eastern boundary of Pimería Alta. Recognizing the warlike reputation of the Sobaipuri, the Spaniards sought to organize the villages of the San Pedro Valley into a military alliance to defend the northern frontier of New Spain. This attempted militarization eventually had disastrous consequences (Fontana 1983b:137). The *reducción* policy and missionization actually increased Apache raiding, as the concentrated livestock, weapons, and stored food provided an additional lure (Ezell 1983:149).

Problems with Apache raiding became so great that in 1762 the San Pedro Sobaipuri joined the Santa Cruz Sobaipuri at Santa María de Suamca, San Xavier del Bac, and San Agustín del Tucson, significantly changing

the ethnic composition of the valley. This also left the San Pedro Valley—once a Sobaipuri barrier against the Apache—essentially defenseless and unprotected. There is controversy surrounding the reasons that the Sobaipuri abandoned the San Pedro River valley. Some authors think that the Sobaipuri simply fled in the face of the hostile Apache (Kessell 1976), whereas others believe that Sobaipuri resettlement was by order of Spanish *reducción* policy and carried out by military officers (Dobyns 1976).

The densely settled villages of the Santa Cruz River valley quickly succumbed to epidemics against which the residents had little resistance. By 1773, the population of San Xavier del Bac was greatly reduced as a result of epidemics and Apache raids. Tohono O'odham were encouraged to settle at the mission beginning around 1800 to replace the Sobaipuri population that was lost to disease and war. Intermarriage between the Tohono O'odham and the remaining Sobaipuri eventually led to the loss of Sobaipuri ethnic identity. In 1776, the Tubac presidio was relocated to Tucson. Within the next quarter century, the Spanish population increased as ranchers and miners moved into the Santa Cruz Valley, and as contact between Spanish and O'odham peoples increased, the native population decreased (Bronitsky and Merritt 1986; Erickson 1994; Ezell 1983; Whittlesey et al. 1994).

Apache

In sharp contrast to sedentary farmers such as the Akimel O'odham, the Apache were the most mobile of southwestern peoples. Instead of defining their lives with reference to a particular river valley, the Apache centered their lives on the mountains of southern and central Arizona. The mountains defined their traditional territories, provided them with food and shelter, and embodied their sacred places. In times of conflict, the mountains were their refuge. Because of their uniquely close familiarity with the mountains, the Apache were able to pursue their way of life long after many other Native Americans had resigned themselves to reservations.

The Apache were relatively recent migrants to the Southwest, although the timing of their entry has been widely debated. Most scholars agree that the Apache, who are classified linguistically as Southern Athapaskan speakers, moved southward from an original home in Alaska or southern Canada sometime around A.D. 1500, if not earlier. Their language, culture, and lifeways reflect this distinctive origin and comparatively recent history. All Apache peoples were highly mobile and made their living through a combination of hunting, collecting wild-plant foods, raiding, and some farming. This way of life brought them into frequent and often violent contact with sedentary, farming Native Americans and the Euroamericans who came later.

Ethnographers have subdivided the Apache into several hierarchical groupings on the basis of territorial, linguistic, and cultural differences. The largest grouping is the tribe or division, traditionally subdivided into smaller groups and bands. Two groupings whose traditional territories overlapped are most important in southern Arizona history. These are the Aravaipa band, part of the San Carlos group of the Western Apache, and the Central Chiricahua band of the Chiricahua Apache.

Bands were composed of 3–12 local groups, which were the fundamental unit of Western Apache and Chiricahua Apache society. Chiricahua bands were smaller, consisting of 3–5 local groups, and the local group was named after some prominent natural landmark in its range or known by the name of its chief. Each local group consisted of 2–10 family clusters, or *gota,* usually totaling 10–30 households, who returned each year to the group's farming site. Clans, or large kinship groupings, were nonterritorial and served to regulate marriage, extend kinship beyond the family, and provide economic and social support. Cutting across group and other boundaries, clans served to create an expansive web of kinship bonds. The minimal residential unit was the *gowa,* or camp, a term referring to the house, its occupants, and the camp itself. Dwellings were dome-shaped or conical pole-and-brush structures often referred to as wickiups. The largest and most-permanent structures were called *nesdango'wa* (ripe fruits wickiup) and were located at the farm sites. Archaeologically, a *gowa* can often be recognized only by the rock rings that once formed the wickiup foundation. The Chiricahua Apache occasionally built tepees or hide-covered structures.

The Central Chiricahua band ranged around the present-day towns of Duncan, Willcox, Benson, and Elgin in southern Arizona, and they held mountain strongholds in the Dos Cabezas, Chiricahua, Dragoon, Mule, and Huachuca Mountains. Each local group had a "chief" or "leader" who gained prominence because of his bravery, wisdom, eloquence, and ceremonial knowledge. The local group was important in regulating social and economic institutions, including marriage, raiding parties, and ceremonial events. The Chiricahua depended more heavily on wild-plant foods, hunting, and raiding, and less on farming than the Western Apache, who probably were the most dependent on farming of the Apache tribes. Mescal was the Chiricahua band's most important food plant. The tender stalk was roasted and the crown was dug up, trimmed, and baked in an underground pit oven. The baked mescal was sun dried and stored, supplying food for many months.

Raiding was an integral part of Apache culture and was considered lawful and just. The principal ethnographer of the Western Apache wrote that, "The size of the territory in Sonora over which the Western Apache raided is extraordinary. The Apache knew it like their own country, and every mountain, town, or spring of consequence had its Apache name" (Goodwin 1969:93). Raiding parties ventured as far as the Gulf of California. Raids brought the Apache

horses, mules, cattle, hides, blankets, clothing, metal to fashion knives and arrow points, saddles and bridles, and firearms. O'odham, Mexican, and American farms in southern Arizona and northern Sonora, with their livestock and rich stores of grain, were frequent targets of Apache raids. Horses and mules were often killed and eaten during raids, providing a highly transportable food source as well as transportation, and this enabled the Apache to extend their raiding activities across considerable distances—as far as the Seri country along the Gulf of California.

When the Spaniards first arrived in Arizona, Apache predations on the O'odham were well established. Apache raiding crippled Spanish attempts to establish missions in Pimería Alta in the 1700s and was one reason for the Sobaipuri to abandon the San Pedro River valley (Kessell 1976). The Spanish presidio of Santa Cruz de Terrenate along the San Pedro River was occupied for only 4 eventful years, beginning in 1775, before Apache raiding forced its abandonment (Sugnet and Reid 1994; Williams 1986). The presidio at Tubac was relocated to Tucson in 1776, and as the Spanish population began to grow, the pace of Apache raiding accelerated. Following an unprecedented Apache attack on the presidio in 1782, Commander Don Pedro Allande began a vigorous campaign against them. Four years later, the Spanish Viceroy Bernardo de Gálvez instituted a pacification policy combined with aggressive military action. A key point of this policy was the resettlement of friendly Apache, called *apaches mansos* or *apaches de paz* (Dobyns 1976; Officer 1987), at the royal presidios. A contingent of more than 100 Apaches, primarily Western Apache of the Aravaipa band, settled at Tucson in 1793. Members of the Pinal band settled there in 1819 (Dobyns 1976:98,102). A small camp of peaceful Apaches apparently remained close to the presidio in the 1850s (Gallego 1935:75), but few if any traces of these occupations remain today.

Yaqui

The Yaqui are members of the diverse Uto-Aztecan language family, which includes the various Piman-speaking O'odham peoples, although the Yaqui are somewhat removed from the O'odham. The Yaqui speak a dialect of Cahita, a language once spoken in a large area in the present-day Mexican states of Sonora and Sinaloa. The traditional home of the Yaqui is in Sonora, along both banks of the Río Yaqui and in the portions of the Sierra Madre drained by its tributaries. Because of persecution by the Mexican government in the late nineteenth century, groups of Yaqui abandoned their traditional territory for locations elsewhere in northern Mexico and southern Arizona. In the Tucson area, the Yaqui settled in two locations: Pascua Village on the near north side and a smaller satellite community in Marana, northwest of Tucson (Spicer 1983).

Traditional Yaqui territory included rich agricultural lands in the Río Yaqui valley and equally important gathering areas in the adjacent Sierra Madre. The lower elevations of the Río Yaqui valley were vegetated with subtropical, thorn-thicket vegetation and dense canebrakes. The valley's upper reaches, and the lands bordering the lower valley on the north, had typical Sonoran Desert vegetation: mesquite varyingly interspersed with cacti, cottonwood, palo verde, and other trees and shrubs (Moisés et al. 1971). At the time of Spanish contact, the Yaqui were primarily horticulturalists and lived in scattered *rancherías* in the Río Yaqui valley. Initial contact came in 1533, but the interaction was brief and of little consequence to the Yaqui. The conquest of Sonora did not begin in earnest until the early seventeenth century, when Diego Martínez de Hurdaide headed three campaigns against the Yaqui. Although the Yaqui were successful in fending off all three attempts at conquest, Jesuits soon entered Yaqui territory and introduced the Yaqui to Christianity (Moisés et al. 1971).

The Yaqui had a social and political system that combined bilateral kinship with a strong sense of community. They lacked clans and had little in the way of hierarchical social structure. Family groups lived in scattered clearings along perennial watercourses, the typical *ranchería* settlement pattern noted by the Spaniards in much of northern New Spain. The clearings were surrounded by tall, dense vegetation that lent a distinctly nonurban appearance to Yaqui settlements (Spicer 1980). Yaqui agriculture was tied to the natural flooding cycle of the river. The Yaqui hunted various wildlife species, with a special emphasis on deer. Deer also had a particular religious significance. Wild plants, including cane and native trees such as mesquite, supplied foods and construction materials (Moisés et al. 1971; Spicer 1980).

When Jesuits came to Yaqui country in the seventeenth century, they established churches in eight locations and, in typical Spanish fashion consolidated the scattered *rancherías* around the missions (Moisés et al. 1971). Relations between the Jesuits and the Yaqui were generally good, and many Yaquis were quickly converted, at least nominally, to Christianity. Although most converts relocated near the missions, they insisted on retaining their scattered *ranchería* style of settlement, refusing to accept the Spanish grid as a village plan. With a new focus on the missions as the center of their communities, the Yaqui developed highly productive and successful agricultural villages, as they continued to work and farm for community benefit. Their acceptance of Christianity resulted in a blending of traditional culture with a belief in Christ, the Virgin Mary, and the saints (Spicer 1980).

The Yaqui were incorporated into the Spanish colonial economy when they began using the lands at the missions to produce crops for market. The Yaqui were soon engaged in wage labor for mining and ranching interests that took them away from their home bases. They were generally recognized as hard workers and skilled miners, but most

Yaqui never abandoned their traditional way of life, even when pressured to do so by Spanish colonial policies that threatened their traditional livelihood. Following the expulsion of the Jesuits from New Spain in 1767, encroaching Spanish settlement served only to strengthen the resolve of the Yaqui to protect their land and identity. Their intimate knowledge of the Sierra Madre and their ability to exploit a variety of environments made it difficult for the Spanish colonial government to impose its will on the Yaqui (Spicer 1980).

The Franciscans who replaced the Jesuits were not as successful with the Yaqui as their predecessors, and relations between the Yaqui and the Spaniards became strained. The situation worsened following Mexican independence in 1821. In 1825, the Mexican government tried to collect taxes from the Yaqui, but joining forces with the Mayo, Lower Pima, and Opata, the Yaqui ran the Mexican government out of the region. The show of force, as in earlier events, was not sustained beyond that particular confrontation, and Mexican forces gradually returned. The year 1853 marked the beginning of a period of intermittent warfare that would continue into the twentieth century (Moisés et al. 1971; Spicer 1980).

Spanish Settlement in Southern Arizona

As discussed above, Spanish settlement of the northernmost area of Sonora where Tucson was situated, the Pimería Alta, came fairly late, beginning at the end of the seventeenth century. Some of the larger and more important settlements during this time in northern Sonora—such as Arizonac, Pitic, Ures, Horcasitas, and Arizpe—lay far to the south of remote Tucson, one of the last settlements to be founded in New Spain. The main settlements in this part of New Spain were missions and presidios, but civilian ranches, towns, and mining communities were also present in the region and shared economic relationships with military and religious settlements. These civilian settlements, which focused on mining, ranching, and agriculture, were mostly concentrated in southern Sonora and could be fairly fleeting as resources were exhausted or the security of the settlers against attack could not be maintained (Jones 1979:169–170).

By 1678, 28 missions had been established in Sonora, and these served a total population of perhaps 40,000 Native Americans residing in 72 recognized villages. An estimated 500 Spanish and mestizo settlers, mostly miners and soldiers, also lived in the region. The northernmost settlements were primarily missions and presidios, whereas ranches, towns, and mining communities were prevalent farther to the south in Sonora and in Sinaloa (Jones 1979:177). With the discovery of a promising silver mine at Arizonac in 1736 (near the current international boundary between the United States and Mexico), prospectors from farther south began moving into what is now southern Arizona (Jones 1979:177; Officer 1987:4). Before the discovery at Arizonac, northern Sonora was defended by the presidio of Santa Rosa Corodeguachi, far to the south of Tucson, with occasional military assistance from Janos (Jones 1979:178). The mining boom at Arizonac led to increasing settlement in northern Sonora, and a presidio was established at Pitic, near present-day Hermosillo, Mexico (Jones 1979:179). By the end of the 1730s, Spanish families began to settle near Guevavi and Tubac and probably also began to expand into areas along the Santa Cruz River (Kessell 1970:51–52; Officer 1987:32). Herds at San Xavier del Bac had grown to 240 cattle, 150 sheep, 50 goats, 14 horses, and 2 mules, but church officials remained concerned about the progress of missionization among O'odham (Dobyns 1976; Olsen 1974; Pavao-Zuckerman and LaMotta 2007). With increased settlement came increased raiding activities. To thwart Apache raiding activities, the Spaniards established a presidio 50 miles southeast of Guevavi near the headwaters of the San Pedro River at San Mateo de Terrenate (Kessell 1970:76–78; Officer 1987:33).

By the 1760s, settlements in southern Sonora had become concentrated, stabilized, and fairly peaceful, but northern Sonora remained an unstable frontier, with presidios at Fronteras, Terrenate, Tubac, and Altar. Spanish settlements outside presidios and missions were rare, with as many as 80 ranches and farms destroyed by Apaches or Seris. In northern Sonora, several hundred Spaniards and mestizos lived in scattered mining camps with another 1,100 at presidios. A little over 4,000 Native Americans were reported to be living at mission settlements. More than six times as many Spanish settlers lived in southern Sonora in comparison to northern Sonora (Jones 1979:179–180). In all of Pimería Alta in 1769 there were only 178 Spaniards and mestizos (Jones 1979:193). Discoveries of gold placers at Cieneguilla in 1771, 90 miles south of the present international boundary, prompted Spanish settlers to move farther north into the Santa Cruz River valley and, ultimately, to Tucson (McCarty 1976:19). By 1773, 7,000 people were reported in the Cieneguilla mining district, around a quarter of them being indigenous people; some of these settlers filtered farther north into the Santa Cruz River valley.

New civil settlements were costly to develop, and they were underwritten by royal funds. Settlers were provided animals, tents, and per diem for travel to new settlements as well as a year's salary. Each household head was provided "two horses, four mares, two cows, one jackass, one male burro, one female burro, one bull, and one yoke of oxen" as well as seed for planting corn and wheat and tools for planting and construction (Jones 1979:183). These settlements were considered essential to building a robust economic system based on the extraction of local resources and the exploitation of native labor. The economic system

that developed in Sonora resulted in indigenous groups migrating to mines, farms, and ranches to work on a seasonal or even permanent basis (Jackson 2005:32). Yaqui from southern Sonora migrated to northern Sonora to work at mines, farms, and ranches and are recorded in the baptismal, marriage, and burial registers of many of the northern missions, such as those at Cucurpe, Caborca, Magdalena, and San Ignacio (Jackson 2005:90–91). Yaquis were among 13 "outside" Indians listed in the Tumacácori census of 1796, for instance (Officer 1987:70). Similarly, the main source of labor for mining at Guevavi in 1814 was Yaqui, and many Yaqui were recorded for baptisms, marriages, and burials there (Officer 1987:88).

In the late 1700s and early 1800s, settlement in Sonora continued to expand rapidly, but Tucson was still a remote frontier outpost, and Spanish settlement in Santa Cruz River valley remained thin and vulnerable. The census of 1783 reported a total of 46,077 people living in what is today the state of Sonora. The province now had "two villas, fifty pueblos, twenty reales de minas, twenty-nine missions, six presidios, nine haciendas, and sixty-seven ranchos" (Jones 1979:180). By the early 1800s, the population of Sonora expanded rapidly and reportedly included more than 135,000 residents, more than half of them Spaniards or mestizos. However, the vast majority of European-descended individuals lived south of Arizpe, with the remainder scattered in a few settlements in the Pimería Alta (Jones 1979:184).

The Spanish Mission System

Spanish settlement in southern Arizona during the seventeenth through early nineteenth centuries formed the northernmost extension of the Spanish mission system, which attempted to subjugate, control, and Christianize Native American populations through a program of *reducción*, or reducing Native Americans to fixed settlements where they would develop sedentary, Christian lifeways and European forms of economy and social organization. Native American inhabitants of *ranchería* settlements frequently traveled over large areas, visiting relatives and friends, participating in ceremonies, working for others during planting or harvest time, hunting, foraging for wild plants and other resources, and moving between seasonal residences. The pattern of shifting settlement, seasonally and interannually, and the frequent travel among villages and resource patches, were frustrating challenges to the missionaries, whose interests were aligned with the Spanish crown and with the military in "reducing" Native Americans to fixed settlements and making good subjects out of them (Bay et al. 2008:378; Perez 2003).

The idealized pattern of these *reducciónes* was a permanent community built on a grid pattern and centered on the church, with an adjoining *convento* complex. The houses of indigenous residents of the mission would cluster around the square in front of the church. Some missions, such as at Cocóspera, were placed in defensive locations and incorporated walls and other defensive structures in their design to fend off the attacks of hostile raiding groups (Jackson 2005:189). In the late eighteenth and early nineteenth centuries, Franciscans also tended to include granaries, medical facilities, ranchos, and dormitories in the layout of their mission complexes (Jackson 2005:209–210), a design which appears to have been implemented in the construction of the mission at Tucson during the late eighteenth century.

In the attempt to reduce Native American populations to concentrated, permanent settlements and to force the acceptance of Christian lifeways, missionaries exacted harsh disciplinary punishment that was often aimed at humiliating and subjugating people chosen as examples. Disciplinary efforts were sometimes performed in collusion with military authorities, with priests appearing to compassionately intervene and rescue victims from physical punishment as a means to gain the trust and loyalty of their native subjects. At the same time, priests prevented Native Americans from leaving the mission for other sites and demanded the contribution of their labor in agriculture and other mission projects. In addition, language barriers and a lack of congruence between key Christian concepts and native beliefs led to fundamental misunderstandings (Jackson 2005:242). Native Americans at Sonoran missions were subject to an authoritarian missionary regime, which included "the introduction of new social norms, moral rules, and notions regarding the division of labor" and also subjected them to forcible labor enforced by Spanish civil officials (Jackson 2005:264). Stockel (2008:34) wrote that the intention of the missions was to keep "the subjugated Indians densely packed in working communities where religious indoctrination, careful supervision, and unlimited control over indigenes' activities could be exercised." Moreover, despite the superficial appearance of Christianization among the natives at some missions, traditional religious beliefs and practices persisted and remained at the core of indigenous identities.

Spanish settlers typically did not respect the land and water rights of the missions or indigenous peoples, resulting in the displacement of native peoples and in disputes between settlers, missionaries, and native peoples (Jackson 2005:100). Spanish settlers often tried to shut down or secularize missions in order to eliminate the missions as competitors for land, labor, and market share (Jackson 2005:101). In the Texas and California missions, "missionaries controlled just about every aspect of production, whereas in [the] establishments of northern Sonora an important distinction existed between production to support the mission program and production for the individual native families that remained under the control of

the natives" (Jackson 2005:113). Missions in northern Sonora, where San Xavier del Bac and San Agustín del Tucson were located, tended to have both common lands and "individual plots assigned to native families" (Jackson 2005:151).

Tucson was at the northernmost extent of the mission system in Arizona, and until the late eighteenth century, its inhabitants may have been less affected by the Spanish mission system than indigenous people living farther to the south in Sonora. Sonora itself was also underdeveloped in comparison to states farther to the south. Unlike Sinaloa to the south, Sonora never developed beyond frontier status during the Spanish period, largely because of the continued Apache raiding "for foodstuffs, livestock, and slaves from among the Christianized Indians and the scattered, ill-defended Spanish communities" (Jones 1979:177).

One of the differences between the Sonoran missions and the Texas and California missions, according to Jackson (2005:31), was that Sonoran missions came to be part of a settlement system that included mines, ranches, farms, and military garrisons. Conflicts arose between missionaries and Spanish settlers over the use of native land and labor, and both the missions and indigenous people helped support a regional market economy by supplying secular settlements with agricultural surpluses and with labor (Jackson 2005:32). Sonoran and Sinaloan missions that produced surplus crops also shipped grain to other missions to help support them, such as those in Baja California (Jackson 2005:122). In the Santa Cruz River valley, missions on several occasions sold livestock to fund mission activities.

Native Resistance

One of the problems with the historiography of the Spanish Colonial period in the Pimería Alta is the limited documentation available coupled with a strong focus on events, rather than processes or the structure of interactions, and on the perspectives and experience of the colonizers, as opposed to those of the indigenous people. More recent scholarship has stressed that the active roles that indigenous people played in the history of northern New Spain have been largely ignored and their perspectives and motivations have been obscured by a focus on missionary priests and Spanish-American soldiers. Representation of indigenous peoples in historical reconstructions of the period has been two-dimensional and tends to attribute to them a fairly passive and inferior role in the process of colonization. Missionaries, by contrast, have been characterized as heroic, devoted, and disciplined in their efforts to civilize the natives (Bay et al. 2008; Perez 2003; Reff 1991:251–252). This is in part owing to a lack of available information from indigenous perspectives but also to the valorization of the missionary's efforts and a fundamental mischaracterization of native perspectives.

The scale and intensity of indigenous resistance to colonial authority has not been fully acknowledged or appreciated. This has limited our ability to understand the history of interactions between Native Americans and other groups. Because much of the information we have about indigenous peoples in the Santa Cruz River valley during the Spanish Colonial and later periods comes from missionaries and military officers, there is much that we simply will not know from the historical record about what happened between Native Americans and European visitors to the Santa Cruz River valley. However, consideration of the deeper history of interactions in northern New Spain and the glimpses we do have of various events and conditions provide a somewhat broader view. As Majewski and Ayres (1997:59, emphasis in the original) have noted, "Archaeological strategies aimed at documenting the process of interaction between the colonizers and the colonized offer the opportunity to balance out the scale . . . the archaeological record can be used to provide *independent* confirmation of information derived from historical accounts as well as to test hypotheses about the indigenous society's response to domination and control." What is clear from the sparse history of early visits to Tucson and Bac is that the O'odham did not unflaggingly welcome the Jesuit priests. The O'odham thwarted and, at times, openly resisted the missionary's efforts at religious conversion and the imposition of Christian discipline.

Dobyns (1963, 1983) has long argued that the epidemiological impact of the Spanish invaders far outweighed any military efforts later undertaken in the region. By the time missionaries arrived in the Santa Cruz River valley, the local population was likely severely weakened by the impact of disease. They may have welcomed some of the subsistence technologies the missionaries brought with them, but they could have been wary of the missionary presence and skeptical of their intentions. Missions were supposed to last for 10 years before they were transitioned into parishes, but missions retained the same status for decades, suggesting limited success in educating indigenous people and encouraging them to lead Christian lifestyles (Jackson 2005).

Native Americans selectively adopted aspects of Spanish lifeways but soundly rejected others; "The new crops, cattle, horses, and agricultural techniques; the Christian calendar and ceremonies; and European's gifts were, as far as we know, accepted by Indians . . . Yet Indians continued to reject, in diverse ways, Europeans' ideals of monogamous, unbreakable marriage bonds; fixed residence; persecution of witchcraft; and prohibition of dances, indigenous ceremonies, and healing practices" (Bay et al. 2008:382). In other words, Native Americans accepted aspects of European lifeways that were useful to them and augmented their own activities with European technologies but held onto core beliefs and social practices and refused to accept those of the missionaries.

Some authors have suggested that, in contrast to the violent Apache response to the Spanish colonial presence, the largely peaceful O'odham response to Spanish

missionization reflected a hope that colonial agents could bring some relief to an otherwise decimated population. Reff (1991:260) has suggested that, to some extent, an interest held by some Native Americans in baptism may have been because of a belief that this cleansing could protect the anointed from disease, as their own healers were unable to provide a cure. Priests also gained some acceptance as healers because they were willing to stay with the sick and administer prayers and curatives, and many traditional healers would leave the sick alone as their condition worsened. Priests also offered reasons for sickness, however misguided; in their minds, sickness was the result of sin and the lack of a righteous relationship with God. If anything, the relationship between many Native Americans and missionaries in the Santa Cruz River valley would have been conflicted and ambivalent.

According to Bay et al. (2008), the mission system run by the Jesuits in Sonora and Sinaloa had begun to deteriorate as early as 1681, before Pimería Alta was missionized. In that year, a rebellion led by Opatas and Conchos, who were inspired by the highly successful Pueblo Revolt of 1680, was brutally suppressed (Bay et al. 2008:380). Less than a decade after the 1681 rebellion, guerilla warfare erupted in the Sierra Madre, lasting for 7 years. In another long-standing conflict, Pimas Bajos and Seri occupied Cerro Prieto in northern Mexico for many decades (1726–1771, 1777–1784), restricting the missionaries from their society. Multiple ethnic groups, including the Yaqui, Mayo, and Lower Pima revolted in 1740–1741.

During the initial decades of the missionary presence in the Pimería Alta, O'odham aligned themselves with the Spaniards and were apparently convinced that the Spanish military prowess was invincible. In keeping with the Spanish colonial program of civilizing and controlling the native populations, some O'odham in northern Sonora concentrated in larger settlements, augmented the military strength of the Spaniards in campaigns against hostile groups, and "accepted the titles and roles of Spanish civil office as governors, captains, *fiscales*, *temastianes*, *madores*, etc."(Dobyns 1959:108). Indeed, without the cooperation and military assistance of the O'odham, the Spaniards would never have been able to close off the northern frontier and withstand the military pressure from hostile Native American groups.

By the mid-1700s, however, a series of disappointing military campaigns, multiple disease epidemics, and a history of subjugation led to a growing tide of deep dissatisfaction among O'odham with the mission program in the Santa Cruz River valley. The O'odham revolted in 1751. The revolt began when Captain-General Luís Oacpicagigua, who had led the O'odham forces in the Spanish campaign against the Seris, persuaded around 20 Spanish settlers and Native American servants that an Apache attack was imminent. Oacpicagigua convinced settlers at Saric (near Hermosillo, Mexico) to find protection in his house. Once inside, the house was set ablaze and all attempting escape were bludgeoned to death. Those killed included "four Spanish men, four youths; two women and nine children died, along with a mestizo and two Yaquis" (Dobyns 1959:111). Other successful attacks occurred at Caborca, Busani, Pitiquito, Oquitoa, Agua Caliente, Arivaca, and along Sonoita Creek. All told, at least 105 people were killed in the initial revolt; most of them were Spanish men, women, and children, but 9 Yaqui, 2 enslaved Nixoras, 1 Opata, and 1 Spanish African were also killed. Other Yaquis were taken as prisoners and enslaved by the O'odham (Dobyns 1959). At Tubac, the church and the priest's house were burned.

The native residents of Bac considered killing Bauer, the local Jesuit missionary, but were "not highly motivated to set off the conflict," taking several days to deliberate on their course of action (Dobyns 1976:11). Bauer was warned in time to escape. Dobyns (1976:11) concluded that the people of Tucson, because of their limited interaction with the missionaries, would have been even less motivated to join the cause. After the uprising, O'odham from Tubac, Tumacácori, and several other *rancherías* moved to Tres Alamos, along the San Pedro River, and others rebels escaped to the Santa Catalina Mountains northeast of Tucson. Some O'odham also apparently attempted to strike up an alliance with Apaches and Seris to fight the Spaniards, but they were refused by both groups because of the previous involvement of O'odham in Spanish military campaigns (Dobyns 1959). Following the initial attacks, the concluding battle of the revolt occurred on January 4, 1752, during which a force of 2,000 O'odham were repelled by Lt. Bernardo de Urrea's force of around 100 Spaniards (Dobyns 1959, 1976:11).

After Oacpicagigua surrendered at Tubac in March 1752, the rebels began returning to the Santa Cruz River valley (Dobyns 1959). One result of the revolt was that when the rebels returned from their places of refuge, they concentrated at Tucson, instead of at the several other settlements that had existed between Bac and Ouiar. In addition, the Spaniards placed a presidio at Tubac (Jones 1979:191; Officer 1987:4) and several missionaries (including Segesser, Sedelmayr, and Stiger) recommended Tucson as a potential location for another military post because it had good pasturage and water and was centrally located within the Pimería Alta (Dobyns 1976:12; Polzer and Sheridan 1997:418–421). Another reason for the presidio at Tucson, given by the captain of the presidio of Terrenate, Joseph Díaz del Carpio, was "to prevent the Indians of the north, if they rebel, from uniting with the Indians of the west" (Polzer and Sheridan 1997:415).

The Jesuit Expulsion

The Jesuit missionary presence abruptly ended by Spanish royal decree in 1767. In that year, the Jesuits were expelled from all Spanish territories, and the Franciscans, who had

been actively missionizing in Mexico since 1524, were given control of the northern missions (Kessell 1976:3; McCarty 1996). The abrupt departure of the Jesuits, coupled with the effects of a devastating epidemic, left the mission system in the Santa Cruz River valley in chaos. By the time the Franciscans arrived in the area in 1768, many Sobaipuri had abandoned their farms and fields and only a few remained at Guevavi and Bac. Most of the approximately 500 Hispanic settlers living in southern Arizona at the time—including military personnel, servants, and their dependents—were concentrated at Tubac. Apache raids increased with attacks on Calabazas, Sonoita, and Bac and the complete destruction of the mission at Soamca, prompting the Franciscans to move the mission at Guevavi to Tumacácori, in order to be closer to the presidio at Tubac. When Sobaipuri threatened to abandon Tucson in 1770, Anza promised them help in building fortifications and a church, which were completed in 1773 (Kessell 1976:56–57; McCarty 1976:16–18; Officer 1987:48).

As the mission system declined in the early nineteenth century, indigenous populations moved away from many mission sites in Sonora, which were then transformed "into non-indigenous communities dominated by the settler populations" (Jackson 2005:394). In fact, neither Jesuit nor Franciscan missionaries in northern Sonora were able to alter the pattern of seasonal movement between settlements and were hence unable to keep Native Americans confined to mission settlements (Jackson 2005:398). According to Jackson (2005:398–399), this failure on the part of the missionaries indicates that the missionaries were unable to alter fundamental aspects of Native American economy, settlement, or religion. The sense of a distinct, collective Catholic identity that could have been created by residing at a mission and adopting Christian lifeways did not seem to develop strongly for many indigenous people residing at Sonoran missions, but those born into mission life were probably more attached to the Spanish colonial world, than those who were neophytes as adults (Jackson 2005:395).

Social Identity during the Spanish Colonial Period

The encroachment of Spanish settlers into the northern frontier of Nueva Viscaya resulted in the formation of new identities formed as Spanish colonial and Native American groups interacted and adapted to new forms of economy and social organization. Fully Spanish individuals were typically among the elite of society in New Spain, but the vast majority of individuals in the Santa Cruz River valley were either Native American or represented a mixture of European, African, and Native American biological and cultural heritages.

Studies of social identity in culture-contact studies have tended to focus on a "colonized-colonizer dichotomy as a fundamental axis of identification" and the impacts of European colonizers on indigenous populations and lifeways (Voss 2005:461). Social identity in Spanish colonial contexts was complex and multidimensional and involved a wide array of interactions among people of Native American, African, and European descent. Sexual reproduction and social interaction among populations resulted in mixed-heritage offspring and the development of new, racialized social identities. Genetic and cultural blending between groups had the potential to create a fair degree of ambiguity in social classification and status (Voss 2005:462).

Spanish colonial identities in the Americas were categorized according to the *sistema de castas*, a racialization project aimed at classifying identities according to a blood quantum scheme. Native American, African, and European individuals were considered to be "pure" races, and their offspring to be of mixed-race or heritage (Voss 2005:463). To organize people in status levels, as many as 40 different classifications of *casta* identities were legally codified. Lighter skin was generally considered to be of higher status than darker skin, but "parentage, class, mannerisms, and material practices" were also important to defining one's casta and corresponding social status (Voss 2005:463). In comparison to other racialization projects, in which mixed-heritage children were assigned to the status of the lower-status parent, the Spanish colonial system, with all of its fine gradations and ambiguities, offered some "opportunities for racial and social mobility" (Voss 2005:463). In some cases, people would change *castas* during their lifetime, mostly by asserting their identification with a higher-status group. The ways that *casta* identity affected individuals differed among genders. Men of European descent could achieve honor through the sexual conquest of women of lower status, but male relatives of women who engaged in sexual relations with men of lower status were dishonored (Voss 2005:464–465).

Despite the complex layers of racialized identities used in differentiating people according to social status, archaeological evidence from the Presidio de San Francisco suggests that the "colonists minimized the racial and cultural distinctions among themselves through shared practices related to material culture, dress, and foodways" while avoiding associations with Native American foodways and material culture (Voss 2005:467). Voss (2005:470) argues that colonists had repudiated the *sistema de castas*, and instead developed common "Californio identities that emphasized shared colonial status over individual casta ranking." This apparent avoidance of indigenous material technologies and foodways is at odds with findings from other colonial contexts in the Americas, which have found a distinction between "male-public-European and female-domestic-indigenous material practices" (Voss 2005:471).

During the early years of the European presence in the Santa Cruz Valley, people of purely European descent were few and generally in positions of religious or military authority. They were in direct contact with the inhabitants of

Tucson and San Xavier del Bac for relatively brief visits, separated by long hiatuses. After the presidio was built and soldiers, settlers, and servants moved into the area, however, the *sistema de castas* probably became more influential in defining status distinctions and social roles among Tucson residents.

Spanish censuses recorded the people living in Sonora as Spaniards, mestizos, Indians, and other groups, which included *coyotes* (children of European and Indian parents); *mulatos* (children of African and European parents); *lobos* (children of African and Indian parents); and *castizos* (children of European and a coyote) (Jones 1979:185). Mestizos were individuals of mixed race and formed the vast majority of what Spaniards referred to as *gente de razon*, or people of reason. These were people who had adopted the colonial lifeway in mannerisms and dress and other outward forms of cultural affiliation with Spanish Colonialism, ostensibly because they were capable of reason. Perez (2003:16) notes that, by extension, "Indians were people who could not reason for themselves" and were instead considered "childlike and incapable of rational decision-making."

Spanish social hierarchies were apparently preserved to some degree in Tucson. At the same time, Tucson was a remote, frontier outpost, with many of its soldiers coming from nonaristocratic backgrounds; the necessities of survival in the face of Apache attacks and the sometimes harsh desert environment may have instilled a level of solidarity and commonality among its inhabitants (Herring 2009). During the early nineteenth century, military officers were listed in military service records as *españoles*, or of predominantly European ancestry. Noncommissioned officers and soldiers, by contrast, were mostly classed as "*mestizos, coyotes* and, occasionally, as *mulatos*" (Officer 1987:92–93). Status distinctions, to the extent they were important, would have played out in both subtle and overt ways, affecting the foods people ate, living arrangements, marriage and business partnerships, privileges, and responsibilities. For the elite, finding suitable marriage partners was difficult in remote Tucson, which sometimes led to marriage between a commissioned officer and spouses of lower social status, such that "by the time of Mexican independence a certain leveling of the social classes had taken place" (Officer 1987:92). At the same time, marriages among elite members of society helped to create a vast network of political and economic alliances that connected elite families in Tucson with other prominent families in the Spanish empire.

Tucson during the Spanish Colonial Period

During the Spanish colonial period, Tucson was at the northern frontier of New Spain and formed a part of the Spanish mission system. For much of this period, Tucson fell within the jurisdiction of Nueva Viscaya but eventually came to be in the combined province of Sonora and Sinaloa in 1734 (Jones 1979:169). Sonora, which extended an indefinite distance northward from the Rio Yaqui, was eventually defined as a distinct province in 1830, after Mexican independence (Jones 1979:177).

A series of priests and accompanying military escorts had visited Tucson during the late sixteenth and early seventeenth centuries, but their stays were relatively brief and their cultural impact on the native populations appears to have been minimal. Indeed, for much of the eighteenth century, Tucson was a *visita* of missions farther to the south, including San Xavier del Bac, and the missionary presence was fleeting. Some priests were Spanish in origin, but others were from Switzerland, Italy, and Czechoslovakia. Because the Catholic priests were sworn to celibacy, they did not, at least officially, produce offspring with Native Americans (Dobyns 1976; cf. Bay et al. 2008:380).[1] The main impact of Spanish Colonial priests on culture, biology, and landscapes of the American Southwest was an epidemiological impact on local populations through the transmission of foreign diseases and technological and economic impacts that followed the introduction of European cultigens and domesticated animals and metal tools (Sheridan 1988).

Prior to the Spaniards' arrival in Tucson, information about the Spanish invaders and their lifeways had probably already made its way into the Santa Cruz River valley as had Old World diseases and some of the technologies the Spaniards brought with them to the frontier (Majewski and Ayres 1997; Reff 1991). Majewski and Ayres (1997:66) have noted, for instance, that "small portable objects, such as beads and metal knives, as well as verbal descriptions of the Spaniards, their horses, and accoutrements" would have likely arrived in the Santa Cruz River valley in advance of colonial agents. Indeed, "a few Spanish artifacts such as beads, metal knives, and . . . cow and horse bones" have often been found at protohistoric sites in southern Arizona (Majewski and Ayres 1997:69). In addition to tools and livestock, Old World cultigens, such as watermelon, also arrived in the area prior to the arrival of Spanish settlers (Sheridan 1988).

During the first half of the eighteenth century, Jesuit priests were typically stationed at missions south of Tucson from which they occasionally visited Tucson. Kino established missions south of Tucson at Guevavi and Bac around 1700. These mission sites were occupied by Jesuit priests only briefly, however, and between 1702 and the 1730s, they were visited rarely by

[1] However, according to Stockel (2008), the heavily masculine zeitgeist of Spanish Colonial society and its concomitant encouragement of sexual conquest, at least among socially prominent males, may have engendered sexual permissiveness, even among missionaries. In other words, priests ideally would have been celibate, but sexual liaisons between them and parishioners were not out of the question.

priests from San Ignacio (Officer 1987:4). Kino was the first missionary to pass through Tucson, doing so several times between 1694 and 1697 while en route to the Gila River, accompanied by a military escort. In the first written reference to Tucson, made on September 27, 1698, Kino referred to the settlement as "San Cosme de Tucsón" (Dobyns 1976:4). Kino described the fields of Tucson favorably and on par with those of San Xavier del Bac. Watered from the river and from springs, the fields were likely used to grow "maize, beans, squash, melons, wheat, cotton, amaranth, chenopodium, devil's claw and tobacco" (Dobyns 1976:5). At San Xavier del Bac, the people raised cattle, sheep, and goats, and baked wheat bread in an oven Kino ordered to be built; residents also built an adobe house and a small church at Bac under Kino's direction (Bolton 1948:1:173–174; Hard and Doelle 1978:6–7).

At the time of Kino's early visits, several Sobaipuri settlements were occupied along the Santa Cruz River in the vicinity of Tucson. San Cosme del Tucson was located on the west bank of the Santa Cruz River, as were three other unnamed *rancherías*. Another *ranchería*, San Agustín de Ouiar, was located farther north on the east bank of the Santa Cruz River near its junction with the Rillito River. Here, the Santa Cruz River still maintained its surface flow before diving underground farther north (Burrus 1965; Hard and Doelle 1978:3–6). Accompanying Kino, Captain Juan Mateo Manje (1954:92) counted 186 houses and 800 people in the settlements at Tucson. San Cosme later came to be known as San Agustín, confusing the identification of specific place. Kino estimated there were 200 families at San Agustín on April 30, 1700, which could represent a drastic reduction in population size in just a few years (Bolton 1948:1:236).[2] According to Dobyns (1976:4), the settlements at Tucson were probably not considered by the Jesuit to be of major importance. Kino performed a few baptisms at Tucson, but he appears to have spent little time there.[3]

Like the visits to these northern outposts, descriptions of the mission of San Xavier and its *visita* at Tucson are rare from the early part of the eighteenth century and reveal the tenuous foothold the missionaries had in the Pimería Alta. Joseph de Torres Perea, who took over Guevavi in 1741, described the mission of San Xavier del Bac on March 16, 1744, stating that 400 families were living there. He noted that they were gentle and were relatively peaceful, but that they were "Christians no more in name than reality" (Dobyns 1976:8). The residents of Bac were reluctant to become involved in Christian rituals, such as baptism and marriage by the Church (Dobyns 1976). Several decades later, newly arriving Franciscans described the native religion in the northern Sonoran missions in much the same way, as if Christian practices represented only a thin veneer that masked fundamentally non-Christian beliefs (Jackson 2005:274). Although missionaries did not fool themselves into believing that sacraments, such as baptism, were demonstrative of belief in the Roman Catholic faith, "missionaries used the administration of sacraments including baptism, confession, and communion to measure the pace of conversion" (Jackson 2005:242). In the northern frontier, conversion was not occurring at a fast pace.

The Jesuit Father Bernard Middendorf was sent to Tucson in 1757 to serve as Tucson's first resident priest, where he was given wild fruits and birds' eggs in exchange for dried meat (Hard and Doelle 1978:7). However, within months of his arrival, he and his party escaped to San Xavier after being menaced one evening by several hundred Sobaipuri. Officer (1987:38) and Hard and Doelle (1978:7) counter that he left because of illness. In order to control Native American settlement, Sobaipuri living in settlements along the San Pedro were forcibly migrated to Tucson in March 1762 (Officer 1987:40). Despite the move, only around 220 people were observed to live at Tucson in 1765. In addition, Tucson's inhabitants spent little time farming and were more involved in hunting and gathering wild-plant foods, spending most of their time in Tucson during the agricultural season (Dobyns 1976:23–24).

The replacement of the Jesuits with Franciscans in 1767 was followed by heightened violence and unrest in Arizona. Two settlements north of Tucson were abandoned because of Apache pressure, and San Xavier del Bac was raided multiple times (McCarty 1976:12–14; Officer 1987:46–47). On one occasion in February 1769, for instance, Apache

[2] Hard and Doelle (1978:3) hypothesize that the name change took place after the Pima Revolt in 1751. Tucson also came to be known as San José in 1762, when Captain Francisco Elías Gonzalez gave it the name when he brought 250 Sobaipuri to the settlement on the feast day of San José. The mission site later established on the east bank of the river came to be called San José by Euroamericans and retained that name into the twentieth century.

[3] The first resident priest of San Xavier del Bac, Francisco Galvo from Valencia Spain, arrived in 1701 and probably visited Tucson on occasion, but he was soon forced to leave in 1702 because Native Americans were killing his livestock. Tucson was again visited in the 1720s by Father Agustin de Campos of the San Ignacio Mission, but it was not until 1732 that additional priests were provided to develop the northernmost missions in Arizona. Philip Segesser, from Lucerne, Switzerland, was sent in 1732 to San Xavier del Bac. He spent much of his time at San Ignacio and appears to have considered Tucson of little relevance. Another missionary from Switzerland, Kaspar Stiger, was sent to Bac sometime shortly after Segesser. During much of his time at Bac, he was antagonized by Native American religious leaders who destroyed and profaned church property in 1734. Stiger probably spent little time at Tucson, returning to San Ignacio to replace Campos in 1736. Another missionary, Joseph Fabier, was sent to Bac from Cucurpe the following year, but soon died. Ministering to the Native Americans at Bac was then taken over by Alexander Rapicani, from Naples, Italy, who was stationed at Guevavi and like the others before him, probably spent little time, if any, at Tucson (Dobyns 1976:7-8).

attacked San Xavier del Bac while most of the residents were away in the mountains gathering agave (McCarty 1976:11–14).

The first Franciscan missionary to visit Tucson was Francisco Hermenegildo Tomás Garcés, who had an escort of two military soldiers while posted at San Xavier del Bac. During his first year living at the mission, Garcés reported that the village was sparsely settled most of the time, with most of the O'odham who spent time there "either working their fields along the river or gathering agave in the mountains" (McCarty 1976:14). After having visited Tucson several times, Garcés (July 28, 1768) described the O'odham living there as "primitive people, showing no sign of knowing Christian teachings—even in their own language" (McCarty 1976:9). Garcés appears to have earned the trust of the O'odham in Tucson—who built a "tiny brush hut among their own" for him—by insisting that he did not want them to work for him (McCarty 1976:9). The O'odham were also reportedly prepared to campaign against the Apache at Garcés's command.

Juan Bautista de Anza, the captain of Tubac, visited Tucson in April 1770, shortly after a measles epidemic and convinced the Sobaipuri living there to build earthen fortifications to protect the settlement, for which work they were to be paid in wheat. Despite the apparent absence of Christianity among the Tucson natives, the O'odham also requested a church. Garcés granted the Tucson O'odham all the Tucson wheat harvest and half the harvest from San Xavier for construction of a church at Tucson, which would be built at the O'odham village near the foot of Sentinel Peak (McCarty 1976:17, 25). Fortifications, consisting of an adobe mission residence with lookout towers, were completed in February 1771, at which point the settlement came to be referred to as San Agustín del Tucson (McCarty 1976:25; Officer 1987:48). Construction of the church began in 1772 and was completed the following year (Dobyns 1976:33; McCarty 1976:25). During a visit to Tucson in 1797, Father Francisco Iturralde described the church as "somewhat deteriorated [but] decent and clean" (Chambers and Sonnichsen 1974:5). A two-storied structure at San Agustín del Tucson was later built between 1797 and 1810 by Father Juan Bautista Llorans, who had finished the construction of the magnificent church at San Xavier del Bac in the late 1790s (Greenleaf and Wallace 1962:12; Hard and Doelle 1978:10).

The Presidio at Tucson

A major transformation in the settlement of Tucson came with the selection of Tucson as the site of a new military fortress, or presidio. During the late eighteenth century, the existing presidios "erected to protect the 2,000 mile border [of New Spain] . . . sat in remote, exposed positions and had undermanned garrisons" (Moore and Beene 1971:266). To tighten up the northern line of defense, the Viceroy of New Spain charged the commander of the San Sabá presidio in Texas, Irishman Hugo O'Conor, with the task of determining where frontier presidios should be placed. O'Conor chose to move the Tubac garrison to Tucson, across the river from San Agustín del Tucson, and marked the site with Father Garcés in August 1775 (Officer 1987:50). The garrison was physically moved sometime the following year, or late in 1775; the exact date is unclear (Officer 1987:51).

At the same time he chose to move the Tubac presidio to Tucson, O'Conor also chose to move the presidio at San Mateo de Terrenate to a location farther down the San Pedro River near modern Tombstone. Named Santa Cruz de Terrenate, this new presidio was abandoned in less than 5 years because of supply problems and constant Apache attacks (Whittlesey et al. 1994; Williams 1986). The Tucson presidio fared much better, but it was still a constant target of Apache raids, and much of the garrison's time during the early years of the presidio was spent fighting Apaches.

Although a mission residence and church were quickly built at Tucson earlier in the decade, the same swift effort had apparently not occurred with the building of the presidio in Tucson. After his arrival in June 1777, Captain Pedro Allande y Saabedra was shocked to find that the presidio walls had not been built and no funds remained for construction. The presidio walls were finally up by December 1783, their completion being spurred by an attack of several hundred Apaches earlier in May of that year (Officer 1987:59). The settlement remained vulnerable, however, as another Apache attack on the presidio in March 1784 succeeded in killing five soldiers and stealing 150 horses (Officer 1987:60).

As neighboring settlements located on opposite sides of the river, the presidio at Tucson and San Agustín de Tucson became inextricably linked, with the presidio offering military protection to the mission settlement and the mission offering religious services. A community of pacified Apaches was established north of Tucson in 1793 as a result of the Spanish military strategy of relentless attacks on the Apache and the offering of provisions to Apaches who settled peaceably at presidio camps (Dobyns 1976:82–105). The first group of Apaches to settle at Tucson was a group of around 18 families of Aravaipa Apaches who were provided a weekly "ration of corn, meat, tobacco, and candy" (Brinkerhoff 1967:13; Officer 1987:66; see also McCarty 1976:60–63).

By 1804, Captain José de Zúñiga was able to report that Tucson had 4,000 cattle, 2,600 sheep, and 1,200 horses and that local industries included growing cotton, weaving, and working a lime deposit north of the presidio (Officer 1987:80). The Tucson population consisted of 1,015 "soldiers, settlers, and Indians" (McCarty 1976:86), although the garrison had "no formal militia of cavalry or infantry"; only 5 recruits were present (McCarty 1976:88). Military service was provided by the settlers, who were obligated to

protect the settlement in exchange for the use of farmland and residential lots, as well as free religious instruction from the Tucson parish (McCarty 1976:88).

Tucson had a company store that sold items such as wax, chocolate, and merchandise from East Asia. The only taxes were for the purchase of tobacco. The Sobaipuri who had lived so long in the area continued to die off from disease and were supplanted by Tohono O'odham moving into the area. A few Spanish families attempted mining, farming, or ranching in outlying areas along the San Pedro River and in Arivaca, but most settlers remained close to the established communities of Tumacácori, Tubac, or Tucson (Officer 1987:82–83; Sheridan 1995:37–38).

For their subsistence, settlers at Tucson "planted corn, wheat, barley, and vegetable crops, in addition to fruit trees and grape vines" (Officer 1987:15). Captain Antonio Narbona also initiated a practice of planting crops at Tres Alamos, along the San Pedro River, but the fields were highly vulnerable to Apache raids (Officer 1987:89). Fish obtained from rivers in the region (Brinkerhoff 1967:17) and wild game contributed to the diet, but domesticated livestock and agricultural products likely formed the majority of foods consumed by Tucson residents (see Chapter 7).

Apache raiding fluctuated through the years. The first few decades of the nineteenth century were apparently relatively peaceful, in terms of Apache attacks, as few raids on Tucson were reported. Regular patrols were sent from Tucson to fight Apaches during the early years of the century, including 12 patrols between 1807 and 1811, which collectively resulted in the death or capture of 120 Apaches (Brinkerhoff 1967:18).

The number of soldiers in Tucson increased during the 1810s. A December 1818 roster of the Tucson presidio recorded 103 personnel on active duty and 17 retired personnel in residence (McCarty 1976:137–143). The settlement also continued to attract additional peaceful Apaches, some of whom were baptized (Brinkerhoff 1967:17). Despite population growth, agricultural production between 1813 and 1819 faltered because of an increased Apache threat and the abandonment of Tres Alamos. As a result, Tucson was forced to rely on the grain supply of settlements farther to the south, and many frustrated settlers left Tucson prior to Mexico's independence from Spain (McCarty 1976:134).

The Mexican Period (1821–1856)

Tucson became part of Mexico when Mexico gained independence from Spain in 1821. At the time of Mexican independence, Father Juan Vaño at Bac counted 287 Native Americans at Bac and San Agustín; 318 Native Americans and 62 Hispanic settlers were counted at Bac and San Agustín the following year (Dobyns 1962:29; Hard and Doelle 1978:10). One of the few immediately noticeable changes in Tucson was a change in community leadership from military to civilian sectors. José León was elected as Tucson's first civilian mayor in December 1824; prior to this, the town had seen only military leadership (Thiel 2005:7).

After Mexican independence in 1821, the presidio system and its command essentially remained in place, but little attention and few funds were allocated to the frontier presidios in the early years of the Mexican government (Brinkerhoff 1967:18–19).The stability of relationships with pacified Apaches declined as funds dried up to supply rations of beef, grain, brown sugar, and other foodstuffs. The rationing program in Sonora officially ended in 1831, but rationing appears to have continued in Tucson. In 1835, 486 Apaches Mansos were enumerated in Tucson, each receiving around 3 1/3 quarts of wheat per month (Officer 1987:133, 363:n.60). The Apache presence in Tucson remained strong enough that "Tucson in the 1830s was as much an Apache as a Mexican community" (Sheridan 1995:46). Tucson's military leaders also signed a peace treaty with Pinal Apaches in March 1836, agreeing to allow Apache to temporarily settle where Aravaipa Creek meets the San Pedro River. The treaty regulated Apache travel to Tucson and required Pinal Apache chiefs to report to the commander of the Tucson presidio every 2 weeks, providing information on activities at the Apache settlement and those of hostile groups (Officer 1987:137).

Despite efforts to maintain a pacified Apache community in Tucson, the ending of the rationing program for many pacified Apaches in Sonora forced them to seek other means of subsistence, and consequently, raiding increased in the region. The Hispanic presence at many settlements dwindled as residents feared for their lives and caring for agricultural fields and livestock became increasingly dangerous. For protection, military escorts sometimes accompanied Tucson's farmers to their fields, and to avoid theft, livestock were brought into the presidio at night (McCarty 1997:13).

Ignacio Zuniga wrote in 1835 that the temporarily peaceful conditions experienced in the early part of the nineteenth century had already begun to erode with the beginning of the Mexican independence movement in 1810. Far removed from political happenings in Mexico City, the Sonoran presidios had remained loyal to Spain, and their experienced soldiers were frequently called upon to fight the rebellion rather than protect settlements from Apaches (Officer 1987:84–87).The vulnerability of residents in the northern frontier of Mexico led to the establishment in 1828 of a state militia and the request for 100 muskets to be sent to Tucson to arm civilians (Officer 1987:112). The situation had become so dire that the political chief of the Arizpe district (which included Tucson), Manuel

Escalante y Arvizu, reported to the acting governor of Arizpe that the attacks had reduced cattle herds to no more than 25 head per settler; horses were few and had to be closely watched, and bulls and oxen needed to be guarded at the fort at night. In addition, increased population had led to a water shortage for Tucson residents, and food was scarce. The abandonment of cultivation at Tres Alamos and unwillingness among Tucson's military commanders to buy local produce resulted in the importation of food from the Magdalena River valley. The situation had become so bad, in fact, that Escalante warned that the settlement could be abandoned, unless well supplied and protected (Officer 1987:113). Apache raiding continued to increase, but funding for troops remained out of reach. Twenty-eight Hispanic settlers, along with 48 O'odham from Tucson and San Xavier, offered their services in campaigning against hostile Indians, and several Tucson residents offered provisions, limited as they were (Officer 1987:119).

The Mexican period also saw the dismantling of the mission system, resulting in the deterioration and neglect of mission facilities and the absence of regular priestly activities in Tucson. The expulsion law of December 20, 1827, which expelled Spaniards from Mexico, "left most of the missions, including those on the Sonoran frontier, without priests" (Dobyns 1959:589; Whalen 1964:19). Father José María Pérez Llera was placed in charge of the missions of the Pimería Alta, including San Xavier del Bac. In an 1830 report to Llera on the condition of San Xavier del Bac, Fernando María Grande noted that the mission had extensive fields that had once supplied the mission and the Tucson presidio. He also noted that O'odham from Santa Ana and Santa Rosa "flock to San Xavier to help with the harvest . . . Indian tribes of the Gila River also arrive here in great numbers to pass the frugal winter season, but they return home in the spring" (quoted in McCarty 1997:23). As the mission was without a priest, the mission residence was closed and all portable church property stored inside; the key was given to a native leader, Juan Ignacio Zapata (McCarty 1997:24).

After the expulsions, priests from Magdalena and San Ignacio would occasionally make the long journey to visit the missions in Arizona, accompanied by escorts of "twenty-five to thirty men" (Whalen 1964:26). Often, these escorts were provided by Tucson residents to ensure religious instruction and the administration of religious sacraments. The priest at San Ignacio, Father Antonio González, officiated at four marriages in Tucson on June 9, 1835 (Whalen 1964:22). By the following decade, a pattern of annual visits in late August–early September appears to have been established, perhaps to take advantage of the concentration of Native Americans in the area during harvest season.

A further blow to the mission system was dealt in 1834, when a secularization law converted the functioning missions of Mexico into secular parishes. However, at that time, the mission system had declined in Arizona to the extent that no missions were functioning (Whalen 1964:21). Still, the security of church property remained a concern. In 1840, the former priest from San Xavier, Father Rafael Díaz, visited the old mission at Tucson and removed the sacred vessels and church ornaments to Imuris, Mexico (Whalen 1964:23).

An 1843 report by Joaquín Quiroga on the mission at Tucson (then a satellite of San Xavier del Bac [Hard and Doelle 1978:10]) described it as having a mission church, a 10-room, two-story mission residence, a granary, two enclosed gardens or orchards, and a cemetery. The church and mission residence were both deteriorating and in the process of collapsing; the garden walls were collapsed and the fruit trees barren, and the granary falling into ruin, but the cemetery was described as being in "excellent condition" (McCarty 1997:90). Religious paraphernalia used in Catholic ceremonies had all been removed to Imuris by Father Rafael, suggesting that no regular religious ceremonies (including baptism) were planned there (McCarty 1997:90). Only six Native Americans remained to tend the mission agricultural fields, and Mexican American settlers from the presidio had taken over much of the remaining farmland (McCarty 1997:91). Quiroga's report suggested moving 40 Kohatk families living at San Xavier to Tucson and repairing mission facilities to encourage O'odham to come in from the desert and become Christianized: "For lack of religious attention, many Indians have abandoned religious practice, left the missions, and returned to the open desert" (McCarty 1997:92).

For the remainder of the Mexican period, priests made only occasional visits to San Xavier del Bac and Tucson. The priest at Magdalena, Father Trinidad Garcia Rojas, visited Tucson annually between 1844 and 1847 in the late summer (Whalen 1964:24). Father Francisco Marquez visited Tucson and San Xavier in January 1849, when he administered large numbers of baptisms, confirmations, and confessions at both places and officiated two marriages at Tucson (Whalen 1964:25). Yet another priest, who may have been Father Vasquez from Caborca, visited Tucson in September 1855 at the same time that cattlemen had stopped in Tucson while herding cattle from Texas to California. To them, Vasquez appeared to be the resident priest, although he was only visiting (Whalen 1964:30). That same year, the commander of the Tucson presidio, Don Hilarion Garcia, removed the sacred vessels, church ornaments, and statues of the presidial church to Imuris (Whalen 1964:23).

Another change during the Mexican period was the "gradual encroachment of Anglo-Americans from the eastern United States" (Thiel 2005:7). American trappers first visited Tucson in 1826, but their presence was short-lived and transient, making an impression on the small isolated community but leaving no lasting impact (McCarty 1997:8–9). Most trappers ignored the requirement to check

in at Tucson and trapped along the Gila River and other well-watered locales without official permission (Sheridan 1995:42–43).

A larger contingent, the Mormon Battalion, paid an equally brief visit was to Tucson in 1846 during the Mexican-American War. Led by Philip St. George Cooke, the battalion entered the town unopposed by Mexican troops, who had withdrawn to San Xavier and taken two brass cannons with them. En route to the Pacific Coast, Cooke had assured the military leadership in Tucson that he did not see Tucson as a foe and did not intend to engage in battle, instructing his troops to respect the private property of the town's citizenry. Tucson residents traded beans, flour, tobacco, quinces, and other items to the troops, who described Tucson, and the products they obtained, favorably in their journals (Bigler 1932; Golder 1928; Jones 1931).

Visits to Tucson by Americans soon became more frequent with the discovery of gold in California in 1848, initiating a mad rush across the American West to the California goldfields. Many would-be argonauts passed through Tucson while following a route along the Santa Cruz River north to the Gila River. It has been estimated that as many as 50,000 argonauts travelled along Cooke's wagon road to California in 1849 and 1850, with many of them passing through Tucson (Sonnichsen 1987:34).

One argonaut, A. B. Clarke (1852:73), traveled through Tucson as a member of a wagon train, the party consisting of "Mexicans, French, Irish, Negroes, Americans, and Scotch." In his journal, Clarke (1852:73) noted that on May 30, 1849, at San Xavier del Bac several hundred O'odham and some Apaches were "camped on a creek near the town." At Tucson, his party was able to obtain meat, bread, milk, and flour, the latter of which had been ground in a mule-driven mill. Milk was provided in tightly woven, watertight baskets and cost 6 cents for 2 quarts. Clarke (1852:73) also purchased mule shoes from a blacksmith for a dollar each.

By 1850, the Hispanic population of southern Arizona had decreased to less than 1,000 but was concentrated at Tucson (Officer 1987:4). Tucson residents were now "accustomed to the 49ers. United States money was accepted by local residents, who were selling foodstuffs, animals, and containers" (Thiel 2005:9). Despite the increasing American presence in town, several hundred Apache warriors raided Tucson in December 1850, driving away livestock and in the process "killing four people, wounding another, and taking five others captive" (Thiel 2005:9). The following year, the population of Tucson was decimated by a cholera epidemic that killed an estimated thousand people in the Altar Valley and a quarter of the population in Tucson (Officer 1987:24). By the time of the Gadsden Purchase in 1854, there were perhaps "four or five hundred souls" living in Tucson, the population having decreased by as much as 50 percent in half a decade (Browne 1869:133).

The Gadsden Purchase

Completed in April 1854, the Gadsden Purchase was the last major territorial acquisition of land within the contiguous United States (Figure 50). The purchase, named for the U.S. ambassador to Mexico, consisted of a large area of southern Arizona, south of the Gila River, and a portion of southwestern New Mexico west of the Rio Grande. With the Gadsden Purchase, Tucson became a part of the United States within the territory of New Mexico.[4] Mexican soldiers remained in Tucson waiting to be relieved until 1856 when Major Enoch Steen was ordered to establish a post at Tucson with four companies of the 1st U.S. Dragoons (Altschuler 1969:216). With the arrival of the U.S. military, the Mexican military garrison of Tucson moved to Imuris, Mexico, around 100 miles south of Tucson. One of the greatest losses stemming from the departure of the Mexican troops was that they took with them all the civil, religious, and legal documents from the Mexican period (1821–1856), making land claims in Tucson difficult to settle and obscuring our historical understanding of this important period (Officer 1987:xv; Sheridan 1986).

Major Steen was not enamored of Tucson and decided to establish a camp at Calabasas, some 65 miles from Tucson. Steen was ordered the following year to move closer to Tucson, but instead he moved his post to Fort Buchanan in the Sonoita Valley, citing as his reason a lack of adequate forage, wood, and water in Tucson. The U.S. military presence remained distant from Tucson for the remainder of the decade until the town was again occupied by first Confederate and then Federal troops during the U.S. Civil War. A few Euroamerican entrepreneurs moved to Tucson shortly after the Gadsden Purchase, but the town remained almost entirely Mexican American and Native American until the arrival of troops during the Civil War.

Conclusions

In this chapter, we have provided information on the protohistoric and historical periods in southern Arizona and Tucson, prior to the establishment of the Alameda-Stone

[4] While surveying the new U.S. boundary, Lieutenant Michier (in Emory 1857) described Tucson as "inhabited by a few Mexican troops and their families, together with some tame Apache Indians. It is very prettily situated in a fine fertile valley at the base of the Sierra de Santa Catarina. Some fine fields of wheat and corn were ready for the sickle [this was June]. Many varieties of fruit and all kinds of vegetables were also to be had, upon which we indulged our long-famished appetites. The Apaches, under the direction of the Mexicans, do most of the labor in the fields" (Emory 1857:118).

Figure 50. The Gadsden Purchase (after Walker and Bufkin 1979:Figure 22).

cemetery. We have discussed the early Spanish *entradas*, Native American groups, the Spanish mission system, Hispanic and Native American settlement, and the settlement and development of Tucson as a frontier outpost of the Spanish empire and Mexico. It should be clear from these discussions that Tucson started out as a collection of Sobaipuri O'odham *ranchería* settlements nestled along the banks of the Santa Cruz River, where agriculture was performed on a seasonal basis. Native American groups were heavily affected and transformed by the devastating effects of Old World diseases and were receptive to some of the technologies and opportunities offered by Spanish missionaries, soldiers, and settlers, but they were resistant to the full acceptance and assimilation of European Christian lifeways and religious practices. The inhabitants of Tucson, as a remote outpost, were less affected by the mission system than the Native Americans living farther south in Sonora, as missionaries and soldiers spent so little time among them. The Europeans themselves had a difficult time settling the Santa Cruz River valley, not to mention Christianizing the natives, in large part because of Native American resistance and to the unrelenting raiding activities of Apache groups, who terrorized Europeans and Native American groups alike at every opportunity.

A firm foothold was established by Spanish settlers at Tucson only with the establishment of a military garrison, whose soldiers spent much of their time fighting the Apache. The effects of Apache raiding were so great that livestock herds and supply lines were difficult to maintain, and agriculture production was frequently disrupted. Many of these conditions only worsened during the Mexican period, as Tucson remained a distant frontier post and the funds available for maintaining the garrison and provisioning pacified Apaches disappeared. The expulsion of Spaniards from Mexico and the secularization of the mission system contributed to the deterioration of the mission system and the withdrawal of missionaries from Tucson. As a consequence, mission facilities were abandoned, emptied of valuable items, and began to deteriorate. For much of the Mexican period, religious sacraments were received on an annual or multiannual basis and the visits of priests to Tucson were accomplished by sending out large escorts to bring priests to the town. Epidemics also continued to strike Tucson, including a particularly devastating cholera epidemic in 1851 that killed a quarter of the population. Despite the many difficult obstacles they faced, life went on in Tucson and the resilient inhabitants made a living from Sonoran Desert environment.

The Mexican period also saw the gradual arrival of Euroamerican visitors to Tucson from the eastern United States, particularly during the California gold rush. This process probably began to familiarize Tucsonenses with the growing American economy. Soon enough, they too were part of the United States with the Gadsden Purchase in 1854, beginning a long process of social, demographic, and economic transformation that took place while the

Alameda-Stone cemetery was in use. In the following chapter, we discuss life in Tucson after the Gadsden Purchase, while the Alameda-Stone cemetery was in use, as well as present information on the history and archaeology of the Alameda-Stone cemetery.

CHAPTER 5

Historic Context and Archaeological Overview for The Alameda-Stone Cemetery

Michael Heilen, with contributions by Kristin J. Sewell

The Gadsden Purchase in 1854 transformed Tucson from a remote town on the far edge of northern Mexico to a remote town on the frontier of the American West. With the expansion of the United States into the American West, Tucson was becoming incorporated into modern capitalist structures that were dependent on the federal government and provisioned by distant markets. The American West, defined as the continental United States west of the ninety-eighth meridian, was "a dynamic periphery of an evolving American world system," connecting Tucson to other parts of the United States as well as other parts of the globe (Hardesty 1991:30). At the time, southern Arizona was peripheral to other major regions of the American West, being "distinctly smaller in population, simpler in economies, without major cities, and more dependent upon external services" (Meinig 1998:145). Mining communities, ranches, and military outposts increasingly incorporated natural and cultural resources into centralized systems of production and control, whereas commercial and political frontier centers like Tucson connected people and resources to distant centers of power and commerce (Hardesty 1991; Heilen and Reid 2009). As such, the American West, including places like Tucson, was an arena of political, cultural, and economic conflict and conquest (Limerick 1987).

As a United States settlement, Tucson's population increased rapidly, from a town of a few hundred individuals at the time of the Gadsden Purchase to a town of several thousand individuals by the 1870s. While the cemetery was in use, the town remained largely Hispanic in terms of culture; Spanish remained the dominant language and local foods and customs still dominated diets, entertainment, and living arrangements. Yet, more and more people and goods from other parts of the United States and other areas of the globe were being transported into Tucson. Many of the newer residents were non-Hispanic Euroamerican adult males who came to Tucson either with the military to occupy the various military posts in the region or to take advantage of the economic opportunities provided by the expansion of the western frontier of the United States. Many of these individuals, along with their Hispanic counterparts, were involved in mining, transportation, or ranching and were eager to secure an early share in emerging capitalist market opportunities.

As discussed in the previous chapter, Tucson at the time of the Gadsden Purchase was occupied by Mexican American soldiers, settlers, and their families, as well as members of different Native Americans groups, including Tohono O'odham, Akimel O'odham, Yaqui, and Apaches. When the U.S. military arrived in Tucson in 1862 to thwart Confederate incursions into Tucson, the frontier town was considered by many newcomers to be a rough and dangerous place, but the local residents were hospitable, generous, and resourceful. By and large, Los Tucsonenses were grateful to have the security and prosperity of the now-American town bolstered by military forces and an improved supply chain. Yet American attitudes toward the once-Mexican town varied from pleasantly surprised to openly hostile. Some visitors and new residents were positive about the people and the place, but others were overtly negative about what they considered to be a lawless, dirty, and slovenly town on the far outskirts of the American frontier. As Sheridan (1986:15–16) has noted, however, Tucson was a resilient and cooperative community adapted to scarcity and isolation.

Increasingly, people predominantly from different parts of the United States, Canada, and Europe, many of whom were of non-Catholic religious backgrounds and who came to be described as Anglo-Americans in much historiography for the period, moved into Tucson. At first, many of these recent migrants moved into the finest houses of the old presidio and found prominent positions for themselves in the local economy and in city government. They mingled with the Mexican population, and some took local

brides and started families. The Mexican American elite of the town tended to affiliate themselves, at least politically and economically, with the newly forming Anglo-American elite, but the large majority of Tucson's Mexican Americans were working-class people who worked as wage laborers in ranching or agriculture, or as teamsters or laundresses (Sheridan 1986, 1995). Census records suggest large numbers of adult males and females were migrating to Tucson from Mexico as well, but many Mexican Americans in Tucson were members of more or less local families who had resided in the surrounding region for generations. As a result, the Mexican American segment of the community was organized around extended families and lived in accordance with southwestern traditions of ranching, farming, and wild-plant collection, whereas the non-Hispanic Euroamericans moving into town—at least while the cemetery was in use—were mostly adult males who adapted to the local traditions and environment to the extent necessary, but who also adhered to imported lifestyles and cultural expectations from other regions as well.

In many cities of the American West, this process of internal colonization led to racialization and economic subordination based on emerging ethnic and racial categories. Sheridan (1986) has argued that, in contrast to cities like Los Angeles and Phoenix, the Tucsonenses' close ties to families in Sonora, Mexico, insulated them somewhat from the growing racial and class-based subordination of Hispanic workers that occurred throughout the American Southwest after the Gadsden Purchase. Despite this, the dependence of the city's economy on a steady supply of low-cost wage labor ensured that most Mexican Americans in Tucson were economically subordinated throughout the latter part of the nineteenth century and afterward. During the period the cemetery was in use, a growing rift separated these groups, to the extent that segregated neighborhoods of Mexican Americans and Anglo-Americans had developed by the time the cemetery was closed.

Divisions in the community were also based in religion, corresponding fairly neatly to a division along ethnic lines. Many of the newly arriving Euroamericans were Protestant, whereas most Hispanics were Catholic. Protestants were considered a grave threat to the Catholic Church, which came to position itself in opposition to Protestants over core public issues, such as the opening of public schools or the administration of the San Xavier del Bac reservation.

Yet, one thing remained common for all the people of Tucson during the early years of this American settlement: where they placed their dead. Archival research conducted prior to and during excavation of the Alameda-Stone cemetery suggested that this was the only cemetery in Tucson while the cemetery was in use. Historical information, however, was relatively scarce on many aspects of the cemetery, including when the cemetery opened, where specific individuals or groups were buried, and how many burials were exhumed historically or disturbed by construction events after the cemetery closed. Archaeological excavation provided further information that supplemented archival information, but a number of specific questions regarding the use and abandonment of the cemetery remain unresolved.

This chapter is divided into three parts. The first part of this chapter discusses the historic context of Tucson while the cemetery was in use, providing information on military activities in Tucson, town administration, demographic trends, economy and culture, and religious practice in Tucson. The second part discusses cemetery reform in Mexico and the United States prior to and during use of the Alameda-Stone cemetery. This is followed by a discussion of the historic and archaeological context of the Alameda-Stone cemetery.

The Military Presence in Tucson

With the Gadsden Purchase, Tucson became part of the United States, but it was not until 1862 that the U.S. Military had a sustained presence in Tucson and the military section of the Alameda-Stone cemetery came to be first used for burial. At the time of the Gadsen Purchase, Tucson fell within the New Mexico Territory. A petition was soon issued to Congress in 1856 to divide the New Mexico Territory in two, with Tucson being in the Arizona Territory, but the petition was defeated because the population of the proposed area was considered too small. The desire to create a new territory was revisited again 4 years later when a convention of delegates met in Tucson in 1860 to create a provisional Arizona Territory south of the 34th parallel north and adopted a constitution. Soon after the outbreak of the Civil War, conventions at La Mesilla (in New Mexico) and Tucson adopted an Ordinance of Secession in March 1861, declaring independence from the United States and creating a provisional Confederate Territory of Arizona. Many recent arrivals in Tucson were from the southern United States and sympathized with the Confederate cause, but they were also concerned about the lack of military protection following the departure of federal troops from the region (Sheridan 1995). Many residents felt vulnerable to the threat of Apache attack, but the town's population also experienced a general lack of safety and security. Sonnichsen (1987:56), for instance, has noted that around the time of the Gadsden Purchase, "There were no courts within reach, no real law and order, no elective or appointed officials the citizens could call on without risking their lives in a journey across Apachería."

Foreseeing an imminent invasion of southern Arizona, the U.S. Army withdrew from Forts Breckinridge and Buchanan and marched to New Mexico to defend forts on the Rio Grande. As part of the withdrawal, post buildings

and supplies were destroyed to prevent their use by the Confederacy. At Tucson, a mill was burned, along with "the flour and other stores" (Altschuler 1969:218–219; Wagoner 1975:443–452).

The Confederate Territory became official when Confederate President Jefferson Davis signed a proclamation on February 14, 1862. Just 2 weeks later, about a hundred confederate troops of Company A and several territorial ranger companies arrived in Tucson under the command of Captain Sherod Hunter (Faust and Randall 2003:127; Masich 2006:30–31). The company consisted of Texans and former Arizonans who Hunter had specially selected to "occupy Tucson, enlist Southern sympathizers from California, and establish amicable relations with the Sonorans, Papagos, and Pimas" (Masich 2006:187 n. 92).

The arrival of Confederate Troops in Tucson was met without opposition and seems to have been welcomed by Tucson residents. Many recent Anglo-American arrivals in Tucson were Southern sympathizers, and the town in general was eager for the protection the troops could offer from the Apache threat. Tucson residents also seem to have felt abandoned by Federal troops (Faust and Randall 2003:128).[1] Like their Federal contemporaries, the Confederate soldiers considered Apache hostilities as the greatest impediment to settling the region. In fact, Colonel Baylor wrote an order for the confederate Arizona Guards stationed at Tucson to entice Native Americans into peace talks with the offer of whiskey and then to slaughter all the adults and sell the children into slavery. The order was never followed, however, and Baylor was removed from his command by Jefferson Davis after the general learned of the order (Wagoner 1970:20).

Two months earlier, in December 1861, General in Chief George B. McClellan had approved an operation to thwart the Rebel invasion of New Mexico Territory with troops from California. The plan entailed sending Federal troops in California to Tucson over the abandoned Butterfield Overland Mail route. James Henry Carleton was selected to lead the column (Masich 2006:10–12). Many of the men who enlisted in California were miners who had some level of formal education and were between the ages of 18 and 45. Masich (2006) has described these men as avid risk-takers who were used to working outdoors under harsh conditions.

Federal troops sent to Tucson to repel the Confederates first headed to Fort Yuma, near the mouth of the Colorado River, from where they were to continue on following the Gila River along the old wagon route of the Overland Stage Company. Troops took advantage of wells and water tanks at the abandoned stage stations along the route and cut hay for forage along the way. Captain McCleave started off early from Yuma with a small number of troops and was soon captured at White's Mill near Pimas Villages by Confederate troops.[2] Confederates also burned haystacks at six stations along the Gila to slow the column's advance (Faust and Randall 2003:128; Masich 2006:32–33; Wagoner 1970:11).

After McCleave's capture, Carleton placed Captain William P. Calloway (Company I, First California Infantry) in command of a force of 272 men who, equipped with 200 wagons and around 1,200 mules, advanced to Tucson. Their wool fatigues and the heavy equipment they had to carry in the hot desert heat made for an exhausting and physically taxing journey. Poorly designed regulation knapsacks were also incredibly uncomfortable, causing Company A to mutiny after being forced to wear them during all drills. Nonetheless, the hardiness of the men and the decision to travel at night left the soldiers in relatively good health (Masich 2006:27, 42, 77). Soldiers cut hay for livestock along the route, carefully measured distances between camps and stations, and kept an ever-watchful eye for Apache warriors. Due to their origins, the troops that marched the nearly 600 miles from Los Angeles to Tucson came to be known as the "California Column" (Hand 1996; Masich 2006:47). One soldier in the California Column, Sergeant George Hand (1994,1996), kept a diary of his military experiences and later came to be a saloon keeper in Tucson who recorded in his diary many of the deaths that took place in Tucson while the Alameda-Stone cemetery was in use (see O'Mack 2006; Chapter 4,Volume 2 of this series).

So as to not raise the suspicion of Confederate spies, Carleton forbade soldiers from correspondence with newspapers, gave instructions in code, and claimed that the mission was aimed at suppressing the Tonto Apaches. All company commanders were instructed "not to engage any Indians encountered on the road to Tucson" (Masich 2006:36). At Pimas Villages, Calloway's command purchased wheat from the Akimel O'odham and learned of the existence of 10-man Confederate picket post at an isolated volcanic hill around 40 miles northwest of Tucson known as Picacho Peak (Masich 2006:38). Disregarding orders to travel to Tucson by a different route, Calloway headed instead to Picacho and sent two detachments to cut off a possible Confederate retreat to Tucson. Failing to meet up with the detachment led by Lieutenant Baldwin, Lieutenant Barrett's detachment surprised the confederate picket commanded by Sergeant Henry Holmes while the soldiers were

[1] One of several spies sent by the U.S. military to Tucson to monitor the Confederate occupation, Frederick C. Buckner, obtained a letter from merchant Solomon Warner indicating that Tucson had been harried by Apache raids, and the local residents were eager for military protection of any kind, regardless of affiliation (Masich 2006:30–31).

[2] Pimas Villages was a series of 10 Pima and 2 Maricopa settlements located along the Gila River around 12 miles east of Maricopa Wells, a stage station and trading post along the Butterfield Overland Mail route and near the confluence of the Gila and Santa Cruz Rivers, near present-day Phoenix (Masich 2006:157 n. 12, 181 n. 77)

relaxing. Despite an early advantage, Lieutenant Barrett lost not only the engagement but his life, along with the lives of George Johnson (Company A, 1st Cavalry, California Volunteers) and W. S. Leonard (Company D, 1st Cavalry, California Volunteers). The dead were buried in an impromptu burial ground at the base of Picacho Peak. Johnson and Leonard were later moved to the Alameda-Stone cemetery (List of the Captured, Missing, Killed and Wounded in Action, of the 1st Regiment of Cavalry Cal Vols, signed by Lieutenant Colonel E. E. Eyre, 1st California Cavalry; National Archives and Records Administration, Record Group 92, Entry 225, Box 1159). Calloway fell back to Pimas Villages to regroup, where he constructed earthen fortifications and named the camp "Camp Barrett," in honor of his fallen comrade (Masich 2006:42). This small engagement is generally considered to have been the westernmost skirmish of the civil war.

The final push to Tucson, considered by Carleton to be the key to the security of Arizona, was begun from Pima Villages on May 14, under the command of Colonel West. West had been instructed to not underestimate the confederates and to take the town only if a victory was assured. California papers were at the time erroneously reporting that the Confederates had 1,500 troops at Tucson (Faust and Randall 2003:129). Unbeknownst to West and his men, the much smaller number of Confederates had abandoned their position in Tucson 10 days earlier. Company B of the 1st California Cavalry, commanded by Captain Emil Fritz, arrived in Tucson on May 20, 1862. Upon entering the town, troops hit the ground at the sight of *canales*, or water spouts, protruding from house roofs. The anxious troops thought these were guns, but soon relaxed after they learned the Confederates had retreated (Faust and Randall 2003:129; Masich 2006:46). In all fairness, prior intelligence held that Tucson was "being entrenched, the houses crenelled for musketry" (Letter from Our Open Army Correspondent, *Alta*, May 24, 1862, in Masich 2006:165).

A letter to *Alta* dated June 16, 1862, from a member of the California Column described Tucson as

> A little, old, Mexican town, built of adobe, and capable of containing about fifteen hundred souls. The Santa Cruz runs within a mile of the town, and feeds the numerous ditches that irrigate the beautiful little valley that extends to the high hills to the westward, and which was, a week since, one vast field of fine grain, harvesting having been commenced. The climate of Tucson is dry and healthy, and the soil will produce almost anything planted. The peach, quince, fig, and pomegranate grow to perfection. Upon our arrival in Tucson, we found it lively with U.S. Volunteers, but abandoned by its former population. Since then, however, they have been coming daily, and a better pleased set of people cannot be found. Some who have returned have been required to take the oath of allegiance [Masich 2006:205].

Carleton arrived on June 6, and having recently been promoted to brigadier general, declared Arizona a provisional U.S. Territory. Carleton imposed martial law on Tucson, with himself installed as military governor, and established a supply depot at Tucson to "support the other posts in the territory as well as the column that would continue to New Mexico" (Masich 2006:48). As military governor, Carleton persecuted purported Confederate sympathizers, monitored all traffic in and out of Tucson, restricted the sale of beer and liquor, and imposed a monthly $100 tax on all gambling tables (Faust and Randall 2003:129–130; Masich 2006:49). The U.S. Army also poisoned dogs which, along with cats, were apparently very numerous in the town (Faust and Randall 2003:130). The large number of troops who passed through Tucson must have created a commotion; a letter to *Alta*, printed on June 29, 1862, indicated that "gambling, vice, and the grossest immoralities attend the march of so considerable a column, but are not allowed to interfere with military discipline" (Masich 2006:188).

The Post at Tucson

Troops set up camp near the Santa Cruz River, where they slept in large Sibley tents and impromptu lean-tos. For the time being, the post was known as "the post at Tucson." Buildings were also rented in town for officer's quarters, post headquarters, a hospital, and a supply depot, which remained separate from the post. The hospital, post headquarters, and officers' quarters were located within area of the old presidio, just a few blocks west of the Alameda-Stone cemetery, and the supply depot was located at Ochoa and Convent Streets, several blocks south of the old presidio. The U.S. Military began using the Alameda-Stone cemetery for military burials, which was located on the northeastern edge of town, shortly after their arrival.

The surge of U.S. troops in Tucson was short-lived, as the California Column continued forward to the Rio Grande beginning on June 21. Several detachments left at different times; the main body of 1,400 troops began leaving Tucson on July 17; groups were staggered so as not to exhaust water supplies along the route. Some of the first troops to depart from Tucson were attacked at Apache Pass; three soldiers were killed and stripped of their clothing and equipment, and Acting Assistant Surgeon Kittridge was wounded when Apaches fired into their camp. Federal troops were again ambushed near Apache Pass on July 15, sparking "one of the largest-scale engagements ever fought between Federal troops and Apache Indians in Arizona history" (Wagoner 1970:18). Reportedly, 2 soldiers were killed and 3 were wounded, and somewhere between 10

and 68 Apache warriors were killed (Wagoner 1970:19). Like the Confederates, the Union supported a policy of extermination, with General Carleton ordering on October 12, 1862, that all Native American men "were to be killed whenever and wherever they could be found" (Wagoner 1970:20).

After the departure of the California column, troops continued to use Tucson as a stopping point and supply depot, along with the teamsters who freighted goods and materials for the military. Various troops remained in town until September 1864, when Carleton moved his post to Santa Fe, New Mexico. While in town, soldiers frequently participated in local dances and purchased fruits and vegetables, at high prices, from the locals (Faust and Randall 2003:130–131).

During this period, Carleton's extermination policy remained in effect. Repeated civilian and military expeditions staged throughout the territory in 1863–1865 to kill hostile Apaches were not often successful, but the practical result of the conflict was that in southern Arizona "no man's life was safe outside the walled pueblo of Tucson" (Wagoner 1970:23). Except for Pete Kitchen's ranch, all the mines and ranches in the Santa Cruz River and San Pedro River valleys had been abandoned (Wagoner 1970:23). California troops again began showing up in Tucson at the end of the Civil War, filtering through the town on their return home.

On March 9, 1866, command of the post was resumed by Captain Jonathan Hafer, who arrived in town in charge of Company G of the 14th U.S. Infantry. The Tucson Depot, which supplied all the troops in southern Arizona, fell under the direction of Gilbert Cole Smith, a former captain of the California Volunteers who had re-commissioned as a 2nd Lieutenant in the 9th United States Infantry (Smith was appointed in January 1867 to the Quartermaster's Department as a captain) (Altshuler 1985:10). The depot, which attempted to maintain a 9-month supply of subsistence stores at all times, also included quartermaster's stores and clothing, a blacksmith shop, carpenter's shop, saddler's shop, and a corral (Faust and Randall 2003:131). Captain Smith also appears to have been responsible for the military section of the Alameda-Stone cemetery during his posting at Tucson. Drought in Arizona, the Apache threat, difficult supply routes, and a lack of official currency in the town made the Tucson Depot difficult to supply, however (Masich 2006:59). Charles Meyers, who would later serve as a civilian in several positions in City government (see O'Mack 2006), was hired as a Contract Surgeon for the hospital, although trained only as a pharmacist, until he was replaced by First Lieutenant, Assistant Surgeon F. C. Bailey in December 1866 (Faust and Randall 2003:131). Company G departed Tucson for Camp Bowie in May 1866, leaving only Captain Smith and Lieutenant Colonel H. G. Wallen, Commander of the Sub District of the Gila, in town.

Camp Lowell

By the end of July, Company C, 1st Cavalry arrived in Tucson with 70 men under the command of Captain William Dean. Tucson was declared a permanent post on August 29, 1866. First Lieutenant Charles Veil assumed command of the post after Captain Dean left on October 2, 1866, due to disability, and promptly changed the name of the post to Camp Lowell, in honor of his Civil War Commander, Brigadier General Charles Russell Lowell (Faust and Randall 2003:132). At Camp Lowell, which was located south of Broadway Boulevard in the area of the present day Tucson Children's Museum, Armory Park, and the recently demolished Santa Rita Hotel, soldiers camped in two-man A-frame tents and built ramadas to provide additional shade. Officers on duty stayed in larger, walled tents or in rented rooms in town while off-duty. The hospital, an adobe structure that housed up to nine patients, was located outside the camp. Water for the hospital had to be obtained some 300 yards away, as the rear of the building was used as a lavatory and the building was "bounded on one side by a corral, and on the others by a hog pen, a hen house, and a stable" (Faust and Randall 2003:133). Camp Lowell was moved to the Rillito, 7 miles northeast of Tucson, in 1873, then renamed Fort Lowell in 1876. Despite the move, the U.S. military continued to use the Alameda-Stone cemetery for burial until 1881, when a new cemetery was established at Fort Lowell (O'Mack 2005, 2006; see also Chapter 4, Volume 2 of this series).

Post-Civil War Military Activities

One of the major efforts of the U.S. Military in Arizona during and after the American Civil War was a campaign against all Western Apaches. Brutal raids were at times carried out against Apache camps, but campaigning troops were often unable to track down and intercept the Apache warriors they pursued. Many military men in Arizona were avowed exterminationists, as was Carleton, who felt that the security and prosperity of the territory was dependent on the extermination of all Apache. The O'odham, who had long been the subject of Apache raids, allied themselves with the U.S. military, fighting in native units as well as fighting from their own homes, and an active effort was made to supply the O'odham with guns and ammunition.

While campaigning in Arizona, California Volunteers often wore sombreros or other more practical headgear, and their clothing and footwear were often tattered, making them appear ragged and unkempt (Masich 2006:75). Military clothing was difficult to maintain and often impractical in the hot, dry environment. Shoes could wear out in a single scouting expedition, and pants were sometimes reduced to rags after a month's use. A frequent

activity assigned to soldiers was vidette duty, defined "as a mounted sentinel placed to best observe the movements of the enemy and able to communicate with others by signaling" (Masich 2006:165 n. 30). Troops were also often engaged in escorting travelers and freighters between towns and posts and pursuing the parties they considered responsible for the frequent depredations against people and property in the region.

The military's efforts, however, were considered inadequate by many of Arizona Territory's growing population. By 1870, military personnel and other Tucson residents argued that Apache hostility in Arizona had increased since Arizona had become a territory. Citizens petitioned Congress for greater protection, expressing the concern that the military was spending most of its efforts building roads and maintaining posts, rather than eliminating the Apache threat (Wagoner 1970:124–125). Apache hostilities, they felt, diminished the economic growth of the region and threatened public safety.

Meanwhile, the Headquarters Department of Arizona in Prescott, issued General Orders No. 9 on August 2, 1870, detailing "Accounts of Successful Operations Against the Apaches" (*Weekly Arizona Miner,* 6 August 1870a:2). One account described how Lieutenant Cushing (who was killed in a later engagement and buried in the Alameda-Stone cemetery [Thrilling Account of a Sad Affair, *Weekly Arizona Miner,* 29 July 1871:4]) and Lieutenant Smith led a combined total of 50 troops "in pursuit of a band of Indians who had attacked and captured a wagon train, and killed some citizens near Canon del Oro, on the road between Tucson and Camp Grant." The troops pursued the warriors "a distance of about 170 miles" into the mountains and attacked their *ranchería*, reporting that they had killed at least 30 Native Americans. In addition, "Large quantities of prepared mescal, and property taken from the captured train was destroyed, also two mules recaptured, the others having been killed" (*Weekly Arizona Miner*, 6 August 1870a:2).

The Camp Grant Massacre

Despite assurances of federal support, Tucson residents remained dissatisfied with U.S. military efforts to eliminate the Apache threat. The rising frustration and disgust felt by Tucsonans regarding Apache hostilities resulted in the tragic Camp Grant Massacre on April 30, 1871. By that time, some Tucson residents were outraged by Army policy to provision Aravaipa Apaches living near Camp Grant with rations, some of whom they felt had continued raiding activities in the region. Further enraged by a recent murder and a kidnapping at a ranch near Tubac, a "Committee on Public Safety" was formed under the leadership of former Tucson Mayor, William Oury. The *Arizona Citizen* also published on April 15, 1871, a lengthy list of Apache depredations and implicated the Aravaipa Apache in two recent raids. The committee petitioned the Army for greater protection, but not satisfied with the response, they decided to take matters into their own hands. On April 28, 1871, William Oury and Juan Elías assembled a group of 148 men, including 94 Tohono O'odham. Sam Hughes, a prominent merchant and civil leader who had arrived in Tucson 13 years earlier, provided supplies. Traveling at night and by foot, the party descended upon the Aravaipa camp at dawn on April 30 while most of the men of the camp were away hunting. Within a few minutes, the party had brutally murdered and mutilated 100 people, nearly all of them women and children; at least 2 of the women were raped. As the Apache had done to their victims, the Tohono O'odham took captive the remaining children who had not been killed.

Easterners who had heard of the massacre were horrified by its brutality, but local sentiment must have been in favor of the group's actions. President Grant threatened to impose martial law on the Territory, unless the perpetrators were brought to trial. One hundred four participants were indicted and tried in Tucson before Judge John Titus, but the judge considered the group's actions as defensive and legal and the jury quickly reached a verdict of "not guilty" for all those indicted (Wagoner 1970:124–131).

The Community of Tucson

During the 1860s and 1870s, Tucson's population was expanding rapidly. The population increased from around 900 people in 1860 to more than 3,000 people in 1870 and had again more than doubled in population by 1880. While the Alameda-Stone cemetery was in use, the town's population remained largely Hispanic in cultural affinity, with many long-time residents as well as recent migrants sharing a Mexican heritage. As discussed in the previous chapter, some Hispanic families had by this time lived in Tucson for several generations, since the founding of the Tucson Presidio in 1775. In addition, Mexican presidial soldiers who had initially left Tucson and Tubac with Mexican forces in 1856 eventually returned to lead civilian lives in Tucson. Other Tucson residents were recent migrants from nearby Mexican states such as Sonora, Sinaloa, and Chihuahua who were seeking economic opportunities in Tucson. As O'Mack (2005:29) noted, "Tucson remained an extension of Sonoran culture and society." O'odham and smaller numbers of pacified Apache continued to live in the immediate vicinity of Tucson, and Yaqui had begun migrating into the area as well.

As previously mentioned, the growing frontier town also attracted an increasing number of Euroamerican settlers. Many of these individuals were adult males from the different parts of the United States, but smaller numbers hailed from Europe, Canada, and other areas of the

globe. In contrast to the largely adult male population of Euroamerican migrants, Tucson's Hispanic population had a more even distribution according to age and sex. The comparatively small, but influential number of non-Hispanic Euroamericans arriving in Tucson came to dominate the town's economy and politics, largely due to the American capital they brought with them as well as their greater connection to American sources of power and authority. Before their arrival, Tucson had long been a relatively poor town with historical connections to places in Mexico, rather than to the centers of power and authority in the United States to which many recent migrants were connected.

As Tucson became integrated as a peripheral community with an emerging capitalist world system, mining, ranching, freighting, and merchandising became major activities supporting economic growth and development of the town. Tucson residents performed a broad range of occupations, including as laborers, ranch hands, seamstresses, launderers, gamblers, merchants, soldiers, freighters, carpenters, and blacksmiths. Many Hispanic residents held blue-collar jobs, whereas Euroamericans held a majority of the white-collar jobs. Native Americans often worked as scouts for the U.S. military or as domestic workers; they also came into town to barter or sell ceramic pots, firewood, and other necessities. In keeping with growing class-based and ethnic discrimination, Euroamericans tended to get paid more for the same jobs and increasingly held positions of political and economic power. In addition, Euroamericans owned and operated the first newspapers, controlling the dissemination of information, which tended to focus on the activities and concerns of Anglo-American settlers, rather than those of the majority population (Sheridan 1986).

A substantial proportion of property in Tucson was soon acquired by recent Euroamerican migrants, but Hispanic residents were able to retain ownership of most of the agricultural fields along the Santa Cruz River, which along with local gardens and livestock, fed the population.[3] The 1862 Fergusson map of Tucson's field system shows three main canals (Acequia Madre Primero, Acequia Madre Segundo, and Acequia Madre Tercia) running from south to north and taking water initially from the river near Sentinel Peak (Thiel 2005:Figure 1.5). Fields were bordered by smaller acequias, or irrigation ditches, which were lined with trees and crossed using wooden planks. The entire system of acequias needed to be cleaned out every few months to keep the irrigation system in operation, which was accomplished by individual field owners for smaller ditches and collectively for the main canals (Thiel 2005:82). The distribution of irrigation water was managed by an overseer elected by the farmers (Thiel 2005:83). Fields were plowed using horses, mules, or oxen; "American" plows with iron blades were in use as early as 1873 (Thiel 2005:82). Foods cultivated in Tucson were quite diverse and included a wide variety of grains, fruits, vegetables, and herbs, as well as meat from domesticated animals. Meals were generally prepared following Sonoran culinary traditions, with stews and prepared meats often being served along with tortillas, beans, chilies, and fresh vegetables (see Chapter 7).

In time, Euroamericans and Hispanic farmers came to fight over water rights, as the two groups had fundamentally contrasting perspectives on the control and ownership of land and water resources. Hispanic systems of land tenure and ownership focused on the use value of land; the usage of resources revolved around community-centered processes of negotiation that took into account the needs of multiple land users. By contrast, Euroamerican systems were based in private, individual ownership of land and its resources and the treatment of resources as commodities that could be bought and sold on a common market, without regard for the needs of the community. In the Hispanic system, the distribution of water for agricultural purposes was based on a community-based determination of the greatest need, whereas within the emerging American legal system, the use of water was dependent on the holding of legal rights to land containing important water sources.

Water for domestic purposes in Tucson was obtained from wells—which were often left open, representing a possible health hazard to the population—or from springs. Purcell (1969:34) has noted that several water carts operated in the city, selling water by the bucket. Most dwellings stored their water in an olla, made by O'odham who sold them in Tucson each spring, ranging in price from a single cent to two-and-a-half dollars, depending on the olla and the purchaser. Men bathed "at a bath house near a spring on the west side of town" (Purcell 1969:34).

As the population grew, the town began to expand beyond the area of the old presidio, with local architectural traditions at first dominating new construction. Architectural technology in early Tucson was based on the construction of raw adobe houses with thick walls and nearly flat roofs made from rough wooden beams overlain with saguaro ribs or ocotillo stems. Water was drained from slightly sloped roofs with wooden parapets, or *canales*, to prevent erosion of adobe walls. Room sizes were typically limited by the length of available wood beams, which were usually around 10–15 feet long. Windows and doors were generally placed in central locations along walls to maintain structural integrity.

Thick walls and dense construction materials allowed the interiors of Tucson's early buildings to remain an even and relatively cool temperature, despite dramatic swings in temperature during the day (Bell 1972:23). Lightweight shade structures made from timber, saguaro ribs, and ocotillo stems were attached to structures or constructed as

[3] The vast majority of fields, some of which had been in operation for decades, were held by Tucson's Hispanic residents, which had originally been used by Native American farmers before they were given to soldiers of the presidio. In 1862, a few fields were held by recent Anglo-American arrivals, including Mark Aldrich, W. S. Oury, and Fred Neville.

free-standing ramadas to shelter windows and doors and to provide cool and sheltered interior/exterior space for activities such as sleeping, cooking, or sitting (Bell 1972:24). These were technologies long adapted to living in the Sonoran desert environment. As Euroamerican traditions became more dominant in the town and more building materials became available, Euroamericans began introducing architectural styles from their homelands. Ironically, nonlocal architectural styles that later came to characterize Euroamerican housing in the town, such as multi-story wood frame or brick construction styles more common in the Eastern United States, were comparatively ill-suited to the local environment.

Many houses in Tucson were row houses that faced the public street, with living spaces placed toward the front and more private sleeping and cooking spaces arranged in the back. Larger houses had *zaguan*-style entryways. During the time he was in Tucson, Bourke (1891:60–61) noted that no hotels offered accommodations. Recent arrivals, if accommodations in a private home could not be secured, camped out in a corral or in the plaza. Visitors would also use the gambling halls as a kind of residence.

If not made in Tucson or the immediate vicinity, goods consumed in Tucson while the Alameda-Stone cemetery was in use were brought to Tucson by pack animals and wagons trains. During the Spanish and Mexican period, European manufactures eventually brought to Tucson had to be packed 1,500 miles from Mexico City to Tucson or packed over Sierra Madre Occidental to a Pacific port and shipped along the coast for 1,000 miles (Walker 1973:182). After the Gadsden Purchase, the transportation network expanded and diversified, but transportation remained time-consuming and costly: "goods were freighted from the Texas Coast or over the Santa Fe trail from Missouri," from the port of Guaymas in Sonora, Mexico, or following trails through the desert from Los Angeles or San Diego (Walker 1973:182). Goods were also shipped from San Francisco to Port Isabel at the head of the Gulf of California and transferred to river steamers, which could travel as far as 200 miles up the Colorado River (Walker 1973:182–183). Freighting through the desert to Tucson was complicated by the challenging desert environment, rough roads, and Apache attacks. For instance, Tucson merchant Solomon Warner lost more than $1,000 worth of merchandise in December 1857 when Apaches got hold of two of his wagons en route to Tucson from Yuma and scattered the contents (Walker 1973:185).

Getting in and out of Tucson was also costly to freighters, who would occasionally get stuck and damage their wagons, as well as frustrating to residents, as wagon trains clogged the streets (Walker 1973:193). Wagon freighting was big business in Tucson, as it was the only way to move large quantities of manufactured goods into town. The cost of expenses for a trip to Yuma and back to haul 25,000 pounds of goods might cost $1,300 and gross $1,750, yielding around $450 in profit (Walker 1973:196). Losses of livestock, equipment, and merchandise—as well as loss of life—were frequent on travels to and from Tucson, as a result not only of raiding activities but also due to accidents (Walker 1973). As Sheridan (1995:105) has noted, "Along the trail, freighters encountered every hazard known to God or man." Understandably, the cost of freighting raised the price of goods in town considerably. More than mining or ranching or the other opportunities that brought fortune seekers to Tucson, freighting was, in fact, one of the industries that brought the greatest wealth to Tucson entrepreneurs. The profits obtained in freighting allowed the owners of freighting companies to diversify into other related business. Tully and Ochoa, for instance, owners of one of the major freighting companies in Tucson, were to establish the largest stores in Tucson as well as fund mines, furnaces, and ranching operations as a result of the freighting business (Sheridan 1995:106).

Early descriptions of the town by Euroamericans illustrate the negative perceptions some held of the town and its desert environment. Browne (1869:131–133), for instance, described Tucson as follows:

> Passing the Point of the Mountain, eighteen miles below, [the traveler] is refreshed during the remainder of the way by scraggy thickets of mesquite, bunches of sage and grease-wood, beds of sand and thorny cactus; from which he emerges to find himself on the verge of the most wonderful scatteration of human habitations his eye ever beheld—a city of mud-boxes, dingy and dilapidated, cracked and baked into a composite of dust and filth; littered about with broken corrals, sheds, bake-ovens, carcasses of dead animals, and broken pottery; barren of verdure, parched, naked, and grimly desolate in the glare of a southern sun. Adobe walls without whitewash inside or out, hard earth-floors, baked and dried Mexicans, sore-backed burros, coyote dogs, and terra-cotta children; soldiers, teamsters, and honest miners lounging about the mescal-shops, soaked with the fiery poison; a noisy band of Sonoranian buffoons, dressed in theatrical costume, cutting their antics in the public places to the most diabolical din of fiddles and guitars ever heard; a long train of Government wagons preparing to start for Fort Yuma or the Rio Grande—these are what the traveller sees, and a great many things more, but in vain he looks for a hotel or lodging-house. The best accommodations he can possibly expect are the dried mud walls of some unoccupied outhouse, with a mud floor for his bed; his own food to eat, and his own cook to prepare it; and lucky is he to possess such luxuries as these.

Other visitors were more generous in their descriptions, but nonetheless did not fail to comment on the onerous

presence of garbage, filth, and dust and a lack of the services that were typically available in Eastern cities. Bourke (1891:63–64) commented that:

> The valley of the Santa Cruz, although not much over a mile and a half wide, is wonderfully fertile, and will yield bountifully of all cereals, as well as of the fruits of the south temperate or north tropical climes, and could easily have supported a much larger population, but on account of the bitter and unrelenting hostilities waged by the Apaches, not more than 3,200 souls could be claimed, although enthusiasts often deluded themselves into a belief in much higher figures, owing to the almost constant presence of trains of wagons hauled by patient oxen or quick-moving mules, or 'carretas' drawn by the philosophical donkey or 'burro' from Sonora. The great prairie-schooners all the way from the Missouri River made a very imposing appearance, as, linked two, and even three, together, they rolled along with their heavy burdens, to unload at the warehouses of the great merchants, Lord & Williams, Tully, Ochoa & De Long, the Zeckendorfs, Fish & Collingwood, Leopoldo Garrillo, or other of the men of those days whose transactions ran each year into the hundreds of thousands of dollars.
>
> Streets and pavements there were none; lamps were unheard of; drainage was not deemed necessary, and water, when not bought from the old Mexican who hauled it in barrels in a dilapidated cart from the cool spring on the bishop's farm, was obtained from wells, which were good and sweet in the first months of their career, but generally became so impregnated with "alkali" that they had to be abandoned; and as lumber was worth twenty-five cents a foot, and therefore too costly to be used in covering them, they were left to dry up of their own accord, and remain a menace to the lives and limbs of belated pedestrians. There was no hint in history or tradition of a sweeping of the streets, which were every bit as filthy as those of New York.

In part due to such descriptions, the reputation that Tucson earned in other parts of the United States was often unflattering. In addition to being located in a notoriously dangerous region, the town itself was considered by outsiders to be full of villains, thieves, and cutthroats, who sampled every sort of vice in the gambling halls and saloons of the town, and frequently engaged in impromptu gun violence that spilled into the streets. Although there were times when such conditions prevailed, some visitors were surprised to find that Tucson was a relatively orderly and peaceable town despite its location on the frontier and that its residents were amicable and resourceful.

Although people certainly died in Tucson from violence and accidents, one of the most common causes of death was likely to have been disease. The sanitation problems noted in Tucson at the time were not uncommon to many cities in the United States and other industrialized nations at the time. Problems with sanitation increased the risk of waterborne and foodborne disease, leading to frequent illness, particularly among the more vulnerable segments of the community. In addition, the rapid expansion of transportation networks that brought together people and goods from many parts of the globe resulted in the integration of disease environments and the bringing of people into disease environments for which they had established no resistance (Haines 2004; Lee 1997; see Chapter 7). The result was an increasing exposure to deadly diseases, and many cities were soon overwhelmed with rising numbers of the sick and the dead.

Tucson was no exception, as it was subjected to multiple disease epidemics. In particular, a series of disease epidemics struck Tucson between 1868 and 1870 and again several years later. In one particularly devastating small pox epidemic in 1870, perhaps more than 120 people died, most of them Mexican American children and infants. Other epidemics were less selective, taking individuals of all ages and even entire families, leaving the town to struggle with developing a means to dispose of the dead and protect the populace from further infection (see Chapter 7). During the time that the Alameda-Stone cemetery was in use, death in Tucson was omnipresent.

Religion in Tucson

Because a major concern of this volume and this chapter is the Alameda-Stone cemetery, it is important to consider the history of religion in Tucson, particularly Catholicism, in order to understand the varying roles that religion played in administering sacraments and determining the location and physical characteristics of burial. Another equally important concern is the role that municipal and secular concerns played in the disposal of the dead, which is considered in a following section.

As discussed in the preceding chapter, Tucson was visited by a Catholic priest only rarely in the decades immediately prior to the opening of the cemetery. The presence of priests in Tucson in its early years as a United States settlement was sporadic and temporary as well and would continue to be so until late in the 1860s. After a long hiatus in an official Catholic ecclesiastical presence in Tucson, Father Joseph Machebeuf was sent to Tucson late in 1858. At the time, the population was thought to have numbered around 400 individuals (Defouri 1887:58). A native of France and a close friend of Bishop Lamy of Santa Fe, Machebeuf

first stayed in Tucson for only a few days before leaving on December 20, 1858, for Hermosillo. In Mexico, Machebeuf visited Bishop Loza of the Diocese of Durango as an agent of Bishop Lamy. There, Machebeuf facilitated the transfer of the administration of Catholic territories formerly in Mexico and now included in New Mexico Territory.

Upon returning to Tucson, Machebeuf was headquartered in a two-room house lent to him by Francisco Solano León. A *jacal* addition was built on the side of the building to accommodate Machebeuf, resulting in a total space of approximately 35 by 15 feet (Defouri 1887:60). However, it was only 2 months before Machebeuf left for Santa Fe to report to Bishop Lamy (Defouri 1887:73; Sonnichsen 1987:52, 67; University of Arizona Special Collections, Tucson, MS 276, Letter to The President of the Society for the Propagation of the Faith in Paris [SPFP], 21 April 1869). Machebeuf returned to Tucson again and stayed for the summer of 1859 before he left for good to become the Vicar Apostolic of Colorado and Utah in 1860 (Noel 1989; Salpointe 1966:61 n. 9; Whalen 1964:36–46).

Several other priests were sent to Tucson during the early 1860s, but like Machebeuf's, they stayed for relatively brief periods of time (University of Arizona Special Collections, Tucson, MS 276, Letter to The President of the SPFP, 21 April 1869). According to Defouri (1887:61), a Father Manuel Chavez was sent to Tucson but also stayed only a few months. He was succeeded by Father Donato Rogieri, an Italian Franciscan who arrived in 1862 and was instrumental in initiating the construction of a new church building. Rogieri left in 1863 before the walls had been completed, having been sent to Las Cruces due to sickness. Sadly, Rogieri was later killed by Apaches while traveling in Chihuahua, Mexico (Defouri 1887:100; Salpointe 1966:82 n. 7; Sonnichsen 1987:67).

Father Charles Messea and Father Aloysius M. Bosco, both Jesuits, were installed as the next priests for Tucson and San Xavier del Bac in 1864, arriving on January 15 of that year (Salpointe 1966:80). Bosco—who recorded burials in Tucson from May 28, 1863, to July 19, 1864, in the Tucson Diocese burial register—was appointed to Tucson, and Messea was appointed to San Xavier del Bac, where he started a school (Defouri 1887:64; Purcell 1969:94–95; Whalen 1964:68–69). Archbishop Lamy and Reverend J. M. Coudert visited Tucson in March 1864 to spend Holy Week and were afforded generous hospitality by the local residents, staying in the houses of William S. Oury and Juan Fernandez (Salpointe 1987:81). Lamy recorded their visit in the Tucson Diocese burial register on March 27, 1864, stating that the burial register was in good order and that he had celebrated mass in the church, although the roof was not yet complete (O'Mack 2006:54; see also Defouri 1887:61). Like those before them, the priests of Tucson and San Xavier del Bac left after having spent less than a year in Tucson, departing for California on August 8, 1864 (Sonnichsen 1987:67; Whalen 1964:69).

According to Salpointe (1966:82), Lamy was reluctant to send additional priests to Tucson after the departure of Fathers Messea and Bosco, due to the Apache threat. Two priests who volunteered, Peter Lassaigne and Peter Bernal, were eventually sent, but they were unable to make it beyond Las Cruces, New Mexico, and were forced to return (Defouri 1887:62; Whalen 1964:71).

An enduring priestly presence came finally with the assignment of Jean Baptiste Salpointe, another friend of Bishop Lamy's, to Tucson. Salpointe was sent to Tucson early in 1866, arriving on February 7 with Father Francis Boucard, who would serve as his assistant, and Father Patrick Birmingham, who was to be the parish priest at Yuma (Salpointe 1966:95–97; Sonnichsen 1987:68; University of Arizona Special Collections, Tucson, MS 276, Letter to The President of the SPFP, 21 April 1869). This time, the party, consisting of three priests, a schoolteacher, and a wagoner, succeeded in arriving in Tucson by traveling with a U.S. military escort (Defouri 1887:62; Whalen 1964:72). Bravely, Salpointe went with Birmingham to Yuma to help the missionary get established, leaving Boucard in Tucson. After returning to Tucson, Salpointe started a school at San Xavier del Bac, with Mr. Vincent as their teacher, but the school lasted for only a few months (Salpointe 1966:100).

Salpointe estimated that he had much work to do in Tucson instructing the Catholic population and converting Native Americans and Protestant Euroamericans to the Catholic faith. Salpointe estimated that upon his arrival there were approximately 600 Catholics in Tucson. The Native Americans living in the vicinity of Tucson he described as "idolatrous but pacific . . . it would be easy to bring to the knowledge of true God if one had resources sufficient to establish in their midst some teaching congregation, but such resources have been lacking" (University of Arizona Special Collections, Tucson, MS 276, Letter to Cardinal Barnabo in Rome, 22 October 1867). Around this time, in the fall of 1867, Lamy sent another priest, Father Francisco Jouvenceau, to assist Salpointe at Tucson.[4]

Salpointe worked quickly to see the church building begun by Rogieri completed, despite a chronic lack of funds. Only partially completed, the church Rogieri had begun to build had 8–9-foot walls and no roof. Canvas was used as a temporary roof, as no funds were available to purchase timber and attempts to acquire wood from the Santa Rita Mountains proved largely unsuccessful for lack of a good road (Salpointe 1966:99). Timbers were eventually acquired from the Huachuca Mountains in the fall of 1868 for the construction of the church and a school, hauled for free by the merchants Tully and Ochoa on a return trip from Camp Wallen (Defouri 1887:64; Whalen 1964:76).

[4] Boucard returned to New Mexico the following year, in November 1868, due to failing health caused by malaria (Whalen 1964:77). Another priest, Father Francis Lestra, arrived in Tucson in April 1869 and stayed for several months before continuing on to Yuma (Whalen 1964:77–78).

Early on, Salpointe recognized the need for schools to instruct the youth in Catholic religion. Salpointe reported to the Society for the Propagation of the Faith that the Catholic population of Tucson consisted of Mexicans Americans, some of whom were "good Catholics but unfortunately, it is not so for great many of them. This is easily understood when one considers how long they were without any religious administration, not having sufficient instruction about the truths of salvation, the only results would have to be all kinds of licentiousness" (University of Arizona Special Collections, Tucson, MS 276, Letter to The President of the SPFP, 21 April 1869).

Salpointe remained in Tucson for many years, becoming First Vicar Apostolic of Arizona when the Apostolic Vicariate of Arizona was founded in Rome on September 25, 1868 (University of Arizona Special Collections, Tucson, MS 276, Letter to The President of the SPFP, 21 April 1869). Salpointe went to Rome for his consecration, leaving behind Jouvenceau, who had been sent from Yuma to take charge in Tucson (Salpointe 1966:111). Salpointe was unable to return until January 1870. By June 1870, he had established a school for girls in Tucson, which was to become one of several schools he founded in Tucson and San Xavier del Bac (University of Arizona Special Collections, Tucson, MS 276, Letter to the Treasurer of the SPFP, 12 April 1870). As Salpointe had been away from Tucson for some time, much of the work on the school must have been overseen by Jouvenceau.

Salpointe initially regarded the Protestants immigrating to Tucson favorably and characterized them as "in no way opposed to our religion" (University of Arizona Special Collections, Tucson, MS 276, Letter to The President of the SPFP, 21 April 1869). This opinion was soon to change, however, as Salpointe came to consider Protestants and the public school system a dire threat to Catholicism in Arizona. While in Tucson, Salpointe became a strong advocate for developing free, or nearly free, Catholic schools for children in order to compete with the public schools and combat Protestantism. In Tucson, Salpointe increasingly came to regard Protestants as a menace to Catholicism, championing education as the means of defense, stating that

> The fruits of a religious education are not only for the children who receive it, but that through them, it penetrates even in their families. These schools are attended by a great number of children from the protestant families and there is hope that many of these children will embrace Catholicism. Anyway, we always have a few conversions. Protestantism is redoubling its efforts to counterbalance this good. Once in a while the ministers come here with quite a provision of books in which there are many untruths against the catholic religion and which they pass out free to the people. Fortunately, our people are warned, they know in advance what is in these writings and when they receive them, they destroy them or bring them to us. The ministers preach anywhere, on all subjects, sometimes in the streets and sometimes in the gambling halls and despite all this, no one listens to them, not even those who claim to be of their religion" [University of Arizona Special Collections, Tucson, MS 276, Letter to the Central Council of the SPFP, 11 September 1871].

In 1870, the only church buildings listed in Pima County were San Agustín del Tucson and San Xavier del Bac, and the only school was that one founded by Salpointe and run by the Sisters of St. Joseph (Whalen 1964:85). Protestant churches were not established in Tucson until the late 1870s, after the civilian section of the cemetery had closed. Protestant services were held more regularly as Protestant women moved to Tucson during the 1870s, with 50 or more people gathering for Methodist services at the courthouse by the late 1870s. The Presbyterians, who had held services at the courthouse and at the Palace Hotel, began building a Gothic-style stone and adobe church in June 1878, which was completed in August of the following year (Purcell 1969:70–71).

Like Protestants in Tucson, Jewish residents, a number of whom had arrived in Tucson as entrepreneurs after the Gadsden Purchase, had no official places of worship. Instead, they too tended to hold religious services in their homes. Samuel Drachman, for instance, led services for Jewish families, who assembled in "a home on Friday evenings" (Purcell 1969:69).

This brief history of Catholic Church activity and religious instruction in Tucson immediately before and during the use of the Alameda-Stone cemetery was sporadic and inconsistent until the late 1860s. Protestant proselytizing and sermonizing was brought to Tucson by Euroamericans from outside of the southwest and, other than sermons given in impromptu public locations or in private residences, formal Protestant church activities were relatively minimal. Nonetheless, Protestant religious activities, perspectives, and allegiances represented a grave threat to the Catholic Church.

Given the limited ecclesiastical presence in Tucson, we can expect that many of the earliest burials in the cemetery were probably not overseen by a Catholic priest, although perhaps military chaplains, visiting priests, or other Protestant-affiliated individuals occasionally administered burial rites for some individuals buried in the cemetery. Many burials were probably overseen by friends, family, and other respected community members who exercised, remembered, and reinvented mortuary traditions, many of which likely had deep roots in southwestern, Hispanic Catholic traditions. As the Catholic Church established a greater presence in Tucson during the latter years of the cemetery's use, and as more Protestant-affiliated individuals moved into Tucson, a more formal and regularized

influence over mortuary behavior may have developed. In all likelihood, a growing concern with sanitization, which had been prominent in both Mexico and in the eastern United States since the early nineteenth century, also came to play an important role in mortuary practice, as civic officials became increasingly concerned about the health threat posed by decomposing corpses as well as by disease-infected decedents (see Chapter 7).

Cemetery Reform in Mexico and the United States

During the first decades of the nineteenth century, particularly in the Eastern United States, population growth, urban expansion, and the problems of cemetery "overcrowding, sanitation, and the unsightly character of graveyards within the city" resulted in the development of the "rural" cemetery movement (Laderman 1996:44). In addition to impeding urban expansion and development, graveyards were increasingly seen as dangerous sources of contamination, illness, and putrefaction (Laderman 1996:69–70). This movement emphasized the location of cemeteries outside the city in natural, parklike settings where the dead were no longer intermingled with daily affairs, thereby minimizing the health risk. Treatment and disposal of the dead was increasingly secularized and incorporated into a more utilitarian, scientific, and medical discourse—which rationalized the removal of the dead to more distant locales—and the increasingly institutional control of the treatment and disposal of corpses.

By the middle of the nineteenth century, care for the dead began to shift from a more domestic locus to a professional one, and from a private to a more public sphere, as undertakers and other professionals (e.g., carpenters, sextons, etc) began to take on the role of caring for and transporting the corpse, preparing graves, and managing cemeteries. In addition, government health officials, such as coroners, were hired to investigate suspicious deaths. Increasingly, the spaces used to prepare and bury the dead became professionalized and secularized.

In nineteenth-century United States prior to the Civil War, most Protestant Americans either interred their dead in the ground or entombed their dead aboveground, the latter practice being mostly reserved for wealthier families. During epidemics, the dead were viewed as a source of contagion and needed to be disposed of in a more expedient and practical manner. The danger posed by large numbers of the deceased required that no special treatment be made, and differences in treatment associated with class distinctions were leveled. If friends and family were unable to care for the corpse, elaborate preparation of the corpse, vigils, mournful processions, and services did not occur to honor and mourn for the dead. Instead, the local government would have the dead buried expediently in an anonymous grave in the closest potter's field in the company of strangers and outcasts (Laderman 1996:41–42).

As the "rural" cemetery movement grew in popularity, city governments and private corporations came to own and regulate burial spaces. In Boston, for instance, a superintendent was hired to see to the proper placement, order, and recording of burials as well as oversee the maintenance and organization of city burial grounds (Laderman 1996:47). Some cities also began to regulate the scheduling, organization, and composition of funerals and funeral processions and indeed, the organization of burial grounds, with "'undesirables,' including African Americans, the poor, and criminals" being ordered to be placed in distinct burial spaces outside of those reserved for more "desirable" folk (Laderman 1996:48).

Laderman (1996:67) has argued that the interest among antebellum Americans to inter the dead in a controlled and clearly recognizable or delineated burial ground was "related to the ideology of American expansionism and the conquest of the frontier. . . . In order for the wilderness of nature to be vanquished and the success of American expansion to be ensured, the dead had to be put in their proper place under acceptable conditions and remembered by the living community." The need to secure such space, however, applied only to those viewed as fully American, or Euroamericans, and was not extended to other groups, such as Native Americans and African Americans. However, with the increasing mobility of nineteenth-century Americans and the growing complexity of municipal governments, many cemeteries fell into a dilapidated and poorly maintained state. Rather than serving as symbols of proper treatment and care for the dead, many cemeteries came to be considered a disgraceful, public nuisance (Laderman 1996:69).

A similar movement of cemetery reform as occurred in the United States also occurred in Mexico and other parts of Latin America during the late eighteenth and early nineteenth centuries and was motivated by some of the very same concerns. Up until the late eighteenth century, Catholic burial in New Spain took place in churches, convents, and churchyards. Many burials were placed under church floors, or sometimes in walls or other architectural spaces. Existing grave pits were frequently reopened to emplace new burials, exposing the public to overpowering smells and dangerous gases. As in the United States, health authorities considered decomposing bodies to represent an extreme threat to public health. As the population grew and time wore on, these traditional burial spaces literally overflowed with bodies (Lomnitz 2008; Voekel 2002; Will de Chaparro 2007; see Chapter 8). In Paris, underground crypts were used to overcome the problem of overcrowding; then, cemeteries were established further

and further from town to make places for the dead (Aries 1975, 1981).

Existing baroque notions of death practiced in New Spain emphasized hierarchical differences in wealth and status and burial location, elaborate and ostentatious funereal display, paid corteges, and church burial.[5] Many saw specific location of burial within a church to be an essential component not only to achieving salvation, but to affirming the proper social order (Lomnitz 2008; Voekel 2002; Will de Chaparro 2007; see Chapter 8). In New Mexico's San Francisco de Sandía church, for instance, the wealthiest and most powerful individuals sought to be buried as close to the altar as possible, where two martyred friars were buried, whereas the less powerful were buried further away in the nave and "impecunious souls found rest outside the cemetery" (Gutiérrez 1991:61). At another church in New Mexico, burials in different areas were assigned different costs in 1768: "A transept burial close to the altar cost 19 pesos, nave burials cost 8, one at the back of the church cost 4, and burial in the cemetery cost 2 pesos" (Gutiérrez 1991:61).

Intellectual reformists challenged these approaches to burial and instead championed rationality, sanitation, individual internalized piety, and egalitarianism in death. During the late eighteenth and early nineteenth centuries in New Spain, civic authorities fought to relocate places of burial from churches and churchyards to locations on the outskirts of towns, away from town centers and outside of religious authority. In these new locations, socioeconomic distinctions in burial location would be phased out and abandoned, and the elaborate and expensive funeral processions would be replaced with a small party of professionals paid to transport bodies to the place of burial. Intellectuals were especially concerned about the negative health effects caused by decomposing bodies—miasmas were held responsible for disease and society's many other ills (see Chapter 7). In 1787, King Charles III officially banned church burial throughout the Spanish Empire. The edict carried little weight against deeply rooted traditions and beliefs, however, and was resisted in the Spanish colonies.

[5] The Spanish baroque period flourished from the end of the Renaissance through the eighteenth century and can be described as the Church's attempt to reestablish its grasp on the Catholic faithful in Europe. In the New World, remnants of the baroque can be found through to the end of the nineteenth century, particularly in the frontier American West. The baroque Catholic religious experience can be described as a dramatic and awe-inspiring array of multi-sensory religious displays and performances, deployed in the form of architecture, artistry, music, pageantry, lively fiestas, and ecclesiastical ceremonies (Ariès 1975 and 1981). The elements of the baroque Catholic religious experience were intended to move supplicants to adoration and piety and ensure their faithfulness to God and the Church. As Voekel (2002:18) noted, if such breathtaking displays could "wrench the eyes and ears into a state of adoration, perhaps the heart could follow."

Many people, both wealthy and poor, were appalled and outraged by these proposed reforms, arguing that suburban cemeteries would undermine and eliminate appropriate treatment of the dead and in sum, constitute the basest of indignities. For prominent, wealthy citizens, burial in an undistinguished plot amongst the plebes represented the worst kind of affront to the established social order. For others, the care of the soul could not be easily accomplished when their loved ones were placed far outside of town, distant from those who could intercede and care for the once omnipresent dead (Lomnitz 2008; Voekel 2002; Will de Chaparro 2007; see Chapter 8).

Resistance to cemetery reform was particularly strong in northern New Spain, where remoteness and isolation made it next to impossible to enforce. In these areas, such as in what is now New Mexico, burial in churches and churchyards persisted well into the nineteenth century, and the development of suburban cemeteries was slow in taking hold. Catholics continued to uphold many of the baroque notions of a good death (see Chapter 8). As had been the case prior to the cemetery reform movement, burial location was based on status and on the investment the deceased had made in ensuring an acceptable burial location (Will de Chaparro 2007).

In Tucson, cemeteries also remained close to churches or in churchyards during the first half of the nineteenth century. One could argue that conservative practices were retained in Arizona because the populace was resistant to a change in burial location and practice, which may have meant for them the inability to achieve the "good death" they were taught to expect. The rareness of resident or visiting priests in Tucson, moreover, may have contributed to the maintenance of earlier burial traditions. Anonymous burial outside of a church in a suburban cemetery could have represented to Tucsonenses a deplorable indignity that confounded their notions of a proper burial. In addition, the vulnerability of the settlement to Apache raiding would have made caring for graves outside of the presidio during the Spanish colonial and Mexican periods difficult or impossible and exposed graves to vandalism and neglect.

Another broad issue to consider with regard to cemetery formation is the effects of the Civil War, which radically changed American attitudes toward death and burial. The hundreds of thousands of casualties of the war far outnumbered those of the Revolutionary War and the Mexican War, even exceeding by several times the number of American dead from later wars, such as World War I and the Vietnam War (Faust 2008; Laderman 1996:97). The problem of burying and memorializing huge numbers of Civil War dead, many of whom died far from home, also outweighed similar problems of dealing with the dead during epidemics. Thousands of soldiers were killed in individual battles. Owing to unsanitary and crowded conditions at hospitals and camps, inadequate clothing and shelter, poor diet, and contaminated drinking water, twice as many soldiers died from disease as from trauma. The hundreds of thousands

of Civil War dead requiring proper burial (reserved mostly for Federal soldiers) resulted in the creation of the National Cemetery system. The system required the federal government to establish permanent resting places for military dead, where families could visit their loves ones and the dead could be properly memorialized. This movement led to the establishment of National Cemeteries, overseen by superintendents and administered according to a growing set of centralized regulations but also resulted in new pan-religious approaches to death and burial, which emphasized burial in appropriately marked individual graves that could be visited and memorialized (Faust 2008; Steere 1953; see Chapters 8 and 11).[6]

Cemetery Defined

Today, we often speak colloquially of any location where people are buried as a cemetery. According to some authors, cemeteries represent a particular kind of burial space that is distinct in location and other attributes from other kinds of burial spaces, such as churchyards, burial grounds, or mass graves. According to Rugg (2000:261), cemeteries (1) "are close to but not within settlements"; (2) have an established perimeter, often marked by a fence, wall, or hedge; (3) have "an entrance that declares the meaning of the site either literally or symbolically" (Rugg 2000:262); (4) are internally structured such that each grave can be located and individuals can be memorialized; (5) serve an entire community; 6) and are "considered sacred only in so far as the site is 'regarded with respect'" (Rugg 2000:264). Cemeteries tend to be owned by a municipality or held privately, rather than owned by a national Church. Cemeteries are also generally considered to have a fair degree of permanence and are structured in such a way as to permit visitation and memorialization of each individual's grave. The Alameda-Stone cemetery fulfills many of these definitional criteria (see Chapter 11).

Earlier burials in Tucson were placed in churchyards rather than cemeteries, and possibly within churches and *conventos* as well (Hard and Doelle 1978; Thiel et al. 1995). Like cemeteries, "churchyards also have boundaries and a distinctive entrance gate that declares their purpose" (Rugg 2000:265). In other ways, churchyards differ markedly from cemeteries. Churchyards (1) "tend to be located at the centre of communities rather than on their periphery" (Rugg 2000:265); (2) are smaller in size than cemeteries; (3) are not necessarily structured to facilitate location of each individual grave; (4) are owned by the church rather than a municipality; (5) and are directly connected to a "place of ritual religious significance" (Rugg 2000:265). In this sense, churchyards may acquire a greater degree of sacredness than is common for cemeteries, are used differently than cemeteries, and may serve a different and more restricted community than do cemeteries.

Burial spaces in the Tucson Presidio and at San Agustín del Tucson Mission match Rugg's (2000) criteria for churchyards (Hard and Doelle 1978; Thiel et al. 1995). They were located in the center of the community, adjacent to chapels or other areas controlled by the church, were relatively small in area, and were organized in a manner that would not facilitate the location of each individual grave. In addition, graves were frequently reused, blurring the distinction between individual burials. By contrast, the Alameda-Stone cemetery appears to have met many of the definitional requirements of a cemetery but not completely and only for a brief period. The cemetery was an enclosed space with formal entrances, served the entire community, and was located at the edge of the settlement.

However, the cemetery did not achieve any lasting permanence. Instead, the cemetery had become dilapidated and neglected after being closed to further burial, and the land containing it was ultimately reused for residential and commercial purposes. In one area of the cemetery (Cemetery Area 4, see below), burial space was treated in a manner consistent with some elements of earlier baroque practices, as graves, although placed in rows, were frequently reused as well as intruded into adjacent graves. These practices may have made it difficult to differentiate among individual graves if not clearly marked. In addition, grave markers decomposed rapidly in the cemetery. These departures from the ideal expectations for a cemetery do not necessarily mean that this burial space was not a cemetery. Rather, these variances underscore the difficulties and tensions inherent in establishing, controlling, and maintaining a cemetery as a common public facility open to all users and traditions in addition to some of the ambiguities inherent in defining burial spaces for a diverse and changing community. In a sense, the Alameda-Stone cemetery represents in Tucson a transformation from earlier baroque practices to practices consistent with the newer tenets of cemetery reform. It embodied many of the characteristics of the reformed cemeteries but was also a burial space where some elements of baroque Catholic burial practices were retained.

Immediately upon the closing of the civilian section of the Alameda-Stone cemetery on May 31, 1875, the cemetery was replaced by a new cemetery located on the northern edge of the expanding City. This new cemetery was referred to as the Court Street cemetery because Court Street was extended to meet it. The Court Street cemetery was bounded on the north and south by Speedway Boulevard and 2nd Street, respectively, and on the east and west by Stone Avenue and Main Avenue, respectively. The new cemetery was divided into sections for Protestant, Catholic,

[6] Although Tucson residents lobbied for the administration of the military section at the Alameda-Stone cemetery as a National Cemetery, the cemetery was not considered a candidate for this system, as it was associated with a small and impermanent post (see Chapter 4, Volume 2 of this series).

and fraternal burials, in keeping with the demographic distinctions that had emerged in Tucson while the Alameda-Stone cemetery was in use. The Court Street cemetery suffered a fate similar to that of the Alameda-Stone cemetery, as it was officially closed in 1907 although it was used as late as 1916. The Court Street cemetery was replaced with the Evergreen and Holy Hope Cemeteries, both located again at the edge of town, now a few miles north of the original town site (Callender 1999:29; O'Mack 2005; Roskruge 1893). Like the Alameda-Stone cemetery, some effort was made to remove burials to the new Evergreen and Holy Hope cemeteries, but many burials were left behind, and the cemetery itself was quickly built over. Even today, the discovery of remains during ground-disturbing activities is common in the area of the former Court Street cemetery (e.g., Thiel and Margolis 2007).

The Archaeology and History of the Alameda-Stone Cemetery

Having discussed the historic context within which the Alameda-Stone cemetery was situated, we now turn to a discussion of the cemetery itself. Analysis of historical documents suggests that the Alameda-Stone cemetery originally contained the graves of approximately 1,800–2,100 individuals (O'Mack 2006; Chapter 4, Volume 2 of this series). The cemetery was divided into military and civilian sections and appears to have had additional divisions, including a division that may have separated the cemetery into Catholic and secular sections. Most individuals were buried in the civilian section of the cemetery sometime between the 1850s or early 1860s and June 1875. Approximately 100 other individuals were buried in the military section between July 1862 and January 1881. During archaeological excavation of the project area, the remains of 1,386 individuals were recovered from grave pits as well as in secondary, disturbed contexts. A total of 1,044 sets of individual remains were discovered in burial features. Most of the remaining burials in the cemetery that were not discovered during our excavations were either (1) destroyed by excavation of the Tucson Newspapers Building basement in 1940 and 1953, (2) exhumed historically, or (3) destroyed by the many disturbances that occurred within the project area after the cemetery closed (see Chapter 12, this volume, and Chapter 4, Volume 2 of this series). A small number of additional remains likely were placed in a few areas outside the western limits of the project area, based on an inferential reconstruction of the limits of the civilian and military cemeteries. In all likelihood, the northern, eastern, and southern limits of the cemetery were included within our excavation and are described by the archaeological distribution of graves pits in those parts of the project area. As a result, excavations resulted in locating nearly all of the remaining burials in the cemetery, with the exception of the few that may still be located outside the project area under Stone Avenue and under a parking lot owned by Los Chicanos Por La Causa, along the western edge of the project area.

The earliest recorded burials in the military section took place shortly after the arrival of the California Column in Tucson, with the burials of Sergeant John C. McQuade (Company B, 2nd California Cavalry) and Private James L. Richards (Company H, 1st California Infantry) in July 1862 (Callendar 1998; O'Mack 2006; see also Chapter 4, Volume 2 of this series). Clear information on when the first burials were placed within the civilian section has not been located in archival records examined for the project, and archaeological data has not proved fruitful in establishing a precise beginning date. The earliest record we have for a civilian burial in the cemetery comes from a copy of the Tucson Diocese burial record provided to Statistical Research by Los Descendientes del Presidio del Tucson (O'Mack 2006): May 28, 1863. Given the inconsistent presence of Catholic priests in Tucson during the 1850s and early 1860s, the record may have begun after burials had already been placed in the civilian section; we simply do not know.

Hilario Gallego (1935:76), who was born inside the walled presidio on January 14, 1850, reported as an adult that "In the very early times there was a cemetery inside the wall near this church, but as far back as I can remember they were burying people outside the wall near what is now Alameda and Stone Avenue." Gallego's account, although provided late in his life, could suggest that use of the civilian section began sometime before the first entries were written in the Tucson Diocese burial record. Conceivably, the cemetery could have first been used as early as the 1851 cholera epidemic to quickly inter the catastrophically large number of deceased individuals. Another possibility is that the civilian section was first used shortly after the Gadsden Purchase, coinciding with the removal of vestments from the presidio chapel. Still another possibility is that the cemetery was created by one of the French missionaries sent to Tucson in the late 1850s or early 1860s. The establishment of municipal cemeteries located on the outskirts of town was by this time commonplace in France (Aries 1975, 1981). In fact, one of the first things Machebeuf did after becoming Vicariate Apostolic of Utah was to create a cemetery outside of town, something he might have also done in Tucson. Howlett (1908:306) has noted that, in Utah, Machebeuf "had gone so far out on the plains towards Kansas City to choose a resting-place for their dead that a pious visit to their graves was almost an impossibility."

The closing dates for the cemetery are more certain. City Council officially closed the civilian section on May 31, 1875 (Tucson City Council minutes, 18 May 1875), requiring all subsequent burials in Tucson to take place at a new cemetery

north of town. The military section remained open until February 1881, when the City Council ordered it closed.

The Use of Multiple Lines of Evidence in Analyzing the Cemetery

As discussed in Chapter 1, the bioarchaeological investigation of historical-period cemeteries benefits from the study of multiple lines of historical, contextual, and osteological evidence, and this project is no exception. The combined use of these data proved integral to not only conducting analyses of the cemetery and the individuals buried there, but was also instrumental in developing cultural affinity and military identification statements used in support of repatriation and reburial (see Chapters 2, 6, and 11). In the following sections, we provide a brief overview of the organization of the cemetery, temporal differences, and evidence for exhumation and disturbance, followed by discussions of how .historical, contextual, and osteological data contributed to our understanding of burial practices and the demography and life history of the burial population. Much of the information presented in the following sections is revisited in greater detail in later chapters.

Identification of Cemetery Areas in the Civilian Section

As previously discussed, the Alameda-Stone cemetery was divided into military and civilian sections. Analysis of excavation results suggested that in addition to the military section (Cemetery Area 1), at least 4 distinctive areas within the civilian section of the cemetery were present (Cemetery Areas 2–5) (Figure 51). The limits of these areas were inferred based on patterned variation in grave and row spacing, spatial breaks between cemetery areas, and in the distribution of grave pits according age, sex, cultural affinity, burial orientation, coffin shape, and artifact types. In general, the distinctions that proved to be most important in our analyses were distinctions between the southern and northern areas (Cemetery Areas 1–2 versus Cemetery Areas 3–5), as well as between Cemetery Areas 3 and 4. Cemetery Area 5 is somewhat of an enigma; it could have been used later in time, as a few graves are oriented along a more strictly east-west axis, paralleling a late realignment of Stone Avenue, but this is not clear. As discussed will be discussed below, osteological and contextual analyses of the cemetery repeatedly revealed fundamental differences between the northern and southern areas of the cemetery, which seem to correspond to a distinction between the local Catholic community and the rest of the Tucson community, many of whom would have been adult males who were recent immigrants to Tucson.

The distinction between Cemetery Areas 3 and 4 appears to have centered mainly on how burials were placed and in subtle differences in burial treatment and demography (see Chapter 9). In Cemetery Area 4, grave pits were closely packed, intruded into earlier grave pits, and were often reused. Cemetery Area 4 was also surrounded by a distinct gap, which may have corresponded to a fence placed around the area, further differentiating it from the adjacent Cemetery Area 3. Tentatively, it appears that Cemetery Area 4 represents the extension of earlier approaches to burial observed in archaeological excavations at the Tucson Presidio and at the San Agustín del Tucson Mission (Hard and Doelle 1978; Thiel et al. 1995). Cemetery Area 3 appears to conform more closely to reformist approaches to burial with regard to the placement of individual burials within more regularly and more widely spaced grave pits and infrequent intrusion by other grave pits or grave pit reuse.

Because many Hispanics would have practiced a Catholic faith and Hispanic Catholics of the time expected to be buried in ground consecrated by the Church, we suspected that there would likely be one or more areas specifically devoted to Catholic uses. For instance, Hispanic Catholic burial spaces often had an area devoted to *los angelitos*, or children whose innocence precluded the need for them to visit purgatory on their way to heaven. In addition, the burial of individuals who had not been baptized or were not in good standing in the church would likely not have been allowed in consecrated ground and would have been placed in other less desirable areas (O'Mack 2006:39; Will De Chaparro 2007). This was also a period of transition from earlier baroque Catholic burial practices in the American Southwest to practices promulgated by cemetery reform and by changing attitudes toward death and burial that emerged during the American Civil War. In some sense, Cemetery Areas 3 and 4 could represent tension between different segments of the community that subscribed to either orthodox or reformed Catholic burial practices or they could represent a temporal difference, with the burials in Cemetery Area 4 being placed earlier than the burials in Cemetery Area 3.

A further difference between the two cemetery areas and indeed, between Cemetery Area 3 and the rest of the cemetery, is that the burials of young children and infants, as well as old adults, were concentrated in a series of rows in the eastern half of Cemetery Area 3. Possibly, this demographic anomaly represents the burial of individuals as a result of epidemics, such as those that occurred in 1868–1870 (see Chapters 7 and 9).

Temporal Differences within the Cemetery

Temporal information on the growth of the cemetery is limited, either from archival or archaeological sources. Very few grave pits contained artifact types or attributes

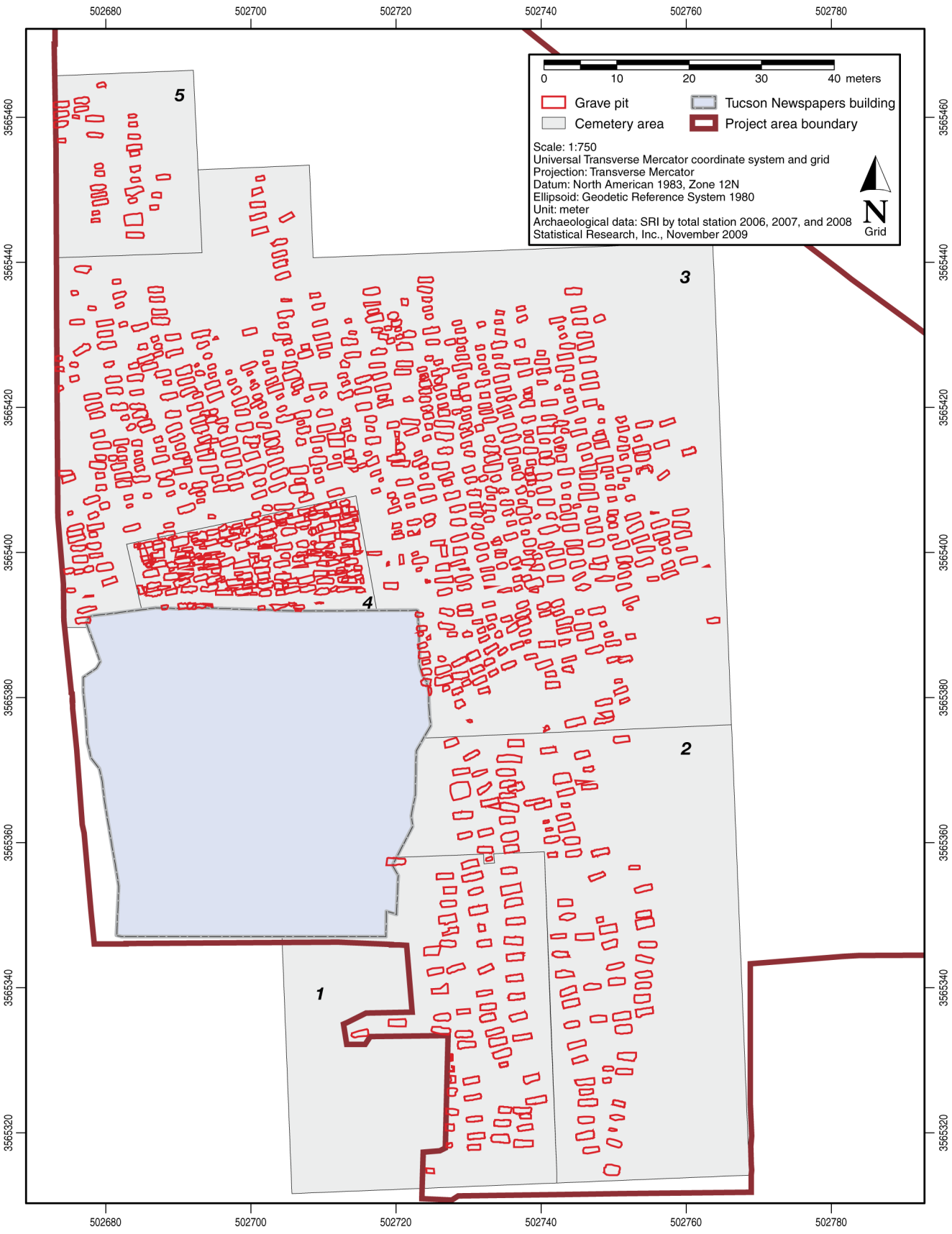


Figure 51. Cemetery area map.

that could be used to differentiate them according to time. We were able to reconstruct the use of the military section through time using dates of death and other information for individuals reported as interred in that cemetery, but even in this case, the exact pattern of use through time is unclear due to missing information. Rows in the eastern half of the military section were filled in from east to west through time, but varied in terms of whether sequential burials were placed to the north or south of previous burials. Instead, we used feature-to-feature relationships in Cemetery Areas 2, 3, and 4 to infer possible growth patterns (see Chapter 4, Volume 2 of this series). Feature-to-feature relationships that could be used to build temporal sequences were common only in Cemetery Area 4. We have been unable to date to identify any patterns in material culture within these sequences, however, although more-intensive analysis in the future could prove fruitful.

Exhumation

After the civilian section closed in 1875, no concerted effort was made to exhume burials from the Alameda-Stone cemetery and rebury them at the Court Street cemetery. Some citizens, however, complained of the continued presence of the cemetery in the midst of the growing settlement, citing sanitation issues and health concerns as a justification for removing the bodies. An October 1878 article in the *Arizona Star* (3 October 1878:3) stated,

> While our city Council is entitled to much credit for the energy and care displayed in sanitary affairs of our town, there are two matters of importance which should be attended to: one is the disinterment of the remains lying in the old cemetery and their removal to the new grounds. It has been almost three years since the new cemetery was established, and we hear many of our citizens inquire why it is the old one still remains. We think, as a sanitary measure alone, something ought to be done in the premises. Let the city council give out the work of disinterment to be done by contract, sale of the ground now occupied by the old cemetery would go far toward defraying the expenses of removal.

In January 1882, the City Council published brief notices in the *Arizona Daily Star* (7 January 1882:3) and the Spanish-language *El Fronterizo* (13 January 1882) to inform citizens that they had 60 days to remove friends and relatives buried in the civilian section, as a street was planned to be placed through the center of the section. Exhumed bodies were to be reburied in the new Court Street cemetery. Although the notice in the *Arizona Daily Star* was silent on the issue of what would happen to burials that were not removed, *El Fronterizo* (13 January 1882) stipulated that "Todos los cuerpos que no sean exhumados durante este tiempo, serán removidos y enterrados bajo el cargo de las autoridades competentes" (All of the bodies not exhumed at this time will be removed and buried under the supervision of competent authorities), implying that the City would ensure that all bodies were removed.

One of the questions prior to fieldwork was: how many burials were actually removed? Excavation revealed that the vast majority of burials were left in the ground, but due to the wide variety of disturbances from utility trenches, building foundations, landscaping features, trash pits, and privies found throughout the cemetery (see Chapter 12, this volume, and Volume 3 of this series), it was not always easy to distinguish which graves had been exhumed from those that had been accidentally disturbed.

To identify potentially exhumed graves within the civilian section, we used our understanding of the archaeological effects of exhumation from studying the military section, where many graves had been exhumed in 1884. Potentially exhumed grave pits in the civilian section were identified as those that either lacked osteological materials or that contained sets of remains consistent with the osteological and archaeological correlates of exhumation seen in the military section. When controlled for disturbance, the analysis of potential cases of exhumation suggests that a small percentage of individuals interred in the civilian section (perhaps a total of 200 or so individuals in the civilian section as a whole, including areas not excavated by Statistical Research) were exhumed (Figure 52). Based on a combination of historical and archaeological evidence, the burials of more than 90 individuals were exhumed from the military section. Many possible cases of exhumation in the civilian section occurred in the area of Council Street or along utility trenches in other nearby areas, suggesting that disturbance could still account for some of the possible cases. Other cases, however, tended to appear in clusters in areas where no intrusive disturbance had occurred, suggesting minimally that multiple grave pits were opened during the course of exhumations. This pattern may in some cases represent a haphazard attempt to locate a single burial by digging in multiple grave pits, as was suggested in one historical account (*Arizona Weekly Citizen* 18 February 1883), but in other cases, the pattern could represent the attempt to recover the remains of multiple friends or loved whose burials were clustered nearby each other.

Other Disturbances

A large variety of disturbances, most of which were cultural, were visited on the cemetery after its abandonment. The largest of these, involving the excavation of the Tucson

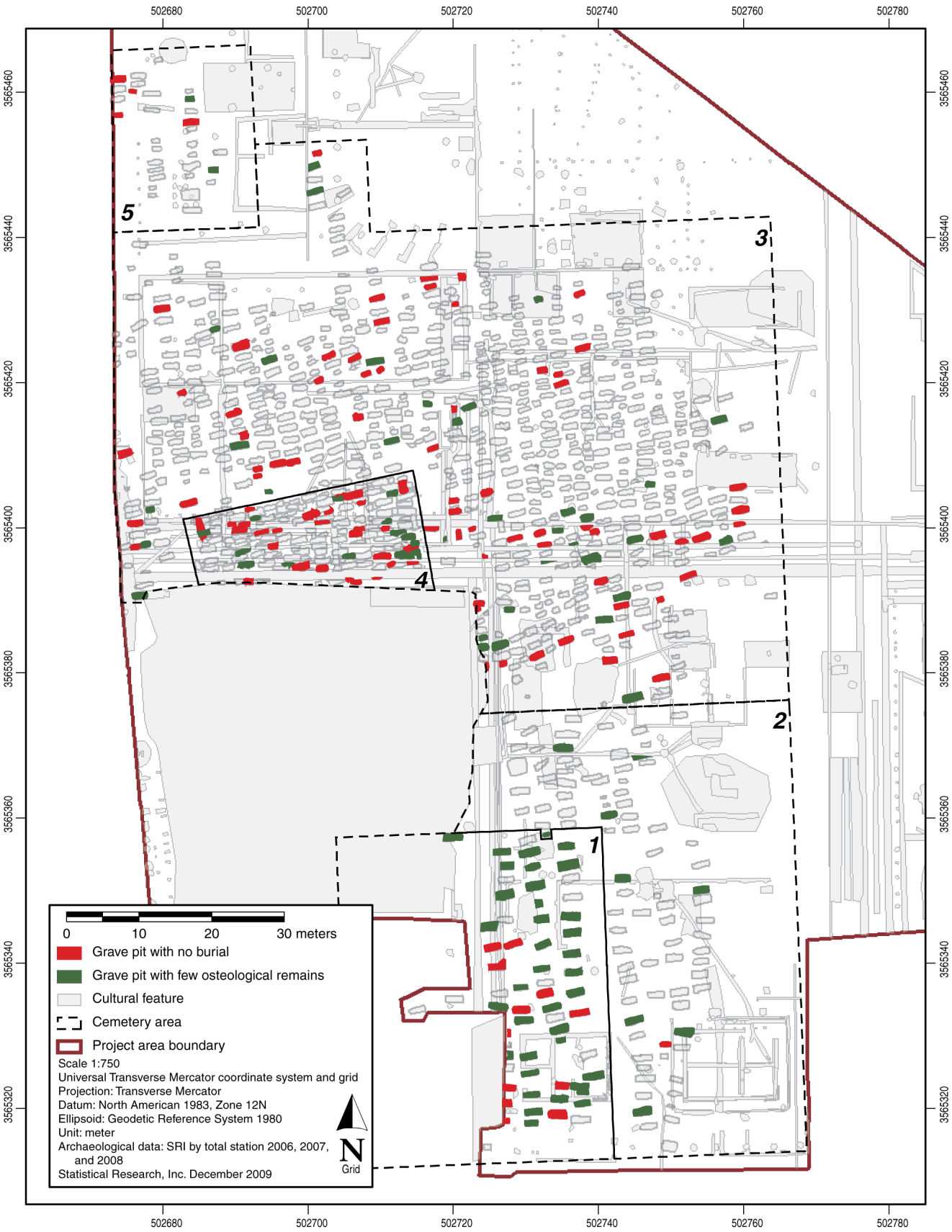


Figure 52. Map of exhumed burials in project area.

Newspapers basement, could have destroyed at least several hundred burials, whereas many other burials were impacted in some way by utility trenches, building foundations, tree pits, trash pits, privies, and other disturbances. Natural disturbances, by contrast, were relatively rare, perhaps owing to the relatively stable and ancient character of the land surface on which the cemetery was placed. Despite disturbance, preservation and burial integrity were relatively good in most grave pits, with the exception of some grave pits in Cemetery Area 4, where both burial practices and postcemetery disturbances conspired to disturb the largest percentage of burials, resulting in half of all individuals in Cemetery Area 4 being discovered in secondary context.

Historical Data

Military records, the Tucson Diocese Burial record, scattered newspaper articles and obituaries, and the Mortality Schedule of the 1870 Federal Census provided information on the specific identity of many of the individuals likely to have been buried in the cemetery. Of principal importance was the Tucson Diocese burial record, which provided information on a total of 944 individuals likely to have been buried in the Alameda-Stone cemetery between 1863 and June 1875. For many of these individuals, information was provided in the record on the deceased's name, age, sex, date of burial, and on the names of parents and spouses. Occasional notes provided additional information on cause of death. The vast majority of individuals listed in the burial record were Hispanic individuals (n = 855). The remaining individuals were Apache (n = 16), Native American (n = 11), non-Hispanic Euroamerican (n = 11), Hispanic/non-Hispanic Euroamerican (n = 9), Yaqui (n = 6), Tohono O'odham (n = 5), or of undetermined affinity (n = 31). As these burials represented only those of interest to the Catholic church and the record had a number of temporal gaps, it pertained to only a portion of individuals buried in the Alameda-Stone cemetery. Comparison of the Tucson Diocese burial record with census data and the 1870 Mortality schedule suggested that perhaps somewhat fewer than two-thirds of Hispanics buried in the cemetery were listed in the record.

We also used historical demographic data on the age, sex, and cultural affinity of individuals listed in the Tucson Diocese burial record, census records, and the 1870 mortality schedule to develop expectations of burial population size, mortality rates, and other variables for comparison with contextual and osteological data. Combined with data on grave density, cemetery area size, and areas of disturbance, historic demographic data were used to estimate the number of burials likely to have been destroyed or removed by prior disturbance. This analysis suggested that the burials of at least several hundred individuals were destroyed by excavation of the Tucson Newspapers basement, a number considerably higher than had been reported in the newspapers (see Chapter 4, Volume 2 of this series). Mortality profiles developed from historical records were compared with osteological records to better understand the differential effects of mortality on the population (see Chapter 7).

Despite a relative wealth of information on who was buried in the civilian section of the cemetery, no record provided information on the specific location of individuals within the civilian section. Hence, it proved impossible to link individuals in the Tucson Diocese record with specific burials discovered archaeologically (O'Mack 2006; see also Chapter 4, Volume 2 of this series). Military burial lists, an exhumation list, newspaper articles and obituaries, and a series of maps of the military section obtained at the National Archives and Records Administration in Washington, D.C. provided information on the identity and relative location of individuals within the military section. An 1881 plat map of the cemetery showed that the walled military section was 120 feet (east-west) by 150 feet (north-south) and was divided into four quadrants divided by paths, with an entrance at the center of the south side of the section (Figure 53). Analysis of burials lists and the map indicates that rows were filled in from east to west in the eastern half of the military section. The sequence of burial and the organization of grave pits into rows in the west half of the military section was less well structured than in the eastern half, suggesting less oversight or a different set of protocols for burial in that area of the cemetery. The eastern half of the military section contained enlisted men, whereas the western half contained mostly officers and their family members and prominent citizens.

Historical data also provided essential information for our cultural affinity and military identification statements (see Chapter 6). Analysis of historical records suggested that perhaps 75 to 80 percent of the individuals interred in the cemetery would have been Hispanic. The remainder was mostly Non-Hispanic Euroamerican, with smaller numbers of Native Americans and a few African Americans. Expectations based on historical data matched our contextual and osteological assessments well, when the age of individuals was taken into account. For our military identification assessments, we were able to closely match the 1881 plat map of the military section with grave pit features discovered in the area determined to have been the military section. This fortuitous match allowed us to correlate historically-mapped graves with archaeologically discovered grave pits. We then compiled from a variety of archival sources information on the name, age, stature, place of birth, regiment, rank, former occupation, cause of death, and exhumation history for individuals associated with the correlated graves and compared this information with osteological data on the age, sex, stature, stress indicators, trauma, and biological affinity of individuals as well as with contextual data that could be used to assess

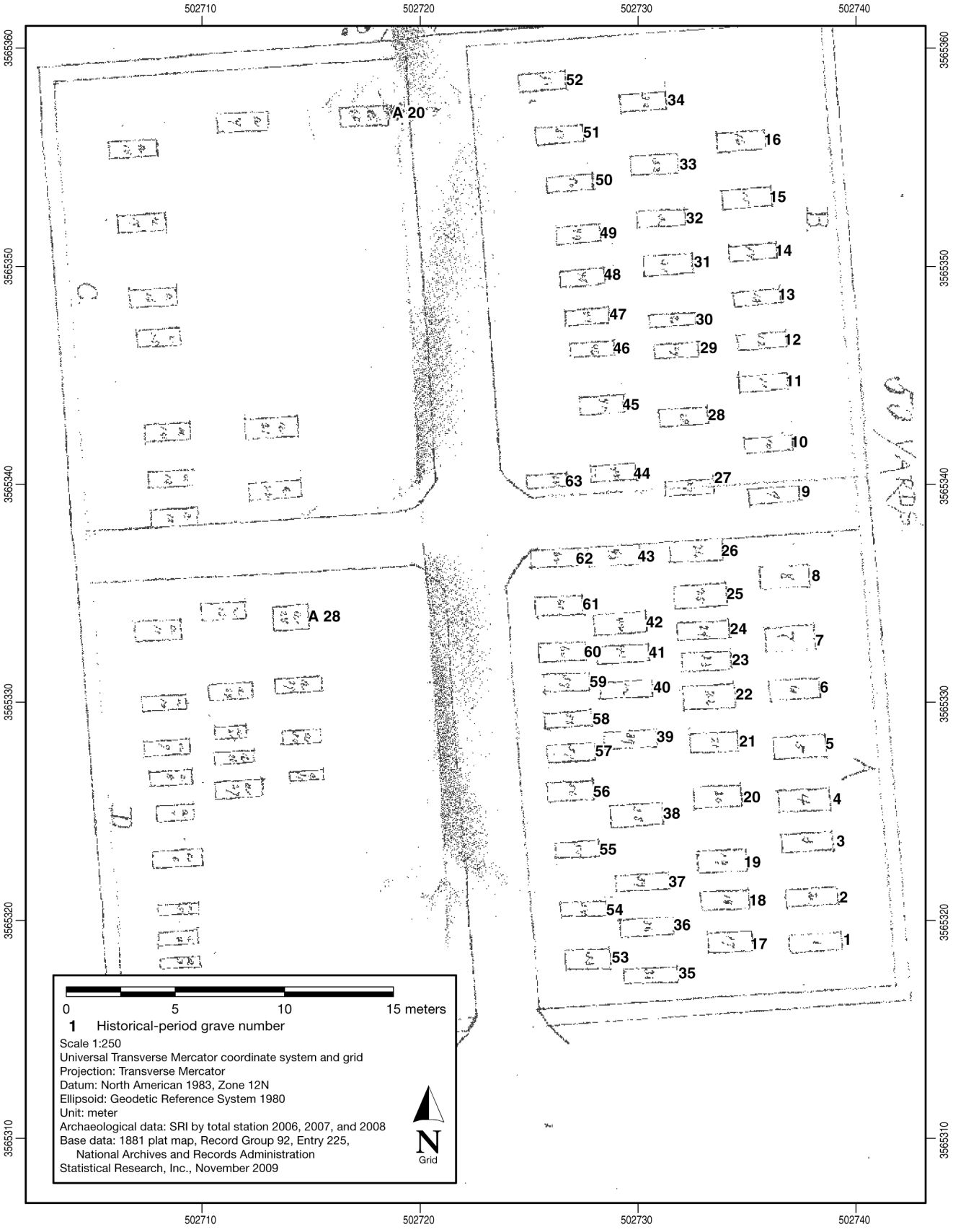


Figure 53. 1881 plat map of Military Cemetery.

cultural attributes such as regiment or rank. In many cases, osteological and contextual data were broadly convergent with historical information. Nonetheless, we could not legally identify any individual in the military section, as most grave pits contained only scattered remains left behind from exhumation efforts in June 1884, and biological evidence was in no case sufficient for identification purposes, no matter how convincing was the connection between contextual and historical evidence (Heilen et al. 2008).

Contextual Data

Contextual data provided a wealth of information on burial practices in nineteenth-century Tucson. Archaeological excavation revealed that most individuals in the Alameda-Stone cemetery were interred individually in coffins, as determined by the discovery of coffin wood, outlines, wood, and hardware. At least three individuals were buried on planks—two infants and a young child—whereas the remainder of individuals were buried without coffins. Most grave pits contained a single burial, but approximately 5 percent contained multiple interments placed either at the same time or during separate burial events. Most of these were located in the northern areas of the cemetery and were particularly concentrated in one area of the cemetery (Figure 54). Multiple interments mostly consisted of two individuals interred at the same or separate times, although as many as five individuals were observed in a single grave pit. In most cases, multiple interments were of either two young juveniles or a young juvenile and an adult (Table 7 provides a definition of age categories used for this project, which are based on Arizona State Museum standards). A few cases of the interment of multiple adults were observed (see Chapter 5, Volume 2 of this series).

Grave pits generally conformed in size to the age of individuals interred within them and were rectangular in plan view with straight, vertical side walls, and flat, horizontal bottoms. A small number of graves had shelves used to support grave arches or planks protecting the coffin (see Figure 23). A similar number of graves had what we have termed head niches, or small openings dug into the short axis of the grave pit in order to accommodate the head of an individual (see Figure 24). Analysis of these graves suggested that head niches were used to protect the head of individuals interred without coffins from being covered with dirt rather than to accommodate an individual taller than the long-axis of an excavated grave pit (see Chapter 9, this volume, and Chapters 5–6, Volume 2 of this series).

Grave depths varied widely across the cemetery, but much of the variation appeared to result from random variation associated with disturbances to the cemetery rather than differences in grave digging behavior. Analysis of the deepest graves in cemetery areas suggests that graves were typically on the order of 3–4 feet deep (see Chapter 4, Volume 2 of this series). Grave depths may have been restricted by the presence of hard and relatively impervious caliche deposits underlying surface deposits in the project area (see Chapter 3, Volume 2 of this series). In the southern areas of the cemetery, graves were typically spaced approximately 1.2 m apart within rows; they were more closely spaced in the northern areas of the cemetery. Graves were spaced closest together in Cemetery Area 4, where graves were most closely packed and tended to intrude into earlier grave pits. Nearly all grave pits were oriented along an east-west axis and were arranged in slightly curvilinear, north-south rows (Figure 55). Rows were spaced furthest apart in the southern areas of the cemetery and in an area in the northwest corner of the cemetery (Cemetery Area 5), where they were nearly 2 m apart. In one area of the cemetery (Cemetery Area 4), rows were so closely spaced as to often overlap (see Chapter 4, Volume 2 of this series).

Many of the graves in the Alameda-Stone cemetery would have initially been marked with wooden headboards, inscribed stone slabs, and aboveground vaults. Particularly for Mexican Americans interments, grave makers may have also included wooden and iron crosses; *cerquitas* (grave fences); *relicaritos* (grave markers with deep recesses to hold items associated with the deceased); *nichos* (smaller versions of the *relicarito*); grave curbs (low enclosures built close to the ground); decorative piles of field stones placed on top of individual graves; and, infrequently, engraved stone markers (Barber 1993; Brock and Schwartz 1991; Griffith 1992:119; Jordan 1990). Unfortunately, many grave markers decomposed rapidly as a result of vandalism and exposure to the elements and were ultimately removed after the land containing the cemetery was surveyed into lots and sold in 1889 and the land containing the cemetery was graded the following year (O'Mack 2006).

Coffins used in the cemetery were simply constructed in vernacular styles—probably by relatives or carpenters rather than by professional coffin makers—using juniper, pine, or a combination of the two woods. Formal coffin hardware was rare and probably did not become widely available in Tucson until after the arrival of the railroad in 1880. Coffins were rectangular, trapezoidal, or hexagonal in shape. Hexagonal-shaped coffins could be further subdivided into bent-shoulder coffins—constructed by bending side boards to create a hexagonal shape—and mitered shoulder coffins, in which the sides of the coffin were made by joining two boards at the coffin shoulder (Mainfort and Davidson 2006:104–105; Peter et al. 2000:269–270). Many coffins in the Alameda-Stone cemetery may have been covered in fabric or painted, perhaps to hide their fairly rough construction, with brightly colored fabrics and pigments possibly used for some burials. Interior coffin treatments were common, with more than half of burials exhibiting evidence for coffin lining. Evidence for pillows and interior paint was also found in some burials. Floral arrangements, as evidenced by wire and paper flower fragments, decorated some coffins (see Chapters 5–6, Volume 2 of this series).

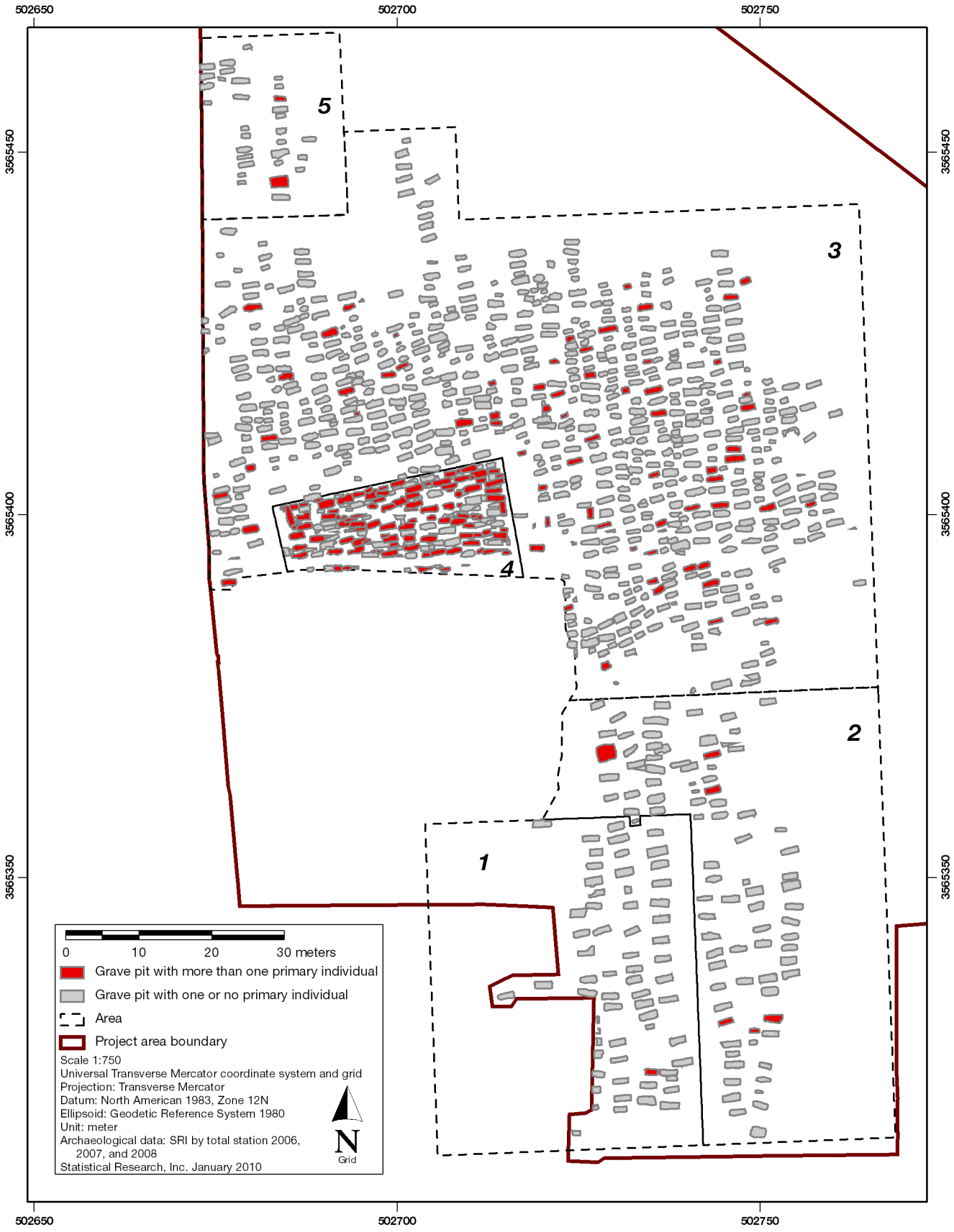


Figure 54. Distribution of graves with multiple interments.

Table 7. Arizona State Museum Age Categories

Age Category	Minimum Age	Maximum Age
Fetal	–0.75	–0.01
Infant	—	1.99
Child	2	11.99
Subadult	12	17.99
Young adult	18	34.99
Middle adult	35	49.99
Old adult	50	99
Adult	18	99

Individuals were buried in supine position, with their hands at their sides or placed over their abdomen or chest. For nearly all burials, bodies were oriented with either the head to the west or the head to the east (Figure 56). The vast majority of individuals in the southern areas of the cemetery were oriented with their heads to the west. With the exception of several of the easternmost rows in the northern half of the cemetery (in Cemetery Area 3), the opposite pattern held for the northern areas of the cemetery (see Chapter 5, Volume 2 of this series).

Individuals were typically buried in clothing, rather than in shrouds, as evidenced by buttons and other fasteners, and a lack of identifiable shroud pins. More than 500 hundred button types were intensively documented, including varieties of Prosser porcelain sew-through buttons, shell sew-through buttons, bone buttons, metal sew-through buttons, cloth buttons, and military uniform coat buttons. One particularly unusual button was an engraved shell sew-through button with a Star of David motif found with an individual with multiple cultural affinities (Figure 57). Other fasteners included cinch buckles and hook-and-eye fasteners. Fasteners were generally distributed according to age and sex patterns corresponding to age- and gender-specific clothing styles, although a few women appear to have been buried in pants, suggesting an inversion of gender roles for some women in Tucson (see Chapters 6 and 9, Volume 2 of this series).

Footwear was relatively rare in the cemetery and was found most commonly among juveniles. Footwear for adults included lace-up booties, lace-up ankle boots, ladies' boots, pull-up work boots, riding boots, and men's buckle shoes. Juveniles were buried with lace-up booties, lace-up ankle boots, or lace-up ankle boots with brass toe covers. Like footwear, jewelry was also relatively rare, and each piece was unique. Jewelry was reserved for females and juveniles and included earrings, lockets, pendants, necklace fragments, pins, brooches, and rings. Religious artifacts included crosses, crucifixes, frames, floral crowns, and rosaries (Figure 58). Religious items, most of which could be associated with Catholic practices, were almost exclusively distributed in the northern areas of the cemetery. Consistent with historical descriptions of the burials of Hispanic children, many children were buried with remnants of floral crowns made of wire wrapped with paper or ribbons and adorned with paper flowers and sometimes beads (see Chapter 6, Volume 2 of this series).

Osteological Data

Osteological analysis of remains focused on paleodemography (including age, sex, and biological affinity), biological distance and geospatial analysis, postcranial morphology of juveniles and adults, pathological conditions, trauma, dental health, and spatial patterns (see Chapter 7, this volume, and chapters in Volume 2 of this series). Paleodemographic analysis revealed distinct differences in the distribution of individuals according to age, sex, and biological affinity between cemetery areas. Biological affinity refers to the most likely biological ancestry of individuals, based on analysis of morphological characteristics distinctive of different biological groups known to have been living in Tucson while the cemetery was in use (see Chapter 8, Volume 2 of this series). This is distinguished from cultural affinity, the assessment of which was based on a combination of historical, contextual, and osteological evidence (see Chapter 6).

Individuals in the northern areas of the cemetery were more evenly distributed according to age and sex, with a somewhat greater predominance of Hispanic individuals, whereas individuals in the southern areas were mostly adult males with a larger percentage of Euroamerican individuals (Figures 59–61). These data supported the idea that the northern area of the cemetery represented the local community, whereas the southern area was more representative of recent migrants to Tucson (see Chapter 7, Volume 2 of this series). Biological distance studies suggested relatively high levels of heterogeneity for the population as a whole, consistent with the multiethnic nature of the cemetery, but relatively little variation within biological groups (see Chapter 8, Volume 2 of this series).

Studies of postcranial morphology revealed that juveniles and Hispanic adults were typically smaller in stature than contemporaneous groups and that individuals growing up in Tucson may have experienced dampened growth followed by a period of catch-up growth, possibly due to the combined effects of nutritional stress and infectious disease. Individuals in the cemetery were also generally shorter than populations from earlier in the nineteenth century, likely due to the so-called "antebellum puzzle," an almost universal decline in stature that occurred between 1830 and 1880 in the United States and other industrialized nations in urbanizing contexts. Shorter stature was likely due to decreased quality of nutrition and increased exposure to infectious disease (see Chapter 7, this volume, and Chapters 9–10, Volume 2 of this series).

Analysis of adult body symmetry, robusticity, vertebral trauma, and degenerative pathological conditions revealed

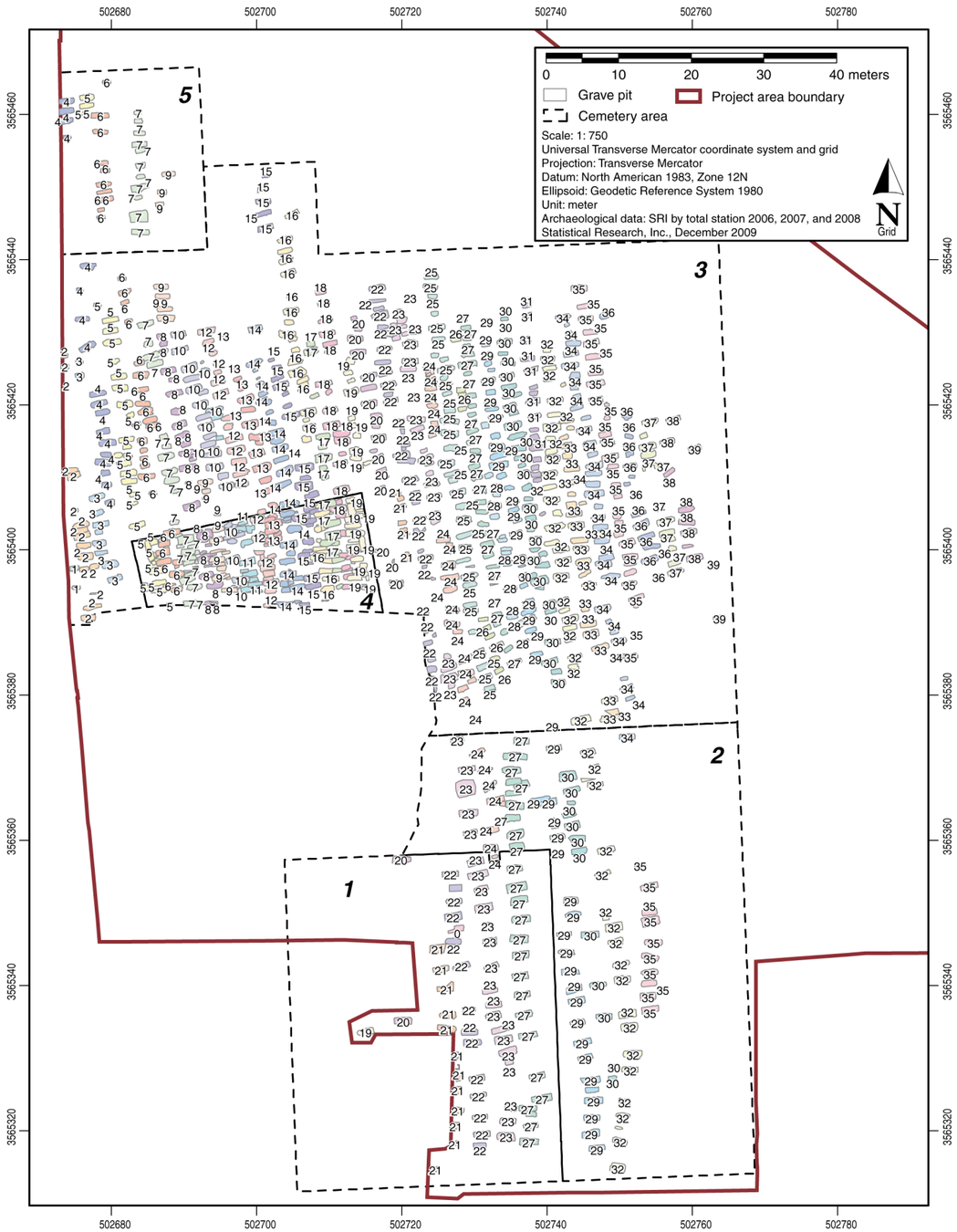


Figure 55. Map showing possible rows in the cemetery.

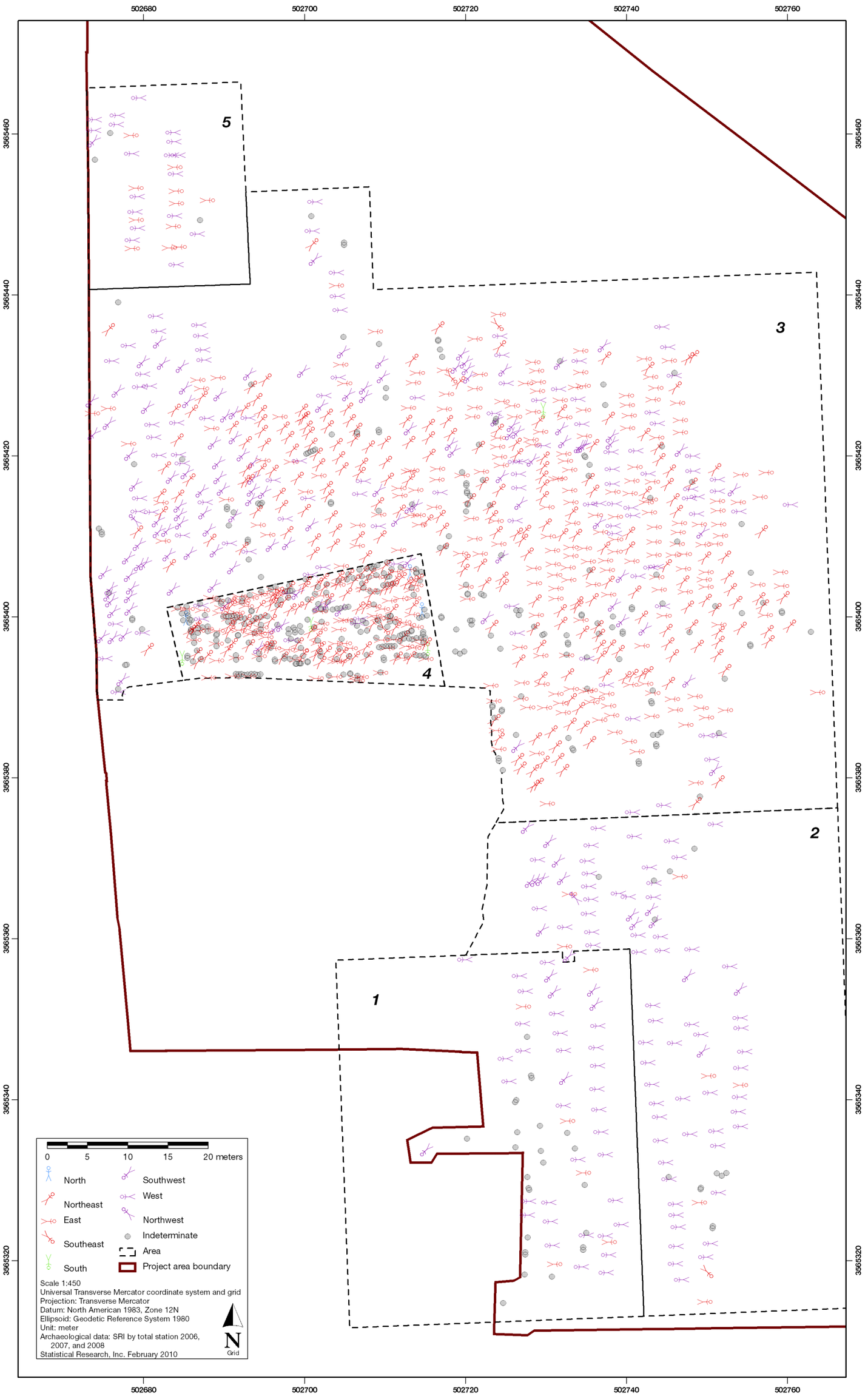


Figure 56. Burial orientation.

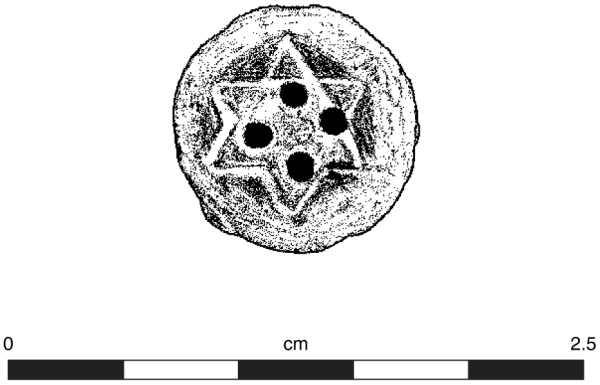


Figure 57. The Star of David button from Individual P, Grave Pit 7894, an older adult male with multiple cultural affinities.

Figure 58. Examples of rosaries from the Alameda-Stone cemetery.

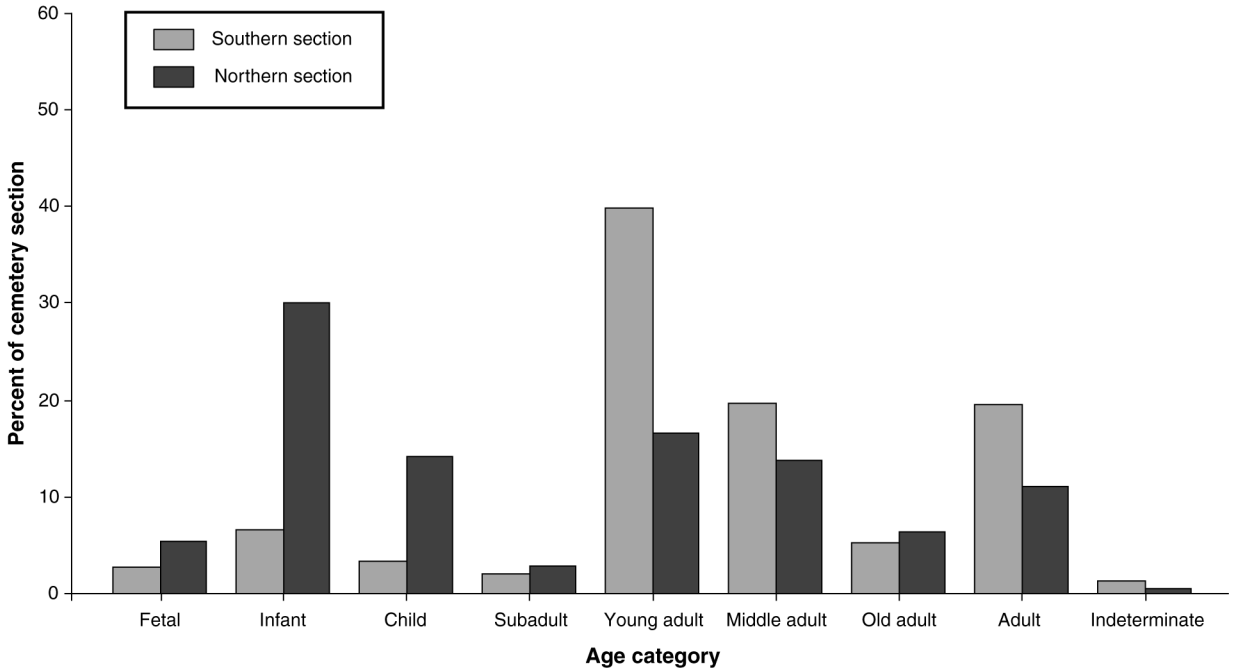


Figure 59. Relative frequency of individuals, by age category and cemetery section.

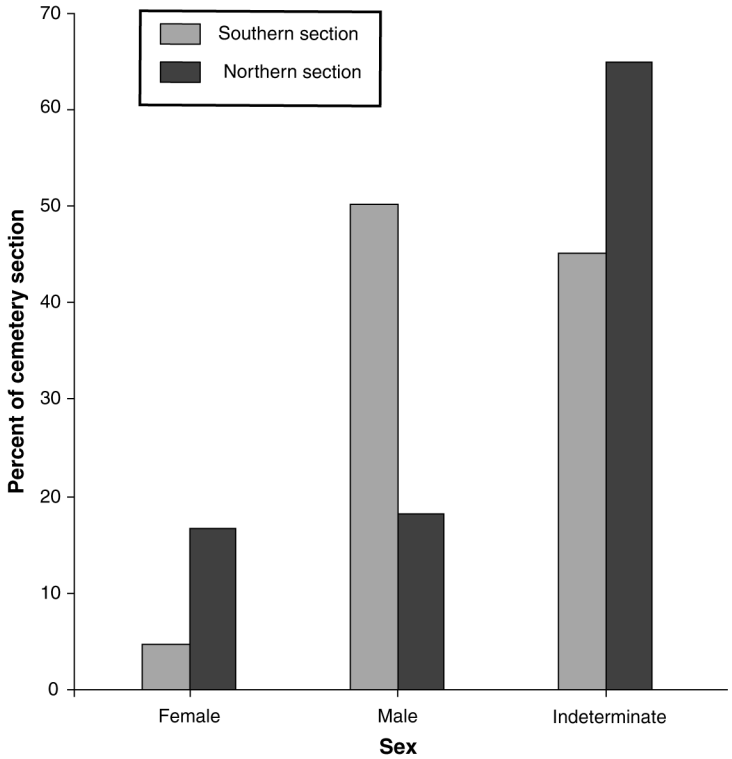


Figure 60. Relative frequency of individuals, by sex and cemetery section.

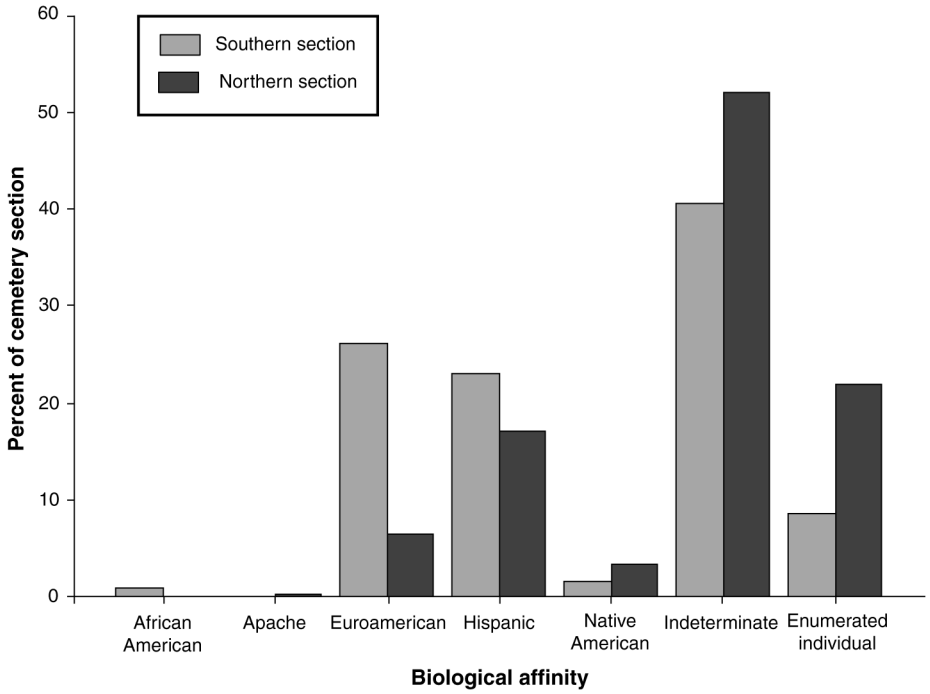


Figure 61. Relative frequency of individuals, by biological affinity and cemetery section.

performed in churchyards and beneath church floors. In such spaces, grave pits were routinely reused, the association of particular graves with specific individuals was rarely maintained, and the arrangement of graves within burial spaces was inconsistent and less structured (Hard and Doelle 1978; Lomnitz 2008; Thiel et al. 1995; Voekel 2002; Will de Chaparro 2007).

One aspect of cemetery reform was a trend towards the placement of individual, marked graves that could be specifically located and identified, so that the individuals interred in them could be memorialized and their burials kept free from future disturbance. Despite some attempts to individually mark and organize graves within the Alameda-Stone cemetery, the ability to identify a specific individual's grave after the cemetery was closed met with limited success. When the city advised family and friends of individuals buried within the civilian section of the cemetery to remove graves in January 1882, in advance of a planned road through the cemetery, undertakers had difficulty locating specific graves. The *Arizona Weekly Citizen* (12 February 1882a:4) complained about "too much indiscriminate and irresponsible digging done in the old Cemetery. When time or neglect has effaced the marks of a required grave, its whereabouts then becomes a matter of mere speculation and on that principle much of the digging is done. On Saturday last not less than six or seven remains were unearthed before finding the supposed one wanted. The bones were widely scattered . . . and on their reinterment they were heaped into a common hole without regard as to where they came from, rendering it impossible for others to identify any particular remains buried in the same locality." Similarly, the U.S. military did not keep adequate records of the identity of individuals in each grave pit, and most grave markers had decomposed or become illegible by the early 1880s, complicating the identification of specific individuals when graves were relocated to a new cemetery at Fort Lowell in 1884 (O'Mack 2006; see also Chapter 4, Volume 2 of this series).

The new cemeteries were often distinctly marked and bounded. During its use, the Alameda-Stone cemetery came to be a clearly bounded space, in keeping with other cemeteries of the nineteenth century. The military section of the cemetery was enclosed on four sides by an adobe wall in 1868 with an entrance on the south side. A historical photo of the military section (see Figure 13) shows an architecturally defined entrance that would have symbolically declared the meaning of the cemetery to visitors. Similarly, the civilian section of the cemetery was bounded on the west and north sides of the cemetery, with an entrance visible on the west side of the cemetery in an 1880 photograph of Tucson by Carleton Watkins (Figure 62).

In contrast to other burial spaces controlled by specific groups or religious organizations, cemeteries in the nineteenth-century United States increasingly served entire communities and were controlled by municipal authorities or private companies. In a similar fashion, the Alameda-Stone cemetery served the entire community, including Mexican Americans, non-Hispanic Euroamericans, Native Americans, and African Americans. Contextual, osteological, and historical data clearly showed this to be the case.

Reflecting the demography of Tucson at the time, the cemetery contained the interments of males and females of all ages and allowed for the performance of religious ritual associated with multiple faiths, including Catholicism, Protestantism, and Judaism, as well as contained the burials of military-affiliated individuals and individuals associated with fraternal orders. Comparison of archaeological and historical information shows that the cemetery sample derived from the excavations is strongly representative of the original burial population and thus represents a true cross section of Tucson during the 1860s through 1880.

In addition, the land on which the cemetery was placed was public land that came to be owned by the City by the time the cemetery had closed, rather than land owned by the Catholic Church or by the U.S. military. In fact, after the civilian and military section of the cemeteries had been closed, the City affirmed its ownership of the land containing the military section of the cemetery and granted in February 1881 a parcel of land containing the southwest corner of the cemetery (Block 254) to the Trustees of School District No. 1, Pima County. Three years later, the City pressured the U.S. military to remove burials from the military section, which the U.S. military completed under contract with Dr. W. J. White in June 1884. Another 5 years later, in April 1889, the Tucson City Council ordered the City Surveyor, John Gardiner, to plat and number lots contained within acreage that encompassed the cemetery. These lots were promptly sold, graded, and then built upon, erasing any surface evidence of the cemetery (O'Mack 2006; see also Chapter 12, this volume, and Chapter 4, Volume 2 of this series).

As can be seen, the Alameda-Stone cemetery did not achieve any permanence, in part because it soon no longer fulfilled another major requirement of a cemetery: to be located on the outskirts of the settlement. As the City expanded in the 1860s and 1870s, the cemetery came to be surrounded by development and itself became prime land for further development. The location of many cemeteries outside of settlements was considered important to sanitation as well as to ensuring the restfulness of the deceased in peaceful and removed location away from daily affairs. As this requirement was no longer being met, the City officially closed the civilian section of the cemetery to further burial on May 31, 1875 and closed the military section of the cemetery to further burial shortly after the last burial was placed in the cemetery in January 1881. In fact, the many public statements made in newspaper articles regarding the state of the cemetery in the late 1870s and early 1880s repeatedly stressed these two factors: that the cemetery was unsanitary and a public danger and that its dilapidated condition was disrespectful to the deceased (O'Mack 2005, 2006; see also Chapter 12, this volume, and Chapter 4, Volume 2 of this series).

Together, multiple lines of evidence suggest that the Alameda-Stone cemetery accommodated many of the principles of cemetery reform that were becoming common throughout the United States, but at the same time represents a transition from earlier to later approaches to death and burial. In the following chapters, we discuss in more detail our cultural affinity assessments; historical and archaeological evidence for diet, nutrition, stature, disease, trauma, medical intervention, and demography; deathways practiced in Tucson during use of the cemetery; synthetic analysis of mortuary variables; broader implications of the cemetery excavations and comparison with other cemeteries that have been excavated; and the reburial efforts undertaken for the project.

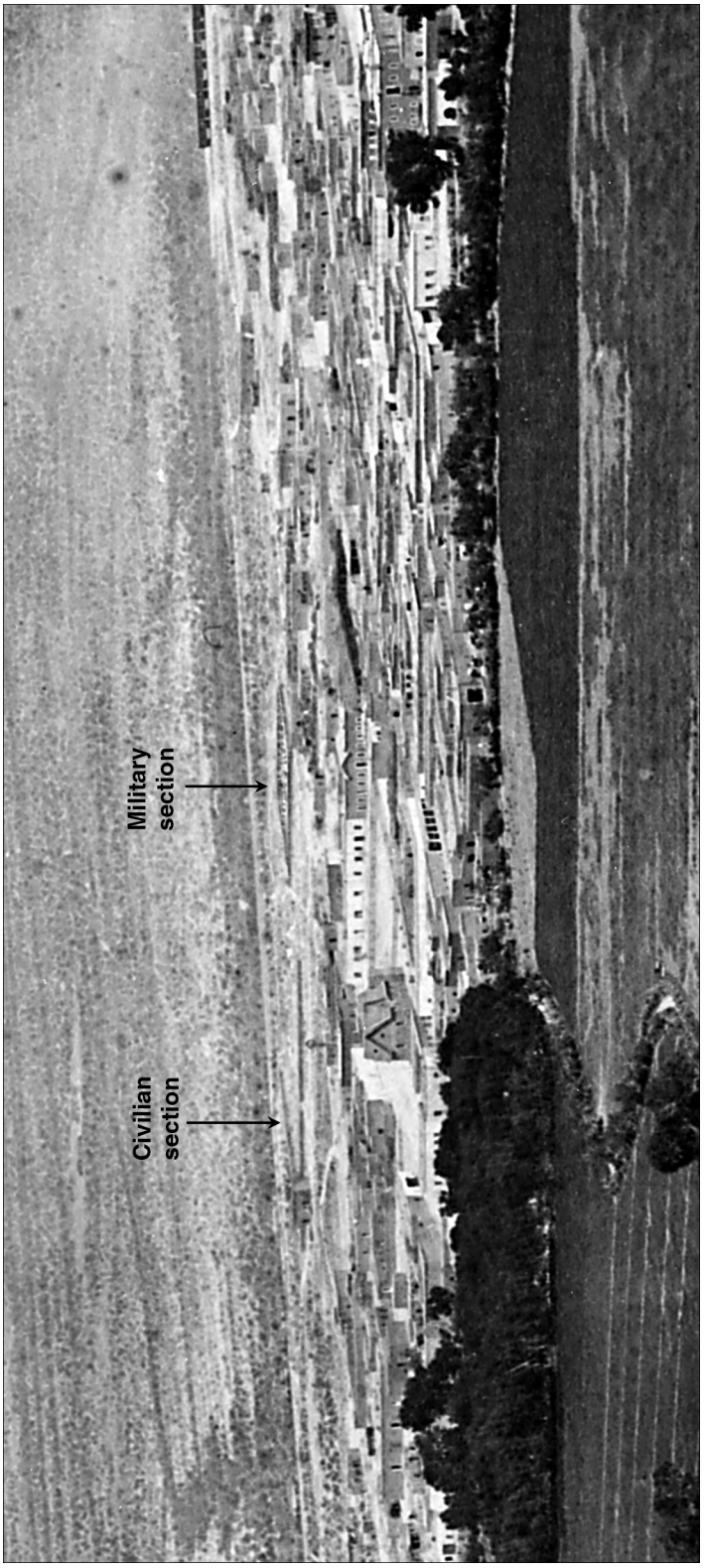


Figure 62. Detail from the 1880 Carleton Watkins photograph of Tucson.

CHAPTER 6

Cultural Affinity, Identity, and Relatedness: Distinguishing Individuals and Cultural Groups in the Alameda-Stone Cemetery

Lynne Goldstein, Joseph T. Hefner, Kristin J. Sewell, and Michael Heilen

Cultural Affinity Defined

It is now common practice for burials recovered from archaeological sites to be repatriated or reburied after identification and analysis have been completed as agreed under the project contract. In the United States, this process has developed into a routine. Sometimes the link between human remains and living groups is known prior to excavation; sometimes an agreement is reached during or after excavation, or physical anthropologists make determinations with some input from archaeologists, native people, and others. What has been relatively rare—even though it is required by the Native American Graves Protection and Repatriation Act (NAGPRA)—is the determination of affiliation through the equal evaluation of all sources of information. Reasons for this lack of equal consideration of all information sources vary: sometimes such information does not exist, sometimes the sources of information are variable in nature, and at other times, the physical anthropological data are given primacy because people assume biological relationships to be of greatest significance, failing to consider the very real practices of adoption, intermarriage, and culture change.

The excavation and analysis of individuals recovered from the Alameda-Stone cemetery do not fall under the provisions of NAGPRA because for excavations conducted after 1990, NAGPRA applies only on Federal and Indian land. The project does, however, explicitly fall under two Arizona laws— Arizona Revised Statute §41-844 and Arizona Revised Statute §41-865— because the property was owned or controlled by the County and is thus treated as state land (the County being a political subdivision of the State). These laws focus on protecting human burials and associated grave goods on state lands. The first choice under the law is to encourage protection of the grave site, but if this is not possible and the site must be disturbed, a burial agreement must be reached that dictates the disposition of the human remains and funerary objects. Scientific study is possible for a limited amount of time but must be negotiated with descendant communities. Under Arizona law, all burials at least 50 years old and associated grave goods located on state lands are included, and under the law, groups having *cultural affinity* to these burials and grave goods have the right to be claimants to them. We will return to the term cultural affinity shortly.

In the case of the Alameda-Stone cemetery, Pima County was certain that some human remains would be recovered (see O'Mack 2005, 2006), so the County planned ahead for the treatment of human remains. For this project, cultural affinity was assessed not only according to Arizona law, but also according to provisions stipulated in the Agreement on Treatment and Disposition of Burial Discoveries Dating After 1775 (A.R.S. §41-844, Case #06–14; see Appendix A). A separate burial agreement, covering human remains dating before 1775, is not considered here only because no remains predating the cemetery were discovered. The Alameda-Stone cemetery agreement includes some of the relevant information that the known descendant groups provided about their burial practices prior to excavation of the cemetery. This was not the only information used about these groups, nor was it the only consultation with these groups. Moreover, this information was not given priority over other information. Rather, these data were included in the agreement and were used in the affinity determinations.

The distinction drawn between Arizona's *cultural affinity* and what NAGPRA terms *cultural affiliation* is significant, because there are some differences in definition and because this project has approached these assessments in a manner different from that of some other projects. We believe that our approach meets the letter and spirit of both definitions better, but it can be more time-consuming and can require more consultation and research.

According to the State of Arizona, cultural affinity exists when

> there is a relationship which can be reasonably traced historically or prehistorically between a present day claimant group and an identifiable earlier group with which Remains were associated, based on the preponderance of the available evidence and allowing for the inevitability of change through time. . . . Kinship and affinity are not synonymous terms. Under Arizona laws, kinship is the key factor with respect to relationships between individual persons and Remains, whereas cultural affinity is the central issue with respect to relationships between cultural groups and Remains [Arizona State Museum 2010:3].

The Arizona guidelines outline elements of what might constitute cultural affinity, making it clear that while evidence of biological descent is important, it is not the sole or most important factor in determining cultural affinity. Also listed are common religious beliefs and practices, common languages, similar forms of social organization, comparable forms of political institutions, and other factors. The guidelines specifically note that locational stability "may be an element supporting claims of close cultural affinity, but it is not a necessary or sufficient condition for establishing close affinity" (Arizona State Museum 2010:4).

Assessing Cultural Affinity

Assessing the cultural affinity of human remains is often difficult because no simple correspondence exists between one's biological ancestry and one's culture. This is especially true in the context of nineteenth-century Tucson, where many people were of mixed biological ancestry but shared a generally Hispanic culture. At the same time, people of distinct biological ancestry might have quite different cultural affinities. For example, some nineteenth-century Tucsonans who were fully Native American in terms of biological ancestry were practicing Catholics, with lives (and burial practices) not obviously different from their Hispanic counterparts in Tucson, while others continued to practice a non-Catholic, Native American way of life. An accurate assessment of cultural affinity requires a close examination of all the available archaeological, osteological, and historical evidence.

For each individual set of human remains found in the Alameda-Stone cemetery, assessment of cultural affinity relied on three kinds of evidence: contextual indicators, or details about where a set of remains was discovered and the items found in association; osteological indicators, or physical characteristics of the skeleton itself; and historical evidence, or the results of research into how the cemetery was used, the identities of the people buried there, and the cultural traditions of the communities potentially represented in the cemetery. It should be emphasized that the three kinds of evidence—contextual, osteological, and historical—were of equal importance in assessing cultural affinity, and that an accurate assessment was not possible until all three kinds of evidence were fully evaluated and compared. After the various lines of evidence were evaluated for each individual, a likelihood statement of cultural affinity was established and provided to the descendant groups for their evaluation and discussion. This procedure was unusual for most repatriation contexts for the following reasons: (1) it is rare that all three kinds of information are equally incorporated into repatriation decisions; (2) the descendant groups were actively involved in the process; and (3) there was communication and discussion about the data between all parties involved in the process.

Contextual Evidence

The burial agreement for the Alameda-Stone cemetery excavations included lists of artifacts and other contextual indicators provided by the claimant descendant groups that they considered useful for distinguishing cultural affinities among the burials. This information was carefully considered during assessment of cultural affinity as part of the detailed analysis of the contextual evidence from each burial. Other indicators not necessarily in the aforementioned lists but still considered useful for distinguishing cultural affinity were also included. In many cases, contextual indicators were not exclusive to any one group, but every effort was made to properly weigh the contextual evidence in light of biological and historical data (see below). Generally speaking, analysts examined a variety of documents, ethnographies, descriptions, and records of the relevant time period, looking for evidence of material culture correlates of mortuary practices of the time and specific culture. This process resulted in a series of lists and matrices that were cross-checked with other records. Eventually, we isolated 10 broad categories that were important in trying to identify cultural affinity in the cemetery from contextual evidence.

The 10 broad classes of contextual indicators used in our analyses are those that were present in the cemetery, and there is some evidence that they vary with different cultures, religious, and ethnic groups (see Chapters 5 and 6, Volume 2 of this series). A brief description of each of each of these indicators is provided below.

Orientation means placement of the body with respect to the cardinal directions (i.e., the deceased's head to the north, south, east, or west). Many cultures emphasize orientation, preferring to orient the dead in the direction of sacred places or other cultural landmarks. Data on the orientation of each individual was collected, when possible.

We also collected data on the orientation of the coffin itself; although these may be the same, they are not always the same, and sometimes preservation makes collection of one possible, but not the other.

Position means placement of a body within a grave. Some individuals may be fully extended, with their arms straight and by their sides, as is typical in most Christian burials, while other burials may be tightly flexed. Burials that are flexed, or in the fetal position, are not uncommon in the U.S. Southwest. Flexed burials and similar body positions (e.g., sitting positions) are common among Native American groups and may sometimes provide a relative date of burial.

Grave type means the nature of the excavation that holds the burial. The shape of the grave and other architectural elements can identify membership in specific cultural groups.

Grave markers means objects used to mark the location of a grave at the ground surface, including commercially manufactured headstones, shell, and stacked stones. In many instances, these markers are used to identify individuals, but they have also been used to isolate sections of the cemetery for limited use by a cultural group or by groups that are culturally distinctive. The original ground surface of the Alameda-Stone cemetery was completely obliterated by postcemetery grading and construction, so these useful mortuary devices were not available to the analysts, but some other architectural grave elements were present.

Burial container means the container used to hold the deceased. Burial containers can vary in construction materials, construction methods, the shape of the container, and decorations on the container; these may be used to identify possible membership in a cultural group.

Clothing means the items in which the deceased was dressed for burial. Clothing can include uniforms, shawls, burial shrouds, belts and cords, sandals, or other footwear that are associated with cultural affinities.

Religious artifacts means items of a religious nature buried with the deceased. Religious artifacts may include a scapular, rosary beads, medallions, saints' images, crosses, crucifixes, and offerings. Placement of these items within the grave and their spatial relationship to the individual may be suggestive of cultural affinity.

Natural materials means any unmodified materials intentionally placed in a burial, such as lime, shells, stones, wax, mineral pigment, or plants. These items may be used to identify cultural affinity.

Personal artifacts means any other items buried with the deceased, like jewelry, framed photographs, or items associated with membership in a fraternal organization. Additionally, spatial relationships between artifacts or with the individual may help to identify membership with a cultural group.

Location means the placement of a burial within the cemetery and its spatial relationship to other burials. For example, a burial may have been placed in the cemetery's crowded central section, within the military section, or within a small cluster of graves on the outer edge of the cemetery.

Osteological Evidence

Our assessment of cultural affinity included a careful consideration of multiple osteological indicators of biological affinity as part of a detailed analysis of each burial (see Volume 2 of this series). An estimation of biological affinity indicates the closest biological group, or ancestry, for each individual. The osteological analysis considered five classes of information to assess biological affinity as part of the assessment of cultural affinity.

Dental wear and dental morphology (the Turner system). Dental morphology includes slight differences in the shape of teeth and has been used to distinguish between certain ancestry groups (cf. Greenberg et al. 1986; Scott 1973; Scott and Dahlberg 1982; Scott and Turner 1988, 1997; Turner 1979, 1986, 1998). A high degree of wear can sometimes be a good indicator that remains are of Native American ancestry. Severe wear will unfortunately also greatly reduce the observable morphologies used for cultural affinity. The details of the system used can be found in Chapter 13, Volume 2 of this series.

Nonmetric, or epigenetic, traits of the cranium and postcrania are slight variations in form or shape that tend to vary among groups, including Hispanic, Native American, and Euroamerican populations (Buikstra and Ubelaker 1994; Hefner 2003, 2007). A complete list of the nonmetric traits considered in the analysis is included in Appendix C.

Cranial and postcranial metrics are both equally important for comparability with reference data sets from known populations. Craniometrics have been used extensively to measure group variability and investigate biological affinity and are generally the preferred approach (due to several statistical advantages described below) (cf. Devor 1987; Jantz 1970; Relethford 1994, 1996, 2001a, 2001b, 2004). Postcranial metrics can be used to distinguish Native American from non-Native American ancestry and to predict biological affinity when differences in postcranial morphology are present between groups. A large reference database of cranial and postcranial metrics drawn from temporally and geographically similar populations was used during the osteological analysis. A complete list of the cranial and postcranial metrics considered in the analysis is included in Appendix C.

Cranial deformation is the intentional change of the shape of the skull that takes place during the life of the individual (see e.g., Ossenberg 1970). So defined, cranial modification serves as an unambiguous indicator of Native American ancestry, because no other North American groups practiced intentional cranial deformation.

Statistical methods and reference samples. The use of osteological data in multivariate analyses is well established and has been used to determine statistically significant biological differences among groups. For cranial and postcranial metrics, statistical integration required the compilation of reference samples from temporally and geographically similar populations in and around Tucson in the nineteenth century.

The metric data for each individual recovered from the cemetery was compared to reference samples using stepwise discriminant function analysis (Krzanowski 2000; Ousley and Jantz 2005), which provides a probability of group membership and several other descriptive statistics useful for predicting biological affinity. These include posterior and typicality probabilities, which are useful for describing how close the unknown individual is to the reference samples. Discriminant function analysis is suitable for continuous, numeric data like craniometrics; however, for the dental and nonmetric traits, discriminant function analysis may not be appropriate, and therefore nonparametric methods—such as nearest neighbor, kernel density estimates, and logistic regression using reference samples derived from multiple sources—were substituted in those instances (see Volume 2 of this series).

Biological affinity was based primarily on cranial morphology and craniometric discriminant function analysis. Some features of the cranium are better indicators of biological affinity—facial height, orbit shape, interorbital breadth, development and prominence of the nasal bones, the shape and width of the nasal aperture, and the morphology of the inferior nasal aperture. In addition, the palate and some of the traits of the dentition provide good indicators of biological affinity. When cranial traits were missing or fragmentary, the dentition and the postcranial elements were used.

Due to the nature of human remains excavated at the Alameda-Stone cemetery, it was not possible to collect the entire set of osteological variables on every individual. In addition, very little research has been conducted on the osteological indicators of biological affinity for subadult individuals (i.e., adolescents and children), but every effort was made to produce a biological profile useful for predicting biological affinity for these individuals using the lines of evidence described above.

Historical Evidence

Interpreting contextual and osteological evidence from burials in the project area required additional research into the history of nineteenth-century Tucson, both its diverse cultural traditions and the details of lives and events in Tucson during the period the cemetery was open. No single characteristic of a burial, regardless of how distinctive it is or how unambiguously it seems to be documented in the historical record, can be taken in isolation as an indication of cultural affinity. In every case, an accurate assessment of cultural affinity requires that the sum of the evidence be weighed. Historical evidence alone does not provide unambiguous information on the cultural affinity of specific individuals. Instead, historical evidence can be used to develop baseline data and expectations regarding the following factors.

Social and ethnic identity, or how individuals living in Tucson identified themselves with respect to cultural, economic, or religious groups.

Relatedness and marriage patterns, or historical evidence that can be used to establish the existence of distinctive or related groups and the likelihood of their members being buried in the cemetery.

Demography, or the structure and distribution of populations according to age, sex, cultural identity, and other factors. A variety of historical documents were used to reconstruct demography, including newspaper accounts, the Tucson Diocese burial records, military records, census data, and birth, marriage, and death records (see Chapter 7, this volume, and Chapter 4, Volume 2 of this series).

Mortuary treatment and distinctive patterns of material culture. Contextual indicators of cultural affinity, such as grave type, burial container, or personal artifacts, can be further interpreted with the help of historical evidence. For example, a distinctive style of clothing button found in a burial might prompt research into how and when buttons of that style were used and whether such use was restricted to a particular cultural group. Descriptions of the mortuary practices of different groups, such as Hispanic Catholics, also provided clues to interpreting contextual information (see Chapter 8).

Evaluation of the historical evidence differs slightly from the other types of evidence in that it was used both prior to excavation of the cemetery and after excavation, and it was also used to develop broad patterns to which specific data can be compared.

Determining Cultural Affinity

The goal of integrating the various lines of evidence is to establish a connection between context, biology, history, and cultural affinity. Combining and integrating contextual, osteological, and historical evidence into a methodological framework removes some of the subjectivity inherent in this process, providing a means of appropriately weighing the three lines of evidence. Assigning an objective weight or probability to each line of evidence was not always possible; nevertheless, all potentially relevant evidence was considered during the assessment.

The steps to determine cultural affinity were as follows. Contextual profiles of each descendant group were compiled and assessed following the burial agreement and the contextual indicators of affinity. Mortuary analysts also evaluated the individual grave features, their associated

artifacts, and other information outlined earlier. Using contextual evidence, an assessment and classification of probable cultural affinity was made as (1) highly likely or (2) likely, depending on the strength of the assessment and the uniqueness of the contextual information. If the evidence was unclear, the individual was classified as (3) indeterminate.

At the same time, osteological analysts addressed the skeletal evidence for biological affinity using reference data comprising representative samples of the various descendant groups. These data sets were used to establish a biological profile of each recovered skeleton. Statistical comparisons of the cemetery individuals to these reference datasets produced a probability, or a likelihood, of biological group membership for each individual skeleton. If the classification rates and probabilities were greater than expected from random allocation, the remains were classified as either (1) highly likely or (2) likely. We defined "highly likely" as a posterior probability (calculated during the discriminant function analysis) of 0.90 or higher. Similarly, "likely" is defined as a posterior probability greater than 0.50, but less than 0.90. We chose these threshold values because they are reliable estimates of biological relatedness, including among groups with complex population histories (Richard Jantz, personal communication 2006). If the classification produced insignificant posterior probabilities or ambiguous classifications, the individual was classified as of indeterminate biological affinity.

Finally, the historical documentation on nineteenth-century Tucson, the military cemetery, and burials recorded in the Tucson Diocese burial record was used to corroborate and establish demographic profiles of the cemetery population and to highlight cultural group characteristics that may be present in the burial record (see Chapter 4, Volume 2 of this series). Using this a priori information strengthened the classification rates of the osteological data and also further supported and substantiated the contextual evidence for each individual.

After the contextual, osteological, and historical evidence was compiled and evaluated for each individual, the actual determination of cultural affinity was made. Each of the three independent assessments was considered to determine cultural affinity. If all three sources of evidence were in agreement that an individual had a particular cultural affinity, the individual was classified as highly likely to have affinity with that particular cultural group. If the evidence points to multiple affinities, such as when evidence is contradictory or ambiguous, then the individual was classified as having multiple affinities. If it was not possible to determine the cultural affinity of an individual—for instance, when missing, absent, or highly ambiguous data precluded a determination of cultural affinity—the individual was classified as culturally indeterminate.

For each case of multiple affinities, the analysts subsequently discussed the case in detail to determine if the combined evidence could in any way clarify the determination. In other words, we tried to evaluate the most likely cultural affinity designation for each individual classified as having multiple affinities. Each line of evidence was weighed according to its ability to contribute to the designation of a specific group. In some cases, designations might not be conflicting. For example, biological affinity was compared with religious affinity. The following potential designations were possible. For biological evidence, the potential designations were Euroamerican, Hispanic, Native American, Apache, African American, or indeterminate. The more specific biological affinity of Apache was possible because the reference sample used for Apaches—obtained from the Smithsonian Institution National Museum of Natural History, Office of Repatriation—was significantly different osteometrically than the reference samples of other Native American groups known to have resided in Tucson. From contextual evidence, the potential designations for religious affinity were Catholic, Christian, multiple religious affinities, or indeterminate. If an artifact had Christian symbols that could not be tied to a specific denomination, then we assessed religious affinity as Christian. Artifacts closely related to Catholic ritual were used to assess a religious affinity as Catholic. To clarify, Catholic-associated artifacts were considered a subset of the broader Christian artifact type. A Christian designation was used when a finer level of classification was not possible; however, the most specific level of religious assessment was made when possible. If more than one religious affinity was represented, the affinity designation "multiple" was used.

The following process was established for considering a cultural affinity designation for those individuals designated as having multiple affinities:

1. If biological evidence and religious artifacts were present, the individual was assigned to both the cultural group that most closely corresponds to the biological assessment and to a religious affinity based on the artifact(s). For example, if the biological affinity was Euroamerican and cross-shaped coffin hardware was present, the individual was classified as Euroamerican, Christian.

2. When only a biological assessment of affinity was available, the individual was assigned to the cultural group that most closely represents the biological assessment. No religious affinity was designated. For example, if the biological affinity was Native American and a finer level of classification was not possible (e.g., tribe, group, etc.), the individual's cultural affinity designation was Native American.

3. When only one or more artifacts associated with religion were present, and biological affinity was indeterminate, the individual was assigned a religious affinity most closely associated with the artifact. Biological affinity was indeterminate. For example, when the

only recovered artifacts were a rosary and crucifix and no other data were available, the individual was classified as Catholic.

When the biological and contextual evidence was absent or discordant, the individual was classified as indeterminate.

One of the problems of this analysis of affinity is that we are not always comparing precisely the same things. When we examine osteological evidence we are looking at biological indicators of difference, but when we look at contextual evidence, we are looking at many different kinds of things that may crosscut biology. For example, some of the artifactual indicators may be religious (such as crosses and rosaries), some may be individual (such as jewelry or decorated clothing), and some may be tied to a particular group or tribe (a certain kind of artifact or pattern of burial). These can crosscut biology—there is no reason why someone cannot be Apache and also a Christian. It is conceivable that conflicting symbols could also be present. Religion is not the same thing as biology, which is not the same as culture, which is not the same as ethnicity, etc. Our categories are bound to be blurry at some level, especially since they reflect very different things. We have been aware of these issues since the beginning of the project, and this is why we have taken this particular approach on cultural affinity: we want to make certain that no particular line of evidence, no matter how certain it seems, takes precedence over another. All information is treated equally.

Assessment Results

Statistical Research recovered and was able to assess for cultural affinity for a total of 1,202 individuals. This number includes the 47 individuals removed during construction of the Tucson Newspapers building in 1953, 1 individual recovered in 2001 by Tierra Right of Way Services during line trenching, 1090 individuals recovered by Statistical Research from the civilian section of the cemetery, and 64 individuals associated with the military section (Table 8).

Of the 1,091 individuals recovered by Statistical Research and Tierra Right of Way in the civilian section, 1 is highly likely to be African American (the individual subsequently repatriated with burials from the military section because of military association), 1 is highly likely to be Apache, 99 are highly likely to be Euroamerican, 233 are highly likely to be Hispanic, 5 are highly likely to be Yaqui, 182 have multiple cultural affinities, and 570 are culturally indeterminate.[1] Very little is known about the original provenience of the individuals recovered in 1953, so these individuals are not represented in Figure 63; however, cultural affinity was assessed. Of the 47 individuals recovered in 1953, 2 are highly likely to Apache, 8 are highly likely to be Euroamerican, 16 are highly likely to be Hispanic, and 21 are culturally indeterminate. The many fragmentary and scattered human remains recovered are all culturally unidentifiable.

All stakeholders in the project agreed that individuals in the military section would be repatriated to the Southern Arizona Veteran's Association and would be reburied at Fort Huachuca, regardless of cultural affinity. As a result, the cultural affinity statement released to the public and used to decide to which groups individuals would be repatriated pertained only to individuals associated with the civilian section of the cemetery (see Appendix D). A separate statement—referred to as the military identification statement—was prepared for the military section and was developed according to a separate set of protocols. Because a determination of cultural affinity was not necessary to plan the repatriation of individuals from the military section, the military identification statement was used to assess the specific, personal identity of remains from that section. This was accomplished by assessing the correlation between historical records on specific individuals buried in that section and osteological and archaeological information (see below).

Native Americans

In order to identify individuals of Native American affinity, we researched Native American cultural traditions and their presence in nineteenth-century Tucson, used information provided by tribes, and explored the skeletal biology of Native American populations. For the latter, this included the compilation of a database of skeletal data (craniometric, dental, and nonmetric) representative of Native American groups known to have been present in nineteenth-century Tucson. This skeletal reference data set was obtained from the Smithsonian Institution National Museum of Natural History, Office of Repatriation, in Washington, D.C. That source provided comparative craniometric data for a large sample of Native American individuals.

The National Museum of Natural History data set includes traditional, linear craniometric data (Buikstra and Ubelaker 1994) as well as three-dimensional coordinate data. The dental data represent differences in the shape and structure of teeth useful for differentiating between populations (Scott and Turner 1997). Biological affinities were assessed using stepwise discriminant function analysis. As noted elsewhere, a posterior probability greater than 0.5 constituted a positive assessment for a given affinity. Unfortunately, the genetic relatedness and biological similarities of the Native American groups within and around Tucson during this period, with the exception of

[1] Consultation with descendant groups and evaluation of individuals assessed as having multiple affinities resulted in minor revisions to counts provided in the original cultural affinity statement.

Table 8. Distribution of Cultural Affinity Designations, by Cemetery Area and Sex

Cemetery Area	Sex	African American	Euroamerican	Hispanic	Apache	Yaqui	Multiple Affinities	Culturally Indeterminate	Total
Tucson Newspapers Basement	female	—	2	7	1	—	—	9	19
	male	—	6	8	1	—	—	6	21
	indeterminate	—	—	1	—	—	—	6	7
1	male	—	1	2	—	—	—	8	11
	indeterminate	—	7	3	—	—	—	43	53
2	female	—	4	3	—	—	—	—	7
	male	1	28	27	—	—	1	9	66
	indeterminate	—	—	1	—	—	1	16	18
3	female	—	13	68	1	2	23	34	141
	male	—	22	57	—	—	13	46	138
	indeterminate	—	23	29	—	3	118	288	461
4	female	—	1	9	—	—	4	23	37
	male	—	4	12	—	—	5	29	50
	indeterminate	—	3	12	—	—	14	111	140
5	female	—	—	7	—	—	—	1	8
	male	—	1	6	—	—	—	2	9
	indeterminate	—	—	2	—	—	3	11	16
Subtotal female		—	20	94	2	2	27	67	212
Subtotal male		1	62	112	1	—	19	100	295
Subtotal indeterminate		—	33	48	—	3	136	475	695
Total		1	115	254	3	5	182	642	1,202

the Apache, do not necessarily permit a resolution of biological affinity finer than Native American. Contextual affinity for these individuals was indeterminate and could not be used to narrow the determination any further than Native American.

We knew that the Yaqui were in the Tucson area when the cemetery was in use and that they were likely buried in the cemetery (O'Mack 2005, 2006), so we worked to obtain specific reference samples for finer comparisons. The Yaqui had also provided contextual information to assist in possible identification of Yaqui graves. The National Museum of Natural History once again provided comparative data for 40 individuals from Northern Mexico representing Yaqui. This data set consists of traditional, linear craniometric data (Buikstra and Ubelaker 1994) as well as three-dimensional coordinate data for more robust analyses. The dental data (n = 40) represent differences in the shape and structure of teeth useful for differentiating between populations (Scott and Turner 1997). Unfortunately, the genetic relatedness and biological similarities of the Yaqui to other groups within and around Tucson during this period do not permit a resolution of biological affinity finer than Native American. The inclusion of contextual information, however, did permit a finer level of resolution and supported the final assessment of Yaqui for a total of 5 individuals; two of these assessments were made on the basis of spatial and contextual relationships. In one case, we made the assessment of Yaqui because a child was buried with an adult identified as Yaqui, and in the other case, an infant was buried with a subadult assessed as Yaqui.

Final assessments identified a total of 36 individuals with a cultural affinity of Native American. This number pertains only to individuals assessed as generally Native American and does *not* include the 3 individuals assessed as Apache or the 5 individuals assessed as Yaqui. In other words, there were a grand total of 44 individuals of Native American ancestry, 8 of whom we could further identify to tribe.

Hispanics, Euroamericans, and African Americans

We identified individuals as Euroamerican, Hispanic, or African American in much the same manner that we identified Native Americans. As with the sample for Native Americans, additional comparative data on nineteenth-century Southwest Hispanics were collected from the Smithsonian

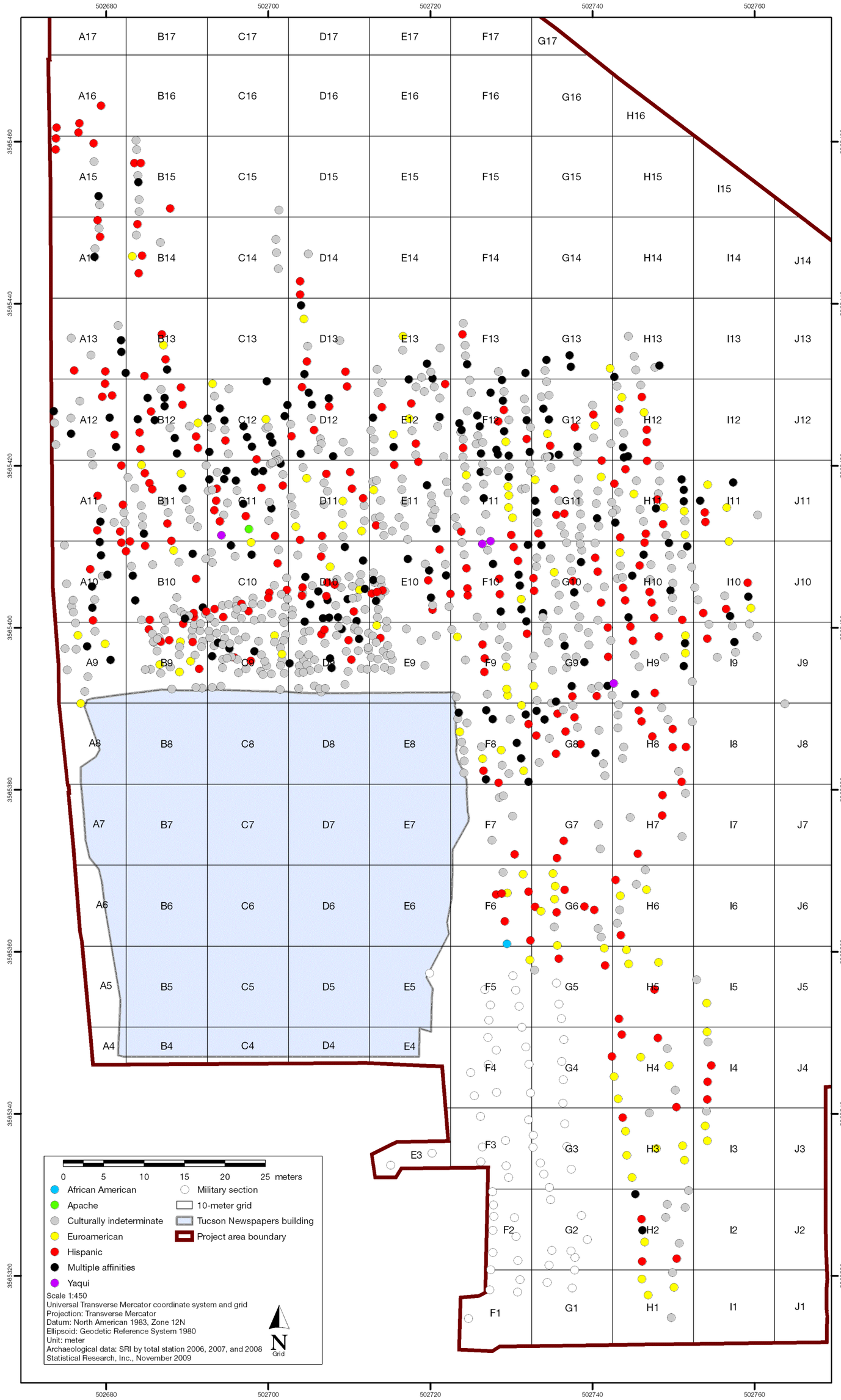


Figure 63. Spatial distribution of individuals recovered by SRI in the Joint Courts Complex Archaeological Project area, showing assigned cultural affinity.

Institution National Museum of Natural History and from modern Hispanic individuals from the Pima County Medical Examiner's Office (see Chapter 2, Volume 2 of this series). Comparisons were made to standard reference samples and determinations of likelihood of affinity were made (see Chapter 8, Volume 2 of this series).

Multiple Affinities

Every effort was made to assess the cultural affinity of all individuals recovered during excavations. As noted earlier, in instances where all three lines of evidence corresponded to the same group, a value of highly likely was attached to the classification for that individual. When missing, absent, or highly ambiguous data precluded a determination of cultural affinity at any level, the individual was classified as culturally indeterminate. However, if the various lines of evidence identified or suggested affinity to more than one group, the final designation of cultural affinity was multiple affinities.

Initially, we had a total of 182 individuals classified as having multiple affinities. To facilitate the repatriation process, we reevaluated these individuals. For cultural affinity designation, each line of evidence was weighed according to its ability to contribute to the designation of a specific group. To derive a cultural affinity designation for individuals initially assessed as having multiple affinities, biological affinity was compared with religious affinity.

Of the 182 individuals reported as having multiple affinities, 140 were Catholic, 2 were Euroamerican with no religious affinity, 1 was Euroamerican with multiple religious affinities, 3 were Euroamerican and Catholic, 1 was indeterminate, 28 were Native American with no religious affinity, 6 were Native American and Catholic, and 1 was Native American and Christian. Table 9 presents the distribution of these designations by age group and demonstrates the difficulties of assigning biological affinity to younger individuals. One individual (Grave Pit 7894/Burial Feature 19926), who was found to have multiple cultural affinities, was buried with a rosary, indicative of a Catholic affinity, as well as a shell button engraved with a Star of David pattern, suggestive of a possible Jewish affinity (see Chapter 6, Volume 2 of this series). The inclusion of the Star of David button with this individual may have been a gesture of clandestine faith or a cryptic symbol of kinship.

Relationships Among Individuals and Cemetery Areas

The spatial distribution of assigned affinities is presented in Figure 6.1. Examination of the spatial distribution of cultural affinities in this figure does not yield a series of neat patterns, but that was not expected. Nineteenth-century Tucson was a diverse place, and the cemetery is a reflection of that diversity. Overall, the cultural affinities map most notably shows Hispanic graves and graves with individuals having multiple affinities or whose affinities are culturally indeterminate. Tucson was a mostly Hispanic community, so that is hardly surprising, but it was also a community where many different people met and exchanged traditions. It was a major hub of trade and exchange at the time, so finding representations of multiple affinities is not surprising either. Additionally, it is important to remember that multiple affinities can include symbols of religion and other aspects of identity, as well as biology. Finally, the culturally indeterminate category includes many children and infants, who could not be identified for biological affinity.

An overall picture of the cemetery is useful, but a closer examination may also prove interesting. If we examine the cemetery by area, additional patterns may appear. Area 1 is the military section of the cemetery, but since these individuals were going to be treated as "military," we did not analyze them in detail as part of the cultural affinity work. Also, there was little left for most of these individuals since most had already been moved in 1884.

In Area 2, there were few graves with multiple affinities. This is striking, as they are prominent throughout the rest of the cemetery. Further, although there are many Hispanic graves in this section, there is also a significant proportion of Euroamerican graves; Area 2 is the only area where the number of Euroamerican graves is roughly equal to the number of Hispanic graves and also roughly equal to the number of culturally indeterminate graves. Area 2 is unique in other ways as well: there are few juveniles, and most of the individuals buried here are adult males. It is possible that this is a section of the cemetery that represents settlers who had recently migrated to Tucson, or the area may have some other meaning. It does have a sparser layout and is less diverse.

Area 3 was the largest and most diverse section of the cemetery. Whereas the entire cemetery has a north-south row structure, the rows here are distinct and sometimes seem to be organized east to west, as well as north to south. Most of the individuals with multiple affinities were found in this area, as were many of the Hispanics and all of the Yaqui. The eastern half of the area has many culturally indeterminate individuals, which may be due to the fact that there are many infants, children, and subadults in this portion. It is not clear whether parts of this section were reserved for children or if the large number of children represents the effects of epidemic disease (see Chapters 7 and 9).

Area 4 is the most spatially distinctive area of the cemetery, because it is densely packed with graves and is oriented at a different angle than the rest of the cemetery. The reasons for Area 4's orientation and density are explored

Table 9. Distribution of the Cultural Affinity Designations of the Multiple Affinities Group, According to Age

Designation	Fetal	Infant	Child	Subadult	Adult under 35	Adult 35 or over	Total
Catholic	10	94	26	—	3	7	140
Euroamerican	—	—	—	—	—	2	2
Euroamerican, multiple	—	—	—	—	—	1	1
Euroamerican, Catholic	—	—	1	1	1	—	3
Indeterminate	—	—	—	—	—	1	1
Native American	—	—	2	1	13	12	28
Native American, Catholic	—	—	—	1	3	2	6
Native American, Christian	—	—	—	—	—	1	1
Total	10	94	29	3	20	26	182

elsewhere, but it is interesting to note that the rationale for its difference is apparently not based on cultural affinity (or not on cultural affinity alone). A number of individuals within Area 4 are Hispanic, especially along the northern edge, but there are also a number of individuals with multiple affinities. Eight individuals are Euroamerican, but the vast majority are culturally indeterminate. Both males and females are represented in Area 4, and although a number of children and subadults are buried here, their number is not the basis of the culturally indeterminate categorization. The problem with Area 4 is that individuals were interred at such a high density that burials were intruded upon by other burials, and preservation in the area was not as good as in other areas. Further, a number of modern utility lines ran through Area 4, damaging a number of burials. The construction of the Tucson Newspapers building immediately south of Area 4, obviously destroying a significant portion of this area, also hindered preservation as well as interpretation.

Area 5 is the smallest area of the cemetery, but it is spatially separated from the rest. It could be the most recent portion of the cemetery, or it could be separated because of the nature of the individuals buried there. Once again, most individuals are Hispanic, a few have multiple affinities, one is Euroamerican, and the rest are culturally indeterminate. Area 5 seems like a small version of the rest of the cemetery; there is nothing particularly notable about it in terms of cultural affinity.

Identification Assessments for Individuals in the Military Section

Within the military section of the Alameda-Stone cemetery, a total of 64 grave pits inferred to have been part of the military section were discovered as part of this project. Most of these grave pits contained incomplete sets of human remains or burial-associated artifacts, such as clothing fasteners or coffin hardware, that were left behind after exhumation in 1884. Only 4 of the 64 grave pits contained a complete or nearly complete human skeleton. Extensive archival research before, during, and after excavations allowed collection of historical information on the identity and relative location of many of the individuals interred in the military section of the cemetery (Heilen et al. 2008; O'Mack 2005, 2006; see Appendixes E and F). No similar information was available for individuals interred in the civilian section.

Within the military section of the cemetery, most of the grave pits excavated during the project were located in the eastern half. Most grave pits historically recorded in the western half of the military section either were outside the project boundary or were disturbed by construction of the Tucson Newspapers Building in 1953.

Remarkably, we were able to spatially correlate historically mapped graves from an 1881 plat map of the military section with archaeologically discovered grave pits in the project area (Figure 64). Because of the availability of historical information on individuals interred in the military section of the cemetery and the close spatial correlation between historically recorded graves and archaeological grave pits in the military section, we made a good-faith effort to assess the identity of human remains recovered there (see Heilen et al. (2008). In order to assess each recovered grave feature for identity, we compared all of the contextual and osteological information for burials recovered in the military section to the historical information for each hypothesized correlation between a set of remains and a historically documented individual. A series of assessment categories—such as age, sex, military association, stature, cause of death—were developed to make direct and consistent comparisons between historical, contextual, and osteological information (Table 10). For each recovered

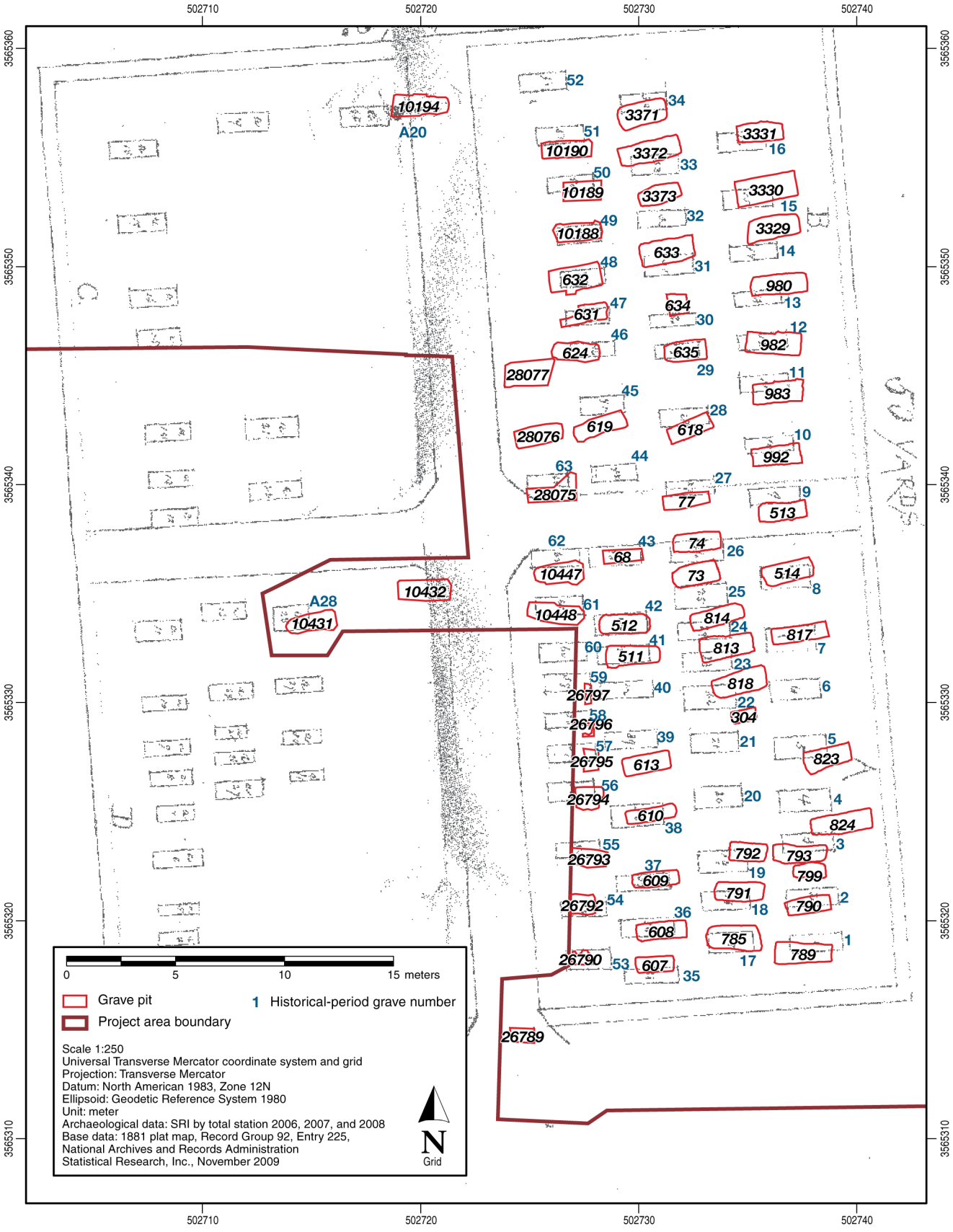


Figure 64. 1881 plat map overlay with Cemetery Area 1.

Table 10. Attributes Compared among the Three Lines of Evidence for Each Grave

Assessment Categories	Contextual	Historical	Osteological
Military association	military service buttons	rank; unit	
Dating the event	coffin hardware; evidence of professional undertaking; shoes	date of death	
Unique characteristics	unusual mortuary treatment	biographical information; physical appearance; enlistment location and date; previous occupation	individualizing characteristics
Age	grave size	age	age
Sex	artifacts; clothing; mortuary treatment	sex	sex
Stature	grave size	stature	stature
Medical	unusual mortuary treatment	medical history	pathology; antemortem trauma
Cause of death	ammunition; unusual mortuary treatment	reported cause of death	perimortem trauma
Ancestry	artifacts; clothing; mortuary treatment	nativity; name	biological ancestry
Disturbance	evidence of exhumation	evidence of exhumation	skeletal completeness; integrity

grave pit, we assessed the level of consistency between the three lines of evidence and determined whether a positive identification was possible.

One might assume that the wealth of information available for the military section would make it relatively easy to assess identity, if not positive identification. However, it is important to emphasize that positive identification rests firmly on the weight of unambiguous biological evidence—such as DNA or dental evidence—linking human remains with a known individual. Recall that most of the individuals buried in the military section of the cemetery were exhumed in 1884. In most cases, the graves excavated during the project in the military section had incomplete osteological remains and few or no burial-associated artifacts. In only a few cases was a complete set of remains recovered, and even in those cases, the correlation between contextual, osteological, and historical information was not strong enough for a positive identification (Heilen et al. 2008; see Appendix F).

Even though the spatial correlation between excavated and historically recorded graves is in many cases quite close, the osteological evidence was in each case insufficient to make a positive identification. The spatial correlation of excavated and historically documented graves was compelling in many cases from an archaeological and historical standpoint, but it was in no case compelling from an osteological perspective, because no positive correlation can be made with any historically named individual. Therefore, we were unable to positively identify the grave of any specific named individual buried in the military section of the cemetery. Although the failure to make these positive links was disappointing, the military took responsibility for the remains in the military section of the cemetery and reburied all of these individuals in a special section of the current military cemetery at Sierra Vista, Arizona, with an elaborate ceremony and full military honors in May 2009 (see Chapter 11 for a description and discussion of this ceremony).

We wish to highlight one individual repatriated with individuals from the military section of the cemetery. He was actually buried north of the northern edge of the military section. That individual was identified as a Buffalo Soldier (see Chapter 11). Both the artifacts found in the grave and the osteological data support this conclusion. The military agreed to include him with the rest of the military burials, and he was reburied with full honors. He was the only African American individual specifically identified in the cemetery.

Conclusions

Our approaches to the determination of cultural affinity and personal identity were both effective and rewarding. We were able to combine contextual, osteological, and historical evidence without assigning primacy to any particular evidence type. Information provided by descendant groups was integrated into the process, and the transparency of that process was critical. In each case, we could outline and demonstrate to all descendants and claimants how and why we made the decisions we made.

When our cultural affinity assessment process resulted in a determination of multiple affinities, we examined each individual as a team to determine whether or not we could make a more specific affinity determination. We had to be aware that our determinations were measuring different kinds of things

and were not really comparable—symbols of religion are not the same as biological determinations, which are not the same as census lists, etc. A Catholic can as easily be a Native American as a Euroamerican. Working out how to deal with these crosscutting categories was difficult and sometimes problematic. Nevertheless, we discussed each case of multiple affinities and worked through the issues.

For our military identification assessments, the archaeological and historical evidence for identification was compelling in many cases, but a positive identification could not be made due to a lack of sufficient biological evidence. Despite the inability to make a positive identification, the information developed for the assessment provided rich details on the identity of individuals buried in that section as well as demonstrated a strong correlation overall between what was recorded historically and what was found archaeologically in the military section.

The analysis of the affinity assessments demonstrates much of what we already know: Tucson in the nineteenth century was a culturally diverse town with a largely Hispanic population. Within the cemetery itself, we find that several of the areas have restricted access or differential distributions of burials. Subsequent chapters in this volume explore those differences in greater detail.

CHAPTER 7

Life, Death, and Dying in Southeastern Arizona, 1860–1880: Historical Accounts and Bioarchaeological Evidence

Michael Heilen, Joseph T. Hefner, and Mitchell A. Keur

Introduction

The osteological sample analyzed from the Alameda-Stone cemetery, consisting of skeletal materials from 1,386 individuals, represents a unique opportunity to examine the lives and deaths of the people of Tucson during a critical time in the history of the city and in the history of the American West. As discussed in other chapters, Tucson was a growing and diverse, multiethnic frontier settlement that had just become a part of the United States when the cemetery was first established. As the only public cemetery in Tucson at the time, the cemetery included the interments of somewhere between 1,800 and 2,100 individuals, including Hispanics, Euroamericans, Native Americans, and at least a few African Americans.

The people buried in the cemetery came from a wide variety of places and cultural backgrounds. Many had grown up in Tucson or in the surrounding region, but others had migrated from parts of Mexico, the United States, Canada, Europe, the Caribbean, South America, and the Middle East. In Tucson, they would have worked in a variety of occupations, including laborers, farmers, domestic workers, soldiers, seamstresses, laundry workers, miners, ranchers, merchants, and craftsmen. As the civilian section of the cemetery was closed before the arrival of the railroad and the military section was closed shortly after its arrival, the people who were buried in the cemetery had generally eaten foods that were grown in and around Tucson or could have been transported to the city via pack trains and wagon trains. Many would have shared a similar diet while in Tucson, with some variation according to taste and availability of foods, but they also would have experienced different diets earlier in their lives if they had lived previously in other areas.

As it had been since the presidio was founded in 1775, Tucson continued to be a center of military activity while the cemetery was in use. After Mexican soldiers left Tucson in 1856, Tucson was occupied briefly during the Civil War by Confederate soldiers until the town was reoccupied by Union soldiers in 1862. Shortly afterward, a supply depot and a post at Tucson were established. The post at Tucson came to be named Camp Lowell until the post was moved 7 miles away in 1873 and renamed Fort Lowell.

While the cemetery was in use, Tucson had a reputation as a town rife with vice and gun violence. The town had saloons and gambling halls, and saw many travelers and soldiers seeking supplies, rest, or entertainment, but it was also a town of families, devout Catholics, and responsible, upstanding citizens. The level of violence in Tucson may have been sensationalized to some degree, but travelers on the roads outside Tucson and isolated farms, ranches, and mines in the vicinity were highly vulnerable to raids, theft, property destruction, kidnapping, and murder, particularly at the hands of Apachean groups as well as bandits who roamed the countryside. Newspaper accounts of the time are filled with descriptions of such events, mostly occurring outside of town, but nonetheless having a profound effect on the psyche of Tucson inhabitants.

As a growing urban center, Tucson was subjected to many of the problems that faced other cities of the time. Poor sanitation and disease led to high rates of morbidity and mortality. Infants and young children were particularly affected by infectious disease. In general, the evidence examined in this chapter suggests that the population was relatively healthy in terms of diet and nutrition, although probably subjected to periods of nutritional stress. Trauma was quite common, but evidence for weapons trauma was surprisingly rare, suggesting that most traumas observed osteologically came from work-related stress or accidents. On the other hand, the population appears to have been heavily affected by infectious disease, which may have resulted from the combined effects of urbanization, poor sanitation, and the integration of disease environments

brought about by the development of large-scale transportation networks and the coalescence of people and goods in a single place from many parts of the globe.

In this chapter, we discuss historical, archaeological, and osteological evidence for diet and nutrition, disease, work, trauma, medical intervention, and demography. For each of these issues, we examine variation according to sex, age, biological affinity, and cemetery area in order to understand how different hazards and life conditions affected the population of Tucson. Where possible, we also compare the results to those from other cemeteries. These comparative cemeteries, and their reasons for selection, appear in the following section.

Comparative Cemetery Samples

An important component of examining and discussing a cemetery population is comparing that cemetery to other data sets with similar or dissimilar attributes. The professional literature contains descriptions of many cemeteries from history and prehistory. Although no cemetery is identical to the Alameda-Stone cemetery in every characteristic, the breadth and number of available comparative samples allows investigators to choose those reference samples that best permit comparison of a number of important attributes, often controlling for geographic area, contemporaneity, or demographic consistency. The samples selected for comparison include Voegtly Cemetery; Freedman's Cemetery; the cemeteries associated with the Mission Nuestra Señora del Refugio, San Agustín de Tucson, and the Tucson Presidio; the Secaucus Potter's Field; and the New York African Burial Ground. Each of these comparatives sites is described below. Elsewhere in this report, investigators make use of a number of other comparative sites. The analyses involving these sites are relatively narrow in focus and do not warrant mention in the present discussion. The reader is encouraged to review the studies described elsewhere in this report for a more complete picture of comparisons between the Alameda-Stone cemetery and other cemeteries.

Voegtly Cemetery

The cemetery associated with the Voegtly Evangelical Lutheran Church of Pittsburgh, Pennsylvania, was used from 1833 to 1861. In 1987, a proposed highway expansion near the cemetery led to large-scale survey and excavation efforts (Ubelaker and Landers 2003:1). A total of 724 sets of human remains was exhumed as part of the excavation project and later analyzed by Douglas Ubelaker and colleagues as the Smithsonian Institution.

Death records were maintained by the German Evangelical United Church and made available to investigators at the Smithsonian Institution. These records led to a detailed demographic analysis of the Voegtly Cemetery individuals, including childhood mortality, patterns of migration, professions, marriage patterns, causes of death, time intervals between death and interment, and burial-sample profiles (Ubelaker and Jones 2003:20–24). Investigators reported that the skeletal observations were generally consistent with inferences drawn from the death records (Ubelaker and Jones 2003:25).

The osteological analyses reported by Ubelaker and Jones (2003) include detailed examinations of skeletal and dental pathology and these data were compared with observations of disease distribution and manifestation among the individuals from the Alameda-Stone cemetery. Comparisons between the Voegtly Cemetery and Alameda-Stone cemetery samples were possible for a number of observations, such as dental and skeletal markers of infection (including periosteal new bone growth); indicators of nutrition stress (cribra orbitalia and dental enamel hypoplasias); evidence of dietary habits (as interpreted by frequencies of dental caries); stature; and skeletal indicators of behaviors (degenerative joint disease and skeletal trauma).

Freedman's Cemetery

Freedman's Cemetery was a historical-period African American cemetery just north of Dallas, Texas, in use from around 1869 until around 1907. Because of proposed highway expansion, the 0.95-acre cemetery was excavated between 1990 and 1994 (Condon et al. 1998:vii, 1). Less than one-quarter of the entire cemetery was excavated during these efforts. Nevertheless, 1,140 individuals were exhumed from 1,157 burials (17 coffins were empty). The set of excavated remains included 653 adult individuals (278 females, 288 males, and 87 adults of indeterminate sex), and 487 juveniles (Condon et al. 1998:v).

The skeletal data set was evaluated by researchers for a number of attributes, including indicators of biomechanical and nutritional stress, dental health, infectious disease, and trauma. The data collected from Freedman's Cemetery was of significant use for comparison to the Alameda-Stone cemetery sample. Although the individuals recovered from Freedman's Cemetery represent an ethnic composition unlike that seen in the Alameda-Stone sample, and the period of use for Freedman's Cemetery was more recent than that of Alameda-Stone cemetery, comparisons between these two sites are important. Both sites feature large sample sizes and closeness to urban centers. These characteristics are uncommon among skeletal samples, so direct comparison between these large, downtown cemeteries provided useful insight into the sites as distinct units of observation, and not simply collections of individuals.

Skeletal and dental observations made it possible to compare the two sites along a number of different lines of inquiry. Specifically, skeletal evidence allowed comparison of the samples based on infection (periosteal new bone growth and treponemal infections), biomechanical stress (arthritis), nutritional stress (cribra orbitalia and porotic hyperostosis), stature, and skeletal trauma. Dental data from both sites permitted comparison of frequencies of carious lesions and enamel hypoplasias.

Mission Nuestra Señora del Refugio (41RF1)

The Catholic cemetery associated with the Mission Nuestra Señora del Refugio was excavated in 1999 to prepare the area for planned highway improvement (Meadows-Jantz et al. 2001). Excavation efforts were performed by the Texas Department of Transportation in conjunction with the Center for Archaeological Research of the University of Texas, San Antonio. The recovered skeletal sample included 177 individuals from 165 burials. Mission documents and the 1810 census were available to investigators for comparison to the examined skeletal material.

A suite of osteological analyses were performed by the researchers. These data from the Refugio Mission provided useful comparisons to the Alameda-Stone cemetery sample on a number of lines of inquiry, including adult stature, evidence of skeletal infection (periosteal new bone growth and treponemal infections), nutritional deficiencies (cribra orbitalia and porotic hyperostosis), and degenerative joint disease, suggesting activity patterns. Additionally, comparisons between the Refugio Mission and Alameda-Stone samples were performed by evaluating dental conditions, including frequencies of carious lesions and enamel hypoplasias.

San Agustín Mission

San Agustín Mission was located along the west bank of the Santa Cruz River, near what would later become the city of Tucson. The mission was established in the late seventeenth century, associated with a Pima Indian village (see Chapter 4). Although the majority of individuals associated with the mission were Native American, several individuals of Spanish descent were also in association, and Christian burial practices were observed (Dayhuff 2002:17–18). Between 1949 and 1950, approximately 83 individuals were recovered from the mission site by investigators from the University of Arizona (Dayhuff 2002:21).

Subsequent analyses of the recovered skeletal remains examined adaptation strategies and levels of success for two distinct populations: a native population responding to altered lifeways and a European population adjusting to a new environment (Dayhuff 2002). These studies were of considerable comparative importance to the Alameda-Stone cemetery sample. First, and most directly, the San Agustín Mission and the Alameda-Stone cemeteries shared identical geographic attributes. Second, the effects of a population in change were shared by both cemetery populations.

Skeletal observations of the San Agustín Mission cemetery sample were compared to those of the Alameda-Stone cemetery along lines of diet, as interpreted by frequencies of carious lesions, indicators of nutritional deficiency (cribra orbitalia and porotic hyperostosis), and dental and skeletal markers of disease (enamel defects and periosteal new bone growth). Behavioral indicators of activity (degenerative joint disease) and violence (skeletal trauma) were also compared to the Alameda-Stone cemetery sample.

Tucson Presidio

The Tucson Presidio shared many characteristics with the San Agustín Mission described above. Also established in the late seventeenth century, and located across the Santa Cruz River from the mission, the Tucson Presidio housed Spanish soldiers and their families, as well as other immigrants from a variety of origins (Dayhuff 2002:15). Many sets of skeletal remains have been recovered from excavations at the Tucson Presidio since efforts by the Arizona State Museum began in 1966. Although many sets of remains have been repatriated to Native American and Hispanic organizations, as of 2002, the Arizona State Museum has 104 burials in curation.

The skeletal examinations of recovered individuals from the Tucson Presidio, along with those recovered from the San Agustín Mission, help to provide a clearer picture of life in the region before the city of Tucson was formally established. Again, these examinations are comparable to those of the Alameda-Stone cemetery in both geographic location, as well as a population adapting to new environments and interactions.

As with the samples from San Agustín Mission, skeletal examinations from the Tucson Presidio were analyzed against those from the Alameda-Stone cemetery along lines of dental health (frequency of carious lesions and enamel defects), nutrition and disease (cribra orbitalia, porotic hyperostosis, and periosteal new bone growth), activity (degenerative joint disease), and injury (skeletal trauma).

Secaucus Potter's Field

The Secaucus Potter's Field project began with proposed construction of the Secaucus Interchange addition to the New Jersey Turnpike. Included in the construction area was a section of an unmarked burial ground, known as "Potter's Field" (The Louis Berger Group, Inc. 2005:1-1). Historical documentation indicated that the Secaucus Potter's Field

was one of three burial grounds associated with the former institutional complex for Hudson County. The period of use for the burial grounds, including the Potter's Field, was from 1880 until 1962. The purpose of the Secaucus Potter's Field project was to discover, exhume, analyze, and relocate all burials potentially impacted by construction of the interchange.

A total of 4,571 individuals was removed during the Secaucus Potter's Field project. An evolving sampling strategy led to a subset of 409 individuals to receive comprehensive skeletal analyses. The Secaucus Potter's Field postdates the Alameda-Stone cemetery, and the two are geographically distinct. Nevertheless, the size and late age of the skeletal sample from the Secaucus Potter's Field offered a large comparative set of skeletal attributes against which biological information from Alameda-Stone could be compared.

The skeletal data for the Secaucus Potter's Field were compared to those from the Alameda-Stone cemetery for adult stature and skeletal indicators of behavior, including degenerative joint disease and skeletal trauma. Data for health and disease related to individuals from the Secaucus Potter's Field were available but not reported in a fashion appropriate for comparison.

New York African Burial Ground

In 1991, construction work revealed skeletal remains below development and landfill in lower Manhattan. The New York African Burial Ground project led to the exhumation of 419 individuals. Records indicate that the area outside the New Amsterdam settlement included a burial ground for both free and enslaved African individuals. The burial ground was in use during the seventeenth and eighteenth centuries, ultimately closing in 1794 (Blakey and Rankin-Hill 2009).

The New York African Burial Ground is similar to the Alameda-Stone cemetery in two important ways. First, the cemetery population of more than 400 individuals of both sexes and varying ages offers a diverse sample with which to compare biological attributes. Second, and more importantly, the New York African Burial Ground was located in association with an urban center and was ultimately overtaken by development. Like the Alameda-Stone cemetery, the New York African Burial Ground was first overwhelmed by development, and then forgotten from the collective consciousness. Its rediscovery led to a renewed interest in reconstructing the lifeways of a historically marginalized group.

The New York African Burial Ground does differ from the Alameda-Stone cemetery in location and time of use; the New York African Burial Ground is on the east coast of the United States, and it predates the Alameda-Stone cemetery by more than a half century. Furthermore, the New York African Burial Ground was composed primarily of African-descended individuals, whereas individuals in the Alameda-Stone cemetery derived from a wider range of ancestries and few were African American. Nevertheless, the scope of biological and mortuary information collected from the New York African Burial Ground established it as a rich data set for comparison to the Alameda-Stone cemetery. Skeletal and dental indicators of diet (caries, cribra orbitalia, and porotic hyperostosis) and disease (enamel hypoplasias, periosteal new bone, and treponemal infection) were available for comparison between the two cemeteries. Additionally, the New York African Burial Ground and Alameda-Stone cemetery were evaluated for skeletal markers of behavior, such as joint disease and skeletal trauma.

Diet and Nutrition

Prior to the arrival of the Spanish missionaries, O'odham living in the vicinity of Tucson cultivated fields along the Santa Cruz River and at springs; they also practiced *ak chin* (or runoff) agriculture on alluvial fans at arroyo mouths and other locations (Nabhan 1983). Common cultivars were corn, beans, and squash, but desert plant and animal foods were also an important component of the local diet (Rea 1997; Sheridan 1988). Saguaro fruits, mesquite pods, prickly pear pads and fruits, and cholla buds, for instance, were major components of the diet of the Northern Piman speakers who we today refer to as the Tohono O'odham. These foods were also incorporated into the diets of Akimel O'odham, who relied to a greater degree on agricultural foodstuffs (Castetter and Bell 1942:57). Several hundred other wild foods were available as well, and at least 40 of them were regularly consumed (Felger and Nabhan 1976). Artiodactyls, including mule deer, bighorn sheep, and pronghorn antelope, were hunted for food and materials, but small mammals and birds were also a major source of protein (Szuter 1984, 1991).

Early Hispanic missionaries brought with them Old World crops and planting techniques, livestock, and metal tools. Shortly after their arrival, the missionaries:

> quickly doubled the number of cultigens available to the Pimans [O'odham] by offering them seed or nursery stock of grains, vegetables, fruit trees, and herbs foreign to the Sonoran Desert. Such plants included chickpeas (garbanzos), lentils, cabbage, onions, garlic, leeks, cowpeas, sugarcane, mustard, mint, anise, pepper, melons, grapes, apples, peaches, quinces, plums, pomegranates, apricots, and figs [Sheridan 1988:157; see also Officer 1987:15].

Because none of the New World cultivars grown locally could survive hard frosts, the introduction of winter wheat was transformative, allowing O'odham to farm year-round and "produce perhaps twice as much food from the same fields" (Sheridan 1988:158). By 1744, the Jesuit missionary Jacobo Sedelmayr found that some Akimel O'odham living along the Gila River, far to the north of the Spanish missionary efforts, were already cultivating wheat that they must have obtained from their southern neighbors.

Similarly, O'odham had begun to acquire some European livestock prior to the arrival of missionaries, but the introduction of European livestock was accelerated by the arrival of early missionaries who brought herds of cattle, horses, sheep, and goats to O'odham settlements (Sheridan 1988:160). These, too, became important components of O'odham diets, and by the early nineteenth century, Kohatk (an O'odham dialect group) were regularly acquiring livestock from Mexico and trading them to Akimel O'odham who lived farther north along the Gila River. Sheridan (1988:161) has argued that the raising and trading of livestock led to the gradual incorporation of missionized O'odham "into the regional market economy, a process that eventually resulted in the assimilation of many of them into Mexican mestizo society itself." The raiding of settlements for livestock, provisions, and personnel also became an important component of Apache subsistence and land use.

The cuisine of Tucson's Hispanic residents during the early eighteenth and nineteenth centuries reflected a combination of Native American and Hispanic foods and foodways. Common dishes among Hispanic frontiersman were based in traditional Native American cuisine and included *posole* (maize stew with meat and seasonings), *piñole* (ground, toasted maize, sometimes used as a base for a beverage), *atole* (a sweet, maize-based beverage, sometimes made with chocolate or fruit), and tortillas (Herring 2009; Officer 1987:43). Evidence from faunal remains at Tumacácori suggests that residents often prepared boiled stews and soups with meat. Imported nonindigenous ceramics were used for food consumption and to a lesser degree, storage, and indigenous ceramics were used for "food preparation, consumption, and storage" (Fratt 1981:191).

Although sugarcane production began in Mexico over 450 years ago, sugar was primarily exported to Europe and was not widely available to most people living in the American Southwest during and prior to the period the cemetery was in use. Beets, used commonly as a sweetener in other areas, were not available early in the nineteenth century, but they became available while the cemetery was in use (Hamnett 1999; Harveson et al. 2009; Palmer 2005). *Piloncillo*, a hardened brown cone of boiled and evaporated sugarcane juice, was probably the most common form of sweetener used by Tucson residents during the nineteenth century.

Archaeological excavations at mission sites, presidios, and a farmstead in southern Arizona provide some further perspective on the kinds of foods available to people living in southern Arizona during the eighteenth and nineteenth centuries, as well as some insight into cuisine, relative contributions to the diet of plant and animal foods, and butchering techniques. For the most part, these investigations reveal a heavy reliance on domesticated animals, particularly cattle, for animal foods; a variable contribution of agricultural foods to the diet; marrow extraction and tallow production at some sites; and the use of metal cleavers and axes for butchering.

At Tubac, Tumacácori, San Xavier del Bac, Tucson Presidio, and San Agustín del Tucson, cattle (*Bos taurus*) were the most commonly butchered animals. Domesticated sheep (*Ovis aries*), pig (*Sus scrofa*), and domesticated fowl, such as chicken (*Gallus gallus*), were also relatively common. Other domesticated animals found in faunal collections included horse or donkey (*Equus* sp.) and goat (*Capra hircus*). Wild animals such as jackrabbits, cottontail rabbits, collared peccary, deer, pronghorn antelope, and some fish and bivalve mollusks were consumed at eighteenth- and nineteenth-century missions and presidios in southern Arizona, but to varying degrees and much less often than domesticated animals (Diehl et al. 2005; Fratt 1981; Hewitt 1975; Olsen 1974; Pavao-Zuckerman and LaMotta 2007; Shenk and Teague 1975). Excavations at the Tucson Presidio, for instance, indicate that nearly all meat came from domesticated animals, including chicken, pig, sheep, and cattle, with cattle being the most heavily relied on source of meat (Diehl et al. 2005:191). Wild game animals were not present in faunal collections from the Tucson Presidio excavations, which could indicate an almost exclusive focus on domesticated animals for animal food for some Tucson residents of the eighteenth and early nineteenth centuries.

At the San Agustín Mission site, age at death data indicated that animals were killed by the time they had reached full body size but had not yet reached full adult maturity, reflecting a focus on the use of domesticated animals for meat. Cut marks on hind feet, forelegs, and mandibles suggested that hides were removed for processing, and the fragmentary nature of the collection suggested that bones were processed for tallow, which could have been used in "the manufacture of food-grade greases, soaps, candles, and lubricants" (Pavao-Zuckerman and LaMotta 2007:263).

Many missions and presidios relied on a combination of ranching and farming to meet subsistence needs, occasionally selling surpluses to fund construction activities. At the Tubac Presidio, however, farming was minimal despite the availability of adequate and irrigable river-bottom farmland. Archaeological investigation of the Tubac Presidio resulted in the discovery of few macrobotanical food remains, consisting of only a few peach pits and corncobs (Shenk and Teague 1975:154). To meet their subsistence

needs, "troopers of the Spanish garrison [at Tubac] were supplied with quantities of corn, wheat, chile, beef, mutton, and salted meat" (Shenk and Teague 1975:153). Because of the abundance of faunal remains from domesticated livestock and the rarity of botanical remains, Shenk and Teague (1975:155, 176–178) concluded that the subsistence economy at Tubac was devoted mostly to ranching and to farming to a lesser extent. They suggested that peaceful O'odham and Apache living near the presidio may have also had similar diets. At Tumacácori, by contrast, farming was important. Botanical remains showed that wheat, corn, beans, squash, melons, gourds, lentils, and peaches were consumed, and likely grown, at the mission (Fratt 1981:190–191).

By the time American argonauts began traveling through Tucson on their way to California during the California gold rush, a wide diversity of foods was available to Tucson residents. Diehl et al. (2005, Table 8.2) compiled the plant and animal foods observed by Americans visiting Tucson between 1846 and 1858, just prior to the opening of the Alameda-Stone cemetery. Accounts reflect the combined legacy of Spanish and Native American foodways, mentioning wheat, fruit, quince, cornmeal, tobacco, bread, tortillas, pumpkins, peppers, sugar, beans, lentils, apples, pears, peaches, grapes, onions, rice, green pepper, squash, green beans, almonds, peaches, peas, gourds, melons, cotton, tea, mescal, hogs, fowls, donkey, milk, cows, horses, burros, pork, beef cattle, fish, tortoises, chicken, and eggs. Wheat was quite common in Tucson and was apparently associated with the higher classes (Diehl et al. 2005:182–183; Pilcher 1988). Although wheat was a major crop for the Tucson area during the 1800s, only one flour mill was in operation during the mid-nineteenth century (Sheridan 1986). Most of the harvested wheat likely went to other areas or to more-affluent groups living in Tucson. Tortillas, which would have been made with corn ground with manos and metates, were the most frequently consumed bread in Tucson (Pilcher 2005).

While the cemetery was in use, a system of fields fed by three main canals (or *acequias*) was maintained to the west of Tucson, along the Santa Cruz River, where Tucson's farmers grew barley, wheat, vegetables, and fruits. Many households may have also had gardens, where they grew melons, beans, onion, chili peppers, herbs, and other produce (Thiel 2005:83). For instance, during the 1870s Cirilo Solano León, a son of Francisco León, owned a ranch on the north side of Tucson (along Silverbell Road) where he grew "wheat, barley, melons, cantaloupes, vegetables, and later, cotton" (Thiel 2005:41). Most fields, some of which had been in operation for decades by the time the Alameda-Stone cemetery had opened, were held by Tucson's Hispanic residents. These fields had originally been used by Native American farmers before they were transferred to soldiers of the presidio. In 1862, a few fields were held by recent Anglo-American arrivals, including Mark Aldrich, W. S. Oury, and Fred Neville (Thiel 2005:82).

In addition to planting in fields watered by the Santa Cruz River, Tucson residents planted crops at Tres Alamos. The Spanish military established an agricultural colony there during the early nineteenth century, but the location was soon abandoned because of Apache hostilities (Officer 1987:89). A picket post was established at Tres Alamos in 1867 by the U.S. military to supply the post at Tucson with agricultural foodstuffs and was "settled by four American and several Mexican famers, who raise corn, beans, and melons on the bottom lands, irrigating by means of acequias" (Billings 1870:464). Residents also raised livestock and poultry (Diehl et al. 2005). The U.S. military also brought in goods on wagon and pack trains to supply the depot at Tucson, which in turn supplied other posts in the region.

The same animals commonly consumed at Spanish Colonial and Mexican period presidios and missions continued to be consumed at farmsteads and ranches after the Gadsden Purchase. Analysis of excavated animal bones from deposits at the León family farmstead dating from the 1840s through the 1860s included artiodactyl, horse, cattle, pig, sheep, ground squirrel, and chicken, with a predominance of cattle bone. As at earlier missions and presidios, butchering techniques suggest that chopping with cleavers and axes was most common during this time. Saw cuts, which would reflect the purchase of meat from butcher's shops, did not become prevalent until the 1890s at the farmstead (Diehl et al. 2005:192).

As more merchandise was imported into Tucson on pack mules and wagon trains during the 1860s and 1870s, canned foods also entered the diet. The cost of imported foods was quite high because of shipping costs. The Acting Assistant Surgeon at the military hospital in Tucson, Henry Durant, reported that, "the cost of living in Tucson is very high in consequence of the rate of freight. Dry Goods and Groceries are brought here from San Francisco—by steamer to Fort Yuma—thence by mule teams. Retail prices are double, and treble those of the Eastern States" (National Archives and Records Administration, Record Group 94, Entry 547, Book 13:73).

Seafood became common only after the arrival of the railroad in 1880, and the few fresh fish or molluscs that could be obtained in Santa Cruz River do not appear to have been targeted for consumption, at least by the Euroamerican settlers (Diehl et al. 2005:193). Dried shrimp and canned oysters from Guaymas, Mexico, were occasionally seen in town, but fresh oysters were not seen until they could be shipped on ice via the railroad (Bourke 1891:59). In 1869, Assistant Surgeon Henry Durant reported that

> The diet issued to the men is of good quality, and sufficient quantity, but greatly needs variety, and the addition of a proper proportion of vegetable. As at present arranged, the men receive fresh Beef Seven days, and Salt Pork, three days. The beef is always poor, lean and tough, and badly butchered.

> Mutton could, and ought to be occasionally substituted for the beef, but the commissary does not include it in the Contract for Supplies.
>
> Fish is of course, unobtainable, and a continuous diet of beef and pork becomes after a while, to say the least, irksome. All the articles of diet which are issued are to be sure, wholesome and nutritious, but the appetite craves for variety, and the most delicious foods become unpalatable, if too long continued without change.
>
> The Company receives a few vegetables such as beets and onions, which are purchased from the Company fund, about twice a week and which barely suffice to ward off scorbulic symptoms. Pickles are not issued by the commissary as a ration, but are sold to the men on order from the Company Commander.
>
> There is no Company Garden–one was undertaken, but proved a failure on account of the distance from Camp, and the difficulty in irrigating the soil, without which cultivation is impossible [National Archives and Records Administration, Record Group 94, Entry 547, Book 13:13].

While the Alameda-Stone cemetery was in use, visitors to Tucson would often eat at one of a few restaurants. Many would have eaten at the Shoo Fly restaurant, which offered meals, paid in advance, of "chile at every meal, bacon, chicken, mutton, or jerked beef made palatable in savory stews and hashes. Eggs, frijoles, beets, tomatoes, and lettuce were regularly served" (Purcell 1969:42). Bourke (1891:58–59) noted, "beef was not always easy to procure, but there was no lack of bacon, chicken, mutton, and kid meat." The Oriental Restaurant was opened at the corner of Meyer and Congress Streets in 1879; an ice cream "saloon" was opened the same year (Purcell 1969:43). There was also apparently a restaurant called Won Tai's Celestial Restaurant, which Purcell (1969:44) indicates was open as early as 1874. Outside of Tucson, travelers would sometimes eat at places like Rancho Punto de Agua, where from 1855 to 1861, the Contzen family provided "a good meal of ham and eggs, butter and milk" (cited in McGuire 1979:7). Hogs from Pete Kitchen's ranch south of Tucson, although often riddled with Apache projectiles, were also a prized commodity in Tucson.

By the time the civilian section of the Alameda-Stone cemetery was closed, an 1875 U.S. Government circular noted that farms along the Santa Cruz River and the San Pedro River continued to supply Tucson with a wide variety of crops. Crops noted in 1875 as being successfully grown in the vicinity of Tucson included wheat, barley, "pease, beans, radishes, carrots, beets, turnips, okra, egg-plant, cucumbers, squashes, melon," and some exceptionally fine tomatoes (Billings 1875:540). The circular also considered a wide variety of wild birds, artiodactyls, and leporids an abundant source of food.

Despite the wide variety of foods noted in historical accounts, fresh vegetables, meat, dairy, and other food products were not always available. Especially during the Spanish Colonial and Mexican periods, Apache raids repeatedly destroyed agricultural fields and storage areas and severely depleted livestock holdings. During especially hostile times, residents were afraid to work in their fields or to leave livestock unattended. Residents would work their fields and pasture their animals hesitantly, with an eye always on the horizon and their weapons ready, and sometimes accompanied by a military escort. Animals were often brought into corrals at night, especially moonlit ones (Herring 2009; Sheridan 1986).

Food shortages continued to be a problem at times while the cemetery was in use. When Jouvenceau first arrived in Tucson in 1867 as a Catholic missionary, for instance, there were few food supplies for him to stock up on and he was not permitted to buy food supplies from the U.S. Army depot, due to a lack of precedent for such purchases (Bourke 1891:182–183). The Surgeon General's office reported in 1870 that butter, eggs, chickens, and fresh vegetables were available in town, but scarce. As a result, soldiers could purchase a supply of canned vegetables, fruits, and jellies from the commissary upon permission (Billings 1870:464).

Together, these data indicate that a wide variety of fruits, vegetables, meats, and dairy products were available to Tucson residents, but they were scarce at times because of seasonal variation in availability, raiding activities, and other factors. In the case of the U.S. military, limited supply chains appear to have also led to food shortages. Although there were cultural differences in cuisine that presumably could have had positive or negative nutritional consequences, it appears that many Tucson residents may have been able to obtain a fairly balanced diet and that recent immigrants to Tucson shared a similar diet with the local community, although wheat products and some imported foods may have had a more restricted distribution.

Of course, not all of the people buried in the Alameda-Stone cemetery would have had most of their meals during their lifetime in Tucson or its vicinity. Many of the recent migrants to Tucson would have brought with them the cumulative effects of any nutritional or functional advantages or deficits they acquired in other areas, in addition to their own culinary preferences. U.S. military diets during the Civil War are generally considered to have been poor (Sledzik and Sandberg 2002:186), and people coming from large transportation centers in other areas of the country would have had greater access to sugar and highly processed flours. We can expect these aspects of diet to have had largely negative health consequences.

Osteological Indicators of Diet

The following section explores the dental and skeletal indicators of diet and nutrition identified in the human skeletal remains recovered from the Alameda-Stone cemetery. First, we categorize dental evidence of diet and nutritional deficiencies, including dental caries, abscesses, and antemortem tooth loss. Next, we explore skeletal indicators of general health, with particular emphasis on evidence of malnourishment. Finally, we explore the distribution of these diseases within the cemetery and their differential impact on various segments of the Tucson community during the nineteenth century.

Dental Indications

One method often implemented to infer information about a population's diet is the analysis of adult and juvenile dentition, primarily the assessment of the frequency and severity of dental caries, abscesses, and antemortem tooth loss.

Dental Caries

Dental caries, or more informally tooth decay or cavities, is caused by specific types of acid-producing bacteria (i.e., *Streptococcus mutans* and *Lactobacillus*), which, in the presence of fermentable carbohydrates such as sugars, break down and destroy a tooth's enamel (Hamada 2002; Harris 1966; Hartles 1967). The presentation of dental caries is highly variable, appearing as little more than a small, chalky area on the tooth's surface to a severe and large cavitation (Hillson 2001). Although the manifestation of dental caries is widely varied, caries formation and development is well understood. The acidic-sensitive mineral content of teeth is in a constant state of demineralization and remineralization, responding to changing pH levels in saliva (Hillson 2001). Tooth decay occurs when demineralization proceeds faster than remineralization, such as when complex sugars remain in the mouth and on the tooth surface for an extended period of time (Ismail 1997).

Dental Abscesses

Dental abscesses are the result of pus collection from a bacterial infection in the pulp chamber (the center) of a tooth. The pain and discomfort from a dental abscess is commonly referred to as a toothache. A dental abscess is a complication of tooth decay or dental caries (Cohen and Armelagos 1984; Hamada 2002; Harris 1966; Hillson 2001). Abscesses can also result from trauma to the tooth, such as when a tooth is broken or chipped. Any opening in the tooth enamel permits bacteria to infiltrate the pulp chamber and, if untreated, the subsequent infection eventually travels down the root forming an abscess in the periapical region, finally spreading from the root of the tooth to the bone in the surrounding alveolar area (Dias and Tayles 1997). Increased pressure within the tooth socket from the accumulation of pus will eventually result in alveolar resorption (periodontal disease) and, finally tooth loss (Hamada 2002; Harris 1966; Hillson 2001).

Antemortem Tooth Loss

Antemortem tooth loss refers to teeth that are lost during an individual's life. Extraction of a diseased or infected tooth is a common treatment for a variety of dental problems, such as caries and abscesses. As we previously mentioned, dental caries and abscesses also result in alveolar bone loss which leads to the eventual loss of the tooth that bone is supporting. In fact, prior to the widespread use of antibiotics, the extraction of a diseased tooth was often carried out to prevent the spread of infection to other parts of the body—a life-threatening scenario at any age (Milner and Larsen 1991; Molnar 1972).

Dental Wear

Dental wear, or dental attrition, is the natural process of wearing down the biting and grinding surfaces of teeth through the consumption of grit-laden foods or habitual activities, such as pipe smoking. As a result, the incidence of dental wear can provide insight into the diet of a population (Indriati and Buikstra 2001; Turner and Machado 1983). For example, the extensive loss of tooth enamel and a subsequent reduction in the height of the tooth crown from heavy wear is a good indicator of an abrasive diet, such as may occur with the consumption of foods processed with a stone mano and metate. Other forms of dental wear are associated with habitual activities, like the grooves created on the anterior teeth from gripping a pipe or transverse grooves on the occlusal surfaces of teeth associated with basket-making (Indriati and Buikstra 2001; Larsen 1985; Milner and Larsen 1991; Molnar 1971; 1972; Turner and Machado 1983).

Dental Indicators of Diet and Nutrition within the Alameda-Stone Sample

Few dental variables related to diet were significantly different between males and females, although there were

consistent differences in some variables between sexes as well as highly significant differences between males and females in the incidence and severity of dental wear. No significant differences in the expression of dental abscesses, antemortem tooth loss, or caries rates between men and women were noted, but caries were more frequent among men, which is not generally the case (Larsen et al. 1991). Throughout the cemetery, caries rates were consistently higher for males in comparison to females. Antemortem tooth loss and abscessing were also slightly higher for males. Although not statistically significant, the differences between males and females in caries rates, antemortem tooth loss, and abscessing are intriguing and may have resulted from a significantly higher incidence of tooth wear among males. Male teeth were more frequently and more severely worn than female teeth, possibly indicating differences in diet between sexes. In addition, male teeth were more often chipped, which in some cases can be correlated with greater meat consumption (Lincoln-Babb 1995, 2001; Schmucker 1985; Turner and Cadien 1969). Chipped teeth were predominantly anterior teeth, particularly incisors, which may suggest that teeth were used for gripping and clenching objects during daily activities.

Differences in dental pathologies related to diet were also observed between biological groups. Native Americans and Hispanics in the Alameda-Stone sample were far more likely than their Euroamerican counterparts to suffer from two or more dental abscesses. Native Americans in the Alameda-Stone sample also experienced the heaviest dental wear, followed by Hispanics and Euroamericans. By contrast, Native Americans experienced the lowest rate of antemortem tooth loss, followed by Euroamericans, the single African American, and Hispanics. Despite differences in dental wear, dental abscesses, and antemortem tooth loss, caries rates were very similar for Hispanics, Native Americans, and individuals of indeterminate biological affinity, and were only slightly lower for Euroamericans, suggesting possible similarity in diets or at least in the amount of processed carbohydrates consumed. Although differences in the frequency of caries were not significantly distributed between biological groups, the distribution of caries was similar to antemortem tooth loss—Native Americans suffered this condition less than both Euroamericans and Hispanics. The African American male had the highest caries rate, but this has no comparative significance, as this was the only individual in the dental sample that represented that affinity.

The lower caries rate for Euroamericans was somewhat unexpected because at least some Euroamericans may have migrated from places where more highly cariogenic diets were the norm, but it could also be the case that many Euroamericans had come from rural areas or economic or cultural backgrounds where processed sugars and highly refined flours were not widely available. The availability of dental care may have also played a role in these patterns, if Euroamericans suffered less antemortem tooth loss than Hispanics and fewer dental abscesses than both Native Americans and Hispanics because they had greater access to professional dental care. The low incidence of antemortem tooth loss and high rate of dental abscesses among Native Americans could also reflect differences in access to dental care, because pulling teeth was a common treatment for diseased teeth at the time. In other words, Native Americans may have had fewer teeth pulled, resulting in greater numbers of abscesses resulting from caries.

Differences in the distribution of dental pathologies associated with diet and nutrition were also observed between cemetery areas (see Chapter 13, Volume 2 of this series,). Cemetery Area 4 presented higher than expected antemortem tooth loss, and lower than expected antemortem tooth loss was observed in Cemetery Area 5. Caries frequencies were also significantly different between cemetery areas. Caries frequencies were highest in Cemetery Areas 1 and 2 and lowest in Cemetery Area 5. Because burials in Cemetery Area 1 had been exhumed historically, comparisons were also made exclusively between Cemetery Areas 2, 3, 4, and 5. Overall, Cemetery Area 2 had the highest rate of caries compared to Cemetery Areas 3, 4, and 5, but the observed rates were generally comparable for both males and females, as well as Hispanics and Euroamericans in that area. In contrast to caries rates, tooth wear was higher in Cemetery Areas 3 and 4 compared to Cemetery Areas 1 and 2. This result complements the result for caries rates, as it suggests a more grit-laden diet for individuals in Cemetery Areas 3 and 4, which we have hypothesized more closely represented the local population, and possibly greater access to sugar and processed flours for individuals in Cemetery Areas 1 and 2, who we believe may have represented fairly recent migrants to Tucson.

The pattern of relatively little wear and much higher caries rates in Cemetery Areas 1 and 2 suggests these individuals had a softer, less-gritty and more carbohydrate-laden diet, providing some support for the hypothesis that many individuals in those areas were recent migrants from places outside the Southwest and Mexico. The fact that antemortem tooth loss was not significantly higher in Cemetery Areas 1 and 2 may reflect greater access to professional dental care, as dental appliances and fillings were observed only in the southern portions of the cemetery (see section on medical intervention).

Comparative Examinations

Lincoln-Babb and McClelland (see Chapter 13, Volume 2 of this series) provide an excellent summation of dental health in late-nineteenth-century Tucson. They conclude that dental health among the Tucson inhabitants interred in the cemetery was consistent with other frontier settlements during the nineteenth century and that the basic diet in Tucson remained fairly stable from the late eighteenth century through much of the nineteenth century, until the

arrival of the railroad in 1880. Although dental pathologies were fairly common in Tucson during the nineteenth century, these conditions were not as prevalent as they were in other skeletal assemblages dating to the same period where refined sugars and highly processed flours were more widely available (see Chapter 13, Volume 2 of this series). For instance, the cariogenicity of the diet was similar to diets in other parts of the frontier American West, but it was substantially less than contemporary diets in major transportation centers of the eastern United States. The incidence of dental wear, by contrast, was relatively high in the Alameda-Stone sample, as well as an earlier sample from San Agustín de Tucson, reflecting a more grit-laden diet in Tucson suggestive of a greater reliance on foods processed with manos and metates.

Overall, caries rates in the Alameda-Stone cemetery sample were similar to compared samples of dentition from the American West—including those from San Agustín de Tucson, the Tucson Presidio, and the Refugio Mission sample. To Lincoln-Babb and McClelland, similar caries rates for the Alameda-Stone cemetery and two earlier samples from Tucson suggest that the amounts of carbohydrates and proteins consumed in the region did not change significantly through time, and they did not think there was any great variation in the cariogenicity of foods consumed based on biological affinity. Interestingly, caries rates were lowest in the New York African Burial Ground sample, suggesting a lack of cariogenic foods in the diet of enslaved Africans in seventeenth- and eighteenth-century New York as well. Caries rates in the Alameda-Stone sample were, however, substantially lower than those obtained for other burial samples, including Freedman's and Voegtly Cemeteries. The higher caries rates in other cemeteries likely reflect greater consumption of processed sugars as well as more highly processed flours.

Skeletal Manifestations of Diet and Nutrition

Now, we turn to the examination of skeletal evidence for indicators of diet and nutrition. Skeletal indicators can inform on periods of malnutrition or metabolic stress to the extent that they interrupt growth and development or result in skeletal abnormalities, such as porotic lesions or deformed bones.

Malnourishment is the insufficient or imbalanced consumption of nutrients. Identifying evidence in the skeleton for nutritional disorders necessarily relies on an understanding of which nutrients were lacking or, in some cases, were overabundant in a diet and the distribution of lesions in an affected individual (Glewwe et al. 2001; Huijbers et al. 1996; Litize et al. 1988). For example, scurvy is a well-known metabolic disorder associated with a prolonged insufficient ingestion of vitamin C. The skeletal manifestation of scurvy appears in the ribs, long bones, and the skull, as well as in the dentition. Unfortunately, differential diagnosis of scurvy is difficult, particularly in archaeological specimens where fragmentation and soil disintegration of skeletal elements does not permit a complete analysis of the affected elements (Ortner 1996).

Two indicators of nutrient deficiencies documented by Leher et al. (see Chapter 11, Volume 2 of this series) for the Alameda-Stone sample were porotic hyperostosis and cribra orbitalia. Evidence for both of these conditions was identified in the Alameda-Stone sample. Stature estimates according to age and their possible relationship to diet and nutrition are discussed in a later section in this chapter, which explores the relationships between diet, nutrition, infectious disease, and stature.

Porotic Hyperostosis

Porotic hyperostosis is a skeletal condition historically associated with iron-deficiency anemia. However, recent research by Walker and colleagues (2009) has demonstrated that the iron-deficiency hypothesis does not fit with the clinical manifestation of porotic hyperostosis. Walker et al. (2009) argue that porotic hyperostosis is actually the skeletal manifestation of maternal vitamin B_{12} deficiency and the unsanitary living conditions associated with population aggregation. Vitamin B_{12} appears naturally in animal products, such as eggs, meat, and milk, and evidence of a B_{12} deficiency provides powerful insight into the diet and nutrition of a population. The distribution of porotic hyperostosis among and between males and females, age cohorts, etc., for instance, could be used to draw inferences on differences in the availability and distribution of food resources and exposure to infectious agents.

Cribra Orbitalia

Like porotic hyperostosis, cribra orbitalia was, until recently, associated with iron-deficiency anemia. Again, Walker et al. (2009) have demonstrated that iron-deficiency anemia is not responsible for the cranial lesions associated with cribra orbitalia, but the more likely causative factor is bleeding beneath the periosteum lining the eye orbits from a combined "co-deficiency of vitamin C and B_{12}" (Walker et al. 2009:119). Thus, cribra orbitalia is a possible indication of limited access or bioavailability to animal foods as well as foods rich in vitamin C, such as fresh vegetables and fruits. However, like porotic hyperostosis, cribra orbitalia also may result from decreases in the bioavailability of nutrients as a result of infection, and thus it is not an unambiguous indicator of the kinds of foods ingested by an individual. The distribution of cribra orbitalia and porotic hyperostosis in the Alameda-Stone cemetery is discussed below.

Skeletal Indicators of Diet and Nutrition within the Alameda-Stone Sample

As discussed above, the incidence of caries, abscesses, antemortem tooth loss, and dental wear in the Alameda-Stone cemetery sample suggest that dental health was consistent with other nineteenth-century frontier settlements. The interpretation of the frequency and distribution of these conditions within the Alameda-Stone sample does not suggest widespread dietary or nutritional deficiencies. This is further supported by the frequency and distribution of other skeletal indicators of poor nourishment and dietary restrictions. Leher and colleagues (see Chapter 11, Volume 2 of this series) noted that cribra orbitalia or porotic hyperostosis affected only a fraction of the individuals interred in the Alameda-Stone cemetery. In fact, a little less than 7 percent of the sample had evidence of cribra orbitalia and less than 3 percent were affected by porotic hyperostosis. In part because of the low incidence of either condition, significant differences within the cemetery were rare when comparisons were made.

No significant differences were found between most age categories, with the exception of a comparison between adults and juveniles for cribra orbitalia. Juveniles were significantly affected more often than adults for cribra orbitalia ($\chi^2 = 6.75$, df = 1, $p = .009$), having the condition more than twice as often. Juveniles also had porotic hyperostosis 50 percent more often than adults, but not significantly so ($\chi^2 = 0.8$, df = 1, $p = .3711$). Perhaps, juveniles who had suffered nutritional deficiencies at some point in their lives suffered higher mortality than adults. Males suffered these conditions more often than females, but these differences were not statistically significant. Perhaps, nutrition or exposure to gastrointestinal infections differed somewhat between males and females.

Differences between biological groups also were generally insignificant. However, Euroamericans were most often affected by these conditions and when only Euroamericans and Hispanics were compared, Euroamericans had cribra orbitalia significantly more often ($\chi^2 = 4.44$, df = 1, $p = .03$). Possibly, Euroamericans were more often exposed as infants and young children to diets deficient in animal foods and fresh fruits and vegetables or had lived in areas where conditions were more unsanitary.

No significant differences were found between cemetery areas. The percentage of both conditions was highest in Cemetery Area 1, but both the sample size and the number of observed cases were very low. Both conditions were also more prevalent in Cemetery Area 5 than they were in Cemetery Areas 2, 3, and 4, but this result may also relate to issues of sample size. In Cemetery Areas 2, 3, and 4, the differences in the incidence of either condition were minor and statistically indistinguishable, suggesting overall that there were no clearly detectable differences between cemetery areas.

These few differences suggest that juveniles and Euroamericans were significantly more often affected by cribra orbitalia than other groups, but overall, there were few differences within the cemetery population. However, there were substantial differences between the Alameda-Stone cemetery and other compared cemeteries. The frequency of both porotic hyperostosis and cribra orbitalia was exceptionally low for both adults and subadults in the Alameda-Stone cemetery in comparison to other cemeteries. In addition, both conditions were considerably more prevalent in samples from earlier cemeteries in Tucson, suggesting that diet and nutrition may have improved substantially in Tucson. These data could indicate vitamin B_{12} and vitamin C deficiencies were relatively rare in comparison to other cemeteries. Possibly, animal foods and fresh fruits and vegetables were available in sufficient quantities so as to make these conditions rare. Another possibility is that infections that reduced the bioavailability of vitamin B_{12} and vitamin C were severe enough that many people in Tucson did not survive long enough for a bony reaction to occur.

Comparative Examinations

The frequencies of cribra orbitalia and porotic hyperostosis observed in the samples from Voegtly Cemetery, the Refugio Mission, San Agustín Mission, Tucson Presidio, Freedman's Cemetery, and the New York African Burial Ground were available for comparison to those recorded in the Alameda-Stone cemetery sample (Figure 65). Among the Alameda-Stone burial sample, approximately 7 percent of individuals exhibited evidence of cribra orbitalia, and approximately 3 percent of individuals showed evidence of porotic hyperostosis. At Voegtly Cemetery, just nine individuals displayed cribra orbitalia, and no evidence of porotic hyperostosis was reported. This suggests a population relatively unaffected by nutritional stress or deficiency.

From the Refugio Mission burial sample, the rate of cribra orbitalia was reported as 9.1 percent of all individuals, including 12 adult individuals and 3 juvenile individuals. Porotic hyperostosis was much less frequent, appearing on just 1 juvenile and 1 adult male. As seen in the Alameda-Stone cemetery, metabolic disorders leading to porosity often manifest as cribra orbitalia. This is, of course, subject to alternate observations. In the Freedman's Cemetery sample, the frequency of cribra orbitalia was 5.7 percent, and the frequency of porotic hyperostosis was 7.6 percent. Thus, between Freedman's Cemetery and the Alameda-Stone cemetery, rates of cribra orbitalia were higher at Alameda-Stone, but rates of porotic hyperostosis were higher at Freedman's Cemetery. Additionally, the frequencies of both manifestations of nutritional stress were relatively close to each other at

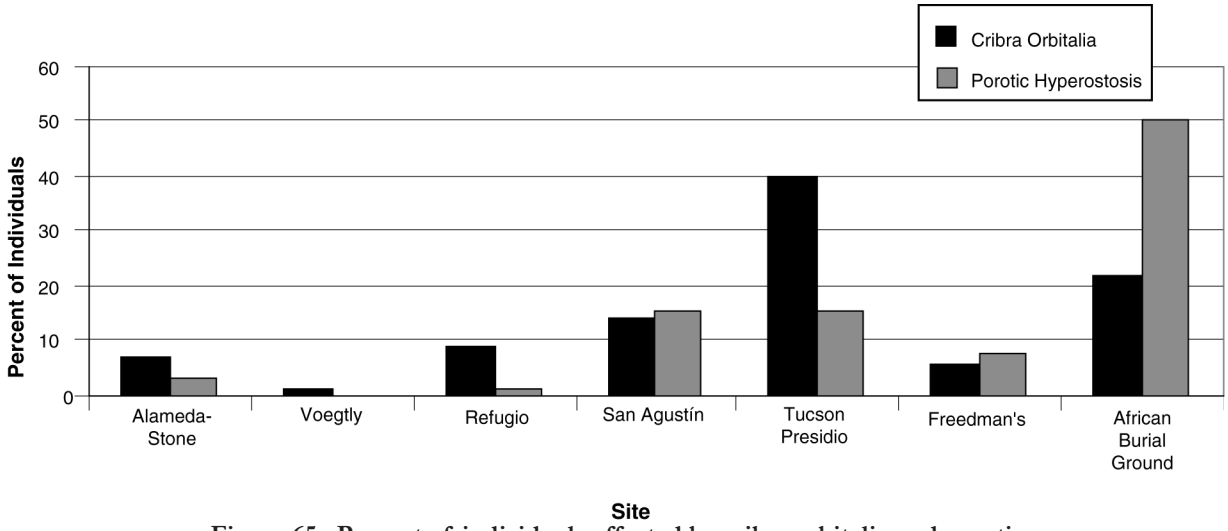


Figure 65. Percent of individuals affected by cribra orbitalia and porotic hyperostosis at Alameda-Stone cemetery and six other sites.

Freedman's Cemetery, whereas rates of cribra orbitalia observed in the Alameda-Stone sample were more than twice the rates of porotic hyperostosis.

The San Agustín Mission and Tucson Presidio burial samples featured nearly identical rates of porotic hyperostosis among adults in each sample. At San Agustín, 15.8 percent of adults exhibited porotic hyperostosis, and 15.4 percent of adults from Tucson Presidio showed evidence of the condition. The rates for cribra orbitalia were much different. The San Agustín sample showed 14.3 percent of individuals (all adult) with cribra orbitalia. Conversely, 40 percent of adults from the Tucson Presidio exhibited cribra orbitalia. This high rate, however, is somewhat misleading; just five adults from the Tucson Presidio could be assessed for the condition and two of these showed porosity in the roof of the eye orbits.

Finally, the New York African Burial Ground showed substantially higher rates of cribra orbitalia and porotic hyperostosis than all other sites under consideration. Among the adults from the New York African Burial Ground, 22.0 percent showed evidence of cribra orbitalia and 50.5 percent exhibited porotic hyperostosis. The disparity between these rates and those seen at Freedman's Cemetery is remarkable, but its causes are unclear; presumably they resulted from extremely high levels of metabolic stress.

Disease

At least since the arrival of the first Europeans in northern New Spain in the sixteenth century, indigenous populations living in the vicinity of Tucson and other areas of the American Southwest were repeatedly affected by devastating disease epidemics. Epidemic diseases that had spread to Arizona as a result of European colonization likely included smallpox, yellow fever, dysentery, typhus, typhoid fever, measles, and malaria. The demographic and social effects of these epidemics were major and had a strong influence on subsistence and settlement patterns as well as population, community, and household structure (Di Peso 1956; Dobyns 1962, 1963, 1983; Reff 1991; Riley 1987; Roberts and Ahlstrom 1997).

Epidemic disease continued to be a problem during the nineteenth century in both the United States and Mexico, particularly in urban centers. Poor sanitation, contaminated food and water, and frequent movement of people and goods between population centers were frequent culprits behind the spread of disease. For instance, cholera, which is spread through ingestion of food and water contaminated by the organism *Vibria cholerae*, was rampant in both the United States and Mexico in the mid-nineteenth century and in other countries as well. A cholera epidemic struck Tucson in June of 1851, causing large numbers of deaths, including the deaths of entire families. Some peaceful Apaches who had been living in Tucson during the epidemic left for the mountains to escape sickness, but they came down with the disease upon returning to Tucson for provisions (*Arizona Citizen,* 19 July 1873a:3). Perhaps cholera had arrived in Tucson from California, as an outbreak of cholera began there in 1850 (Edwards et al. 2005). Cholera reached pandemic proportions in the United States, Mexico, and many other countries in 1853–1854 (Lacey 1995).

Because of increasing long-distance transportation and population mobility, epidemics spread rapidly over great distances. For instance, a cholera epidemic that broke out in New York in May 1866 spread to Kansas by train and to seaports like New Orleans by ship (Lacey 1995). Similarly, a number of cases of smallpox in Tucson were thought to have been brought with travelers from other parts of

the country. Tohono O'odham, on a calendar stick, also recorded that diseases were brought from Sonora to San Xavier del Bac in 1848–1849 and 1851–1852 (Underhill 1938:21).

Living conditions in the growing city were likely to have been conducive to the spread of disease. Although residences made of adobe were relatively cool, they were described by visitors as dark and dusty, with earthen floors that were difficult to keep clean. Many wells were open and could have become contaminated by items falling into them. Dead animals were at times left rotting in the streets. The streets, along with lots in the city, would also have been covered with fecal material from draft animals and the many cats and dogs that roamed the city. Open wells and privies at city residences did not often meet the standards of the day and may have been another source of contamination. The military hospital itself (see below) was surrounded by lots where livestock were kept, making it very difficult for hospital staff to maintain sanitary conditions during treatment. Furthermore, as discussed below in the section on medical intervention, the germ theory of disease was not widely accepted, even by medical authorities, and consequently, residents and medical authorities had only a limited understanding of sources of contamination and disease (Preston and Haines 1991; Richmond 1954).

While the cemetery was in use, Tucson was becoming urbanized. Urbanization during the nineteenth century increasingly put people in environments with diseases for which they had developed no resistance. As Lee (1997:50) noted, "new migrants and those who migrated from isolated rural areas may have been more vulnerable to the unhealthy urban environment than their counterparts." As a result, "urbanization was not merely an extension of unhealthy and densely populated areas but a process of putting rural residents into a new environment to which they had a poor resistance" (Lee 1997:48).

The link between unsanitary conditions and disease was not missed by health authorities in nineteenth-century Tucson, but the exact causes, or disease vectors, were misunderstood. Unsanitary conditions in Tucson were felt to have contributed to disease: *The Weekly Arizonan* reasoned that "vast accumulations of filth and refuse, which under the influence of rain and sunshine send forth balmy odors and noxious insects (including blue-bottle flies) all of which have a tendency to engender disease." A preponderance of open wells at local residences was also cited as a reason for the spread of disease (*The Weekly Arizonan,* 22 January 1870a:3).

Often, health workers in the nineteenth century attributed disease to miasmas, which were associated with stagnant water and decomposing organic matter thought to give off dangerous gases (Anderton 2003; Anderton and Hautaniemi 2004). Marshy areas along the Santa Cruz River near Tucson were, for instance, considered to be source areas for disease, as were irrigated agricultural fields. Cemeteries, too, were considered to generate miasmas. Hospital assistant surgeons would often ascribe cases of fevers to visitation of "malarial districts" or marshy areas that soldiers visited while on scouting duty. For instance, another marshy area east of Tucson, the picket post at La Cienega, was frequently cited in military hospital records as a source of disease. By contrast, the post in Tucson, situated on higher ground above the Santa Cruz River and other lower parts of town, seemed to be in a relatively healthful location (Billings 1870:464). Malaria, which was one of the most common diseases in North America at the time, along with a variety of other unrelated diseases, were theorized to result from miasmas (Thompson 1969).

Review of hospital records for the post at Tucson reveals that for soldiers, fevers were the most common health complaints requiring medical attention, followed by gastrointestinal problems, particularly diarrhea and dysentery (National Archives and Records Administration, Record Group 94, Entry 544, Volumes 118–121). Other than originating from miasmas or malarial districts, the causes of fevers were not well known. Fevers were generally classified as intermittent or remittent, depending on whether they were characterized by cycles of chills and fever separated by periods of normal temperature (intermittent fever) or were characterized by variable periods of chills and fever, without a return to normal body temperature (remittent fever). Fevers were also characterized as quotidian, tertian, or quartan, depending on whether they began in the morning, noon, or afternoon hours, respectively (Brown 1875; Thompson 1969). Fevers were sometimes labeled as malarial fevers, typho-malarial fevers, or puerperal fevers (a form of septicemia contracted by a woman shortly after miscarriage, abortion, or childbirth). Military records cited fevers as causes of death for individuals buried in the Alameda-Stone cemetery.

Other health problems reported in military hospital records for the post at Tucson included respiratory diseases, such as tuberculosis; rheumatism; and more rarely, sexually transmitted diseases like syphilis and gonorrhea; dietary diseases such as scurvy; and rare cases of liver disease, epidermal disease, and neuropathic disorders (Figure 66). Although trauma resulting from accidents and violence was the most common cause of death for soldiers buried in the military section of the Alameda-Stone cemetery, chronic diarrhea, dysentery, respiratory diseases, and fevers were also commonly cited as causes of death (Heilen 2009; Heilen et al. 2008).

Outbreaks of disease were reported in the newspapers, albeit inconsistently. Fever and whooping cough were especially prevalent in Tucson in the late summer and fall of 1868, to the extent that "almost every day a procession can be seen making its way towards the 'City of the Dead'" (*Weekly Arizona Miner,* 3 October 1868a:1). One observer attributed the increase in sickness to heavy rains (*Weekly Arizona Miner,* 24 October 1868b:2). By January 1869, it was reported that an unknown disease, characterized by

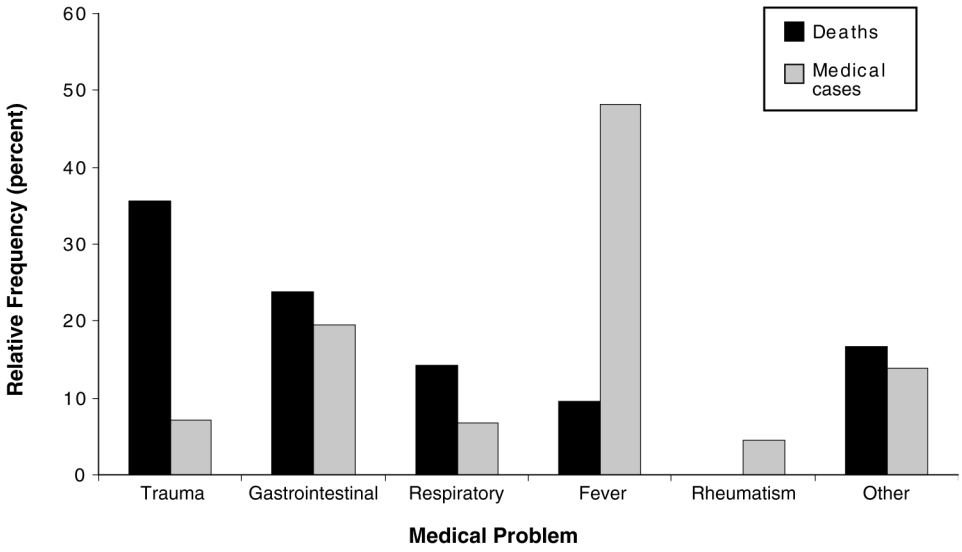


Figure 66. Frequency of health complaints listed in Tucson Military Hospital records, 1868–1872.

fever and ague, had hit Tucson and was affecting nearly the entire population, with mortality estimated at two to three persons per day. The disease was attributed "to the water, and the malarious air of the place" and despite the danger it posed, was not heavily reported in the newspapers (*Weekly Arizona Miner,* 2 January 1869:2). Apache prisoners held at Camp Lowell succumbed to intermittent fevers around this time, perhaps in response to the same disease or diseases affecting the rest of Tucson's population (*Weekly Arizona Miner,* 20 November 1869:3). Typhoid fever was reported in the newspapers in 1870 and 1876 (*Arizona Citizen,* 8 November 1873b:3; *Arizona Citizen,* 21 October 1876a:2), resulting in the deaths of at least two individuals buried in the military section of the Alameda-Stone cemetery (Heilen et al. 2008; see Chapter 4, Volume 2 of this series).

One particularly devastating outbreak of disease was a smallpox epidemic that occurred in Tucson during the winter of 1870. Smallpox (*Variola major*) is a viral infection spread through ingestion, parenteral inoculation, droplet or aerosol exposure of mucous membranes, or broken skin contact with the lesion fluids, crusts, respiratory secretions, or tissues of infected individuals (National Research Council 1989:121–122). Smallpox has a mortality rate of over 25 percent, and 50 percent of those who contract the disease develop permanent, disfiguring scars from the pustules that form as a result of infection (Crist 2000:93). During the 1870 epidemic in Tucson, Tucson residents obtained the services of a physician and proposed that a temporary hospital be established 3 miles outside of town, with every patient taken there for treatment (*The Weekly Arizonan,* 19 February 1870b:3). Dr. E. Phelps was reported to have been treating smallpox patients in Tucson (*The Weekly Arizonan,* 19 March 1870c:3). During its height, smallpox was said to have killed an average of 5 people per day, mostly children (*Weekly Arizona Miner,* 26 March 1870b:2). The February 1870 report in the Hospital Register for Post Hospital at Tucson (National Archives and Records Administration, Record Group 94, Entry 544, Vol. 118) indicated that "the Epidemic is confined chiefly to the Mexican population and the percentage of deaths among the children has been very large." Smallpox was also noted as present "among the Papago Indians [Tohono O'odham], a number of whom have erected their lodges, or winter quarters, on the extreme Southern end of the Town" (National Archives and Records Administration, Record Group 94, Entry 547, Book 13:157). By April 1870, medical authorities at the post estimated at least 120 fatal cases of smallpox had occurred. Only 78 deaths from smallpox were listed that year in the 1870 Mortality Schedule of the U.S. Federal Census for Tucson, nearly all of them Hispanic children, but it also included the deaths of 2 Native American children, 2 African American adults, and 7 non-Hispanic Euroamerican adults who died from the disease. It was believed that the disease was brought to Tucson by a Mr. McPherson, who had arrived in Tucson from California and that the disease continued to spread to other towns from Tucson (*Weekly Arizona Miner*, 23 April 1870c:2).

Smallpox continued to appear sporadically in the vicinity of Tucson in the late 1870s, after the civilian section of the Alameda-Stone cemetery had closed. For instance, cases of smallpox appeared east of Tucson in April 1876, prompting Dr. J. C. Handy to offer free vaccinations to Tucson residents (*Arizona Citizen*, 22 April 1876b:3). When another smallpox case occurred in Tucson in November 1876, the infected child was placed in a temporary hospital 2 miles outside of town, with fences built across the road to block access. After the child died, the house where the child had lived was fumigated, and the clothing of the child and its mother was burned to prevent

further spread of disease (*Arizona Citizen*, 18 November 1876c:3). Additional cases of smallpox occurred in Tucson in January and March 1877, with the arrival of visitors to the city (*Arizona Citizen*, 3 February 1877a:3; *Arizona Citizen*, 10 March 1877b:3). By April 1877, smallpox had again become prevalent in Tucson, and by June, 139 cases had been reported, over 90 percent of them were children. City Council levied a tax to care for the sick and prevent further spread of the disease. Twenty-four individuals died in the 1877 epidemic (*Arizona Citizen*, 28 April 1877c:3; *Arizona Citizen*, 2 June 1877d:3).

Another epidemic of unknown origin hit Tucson early in 1875, when the *Weekly Arizona Miner* reported, "the death rate of Tucson is about one per dium, mostly confined to the Mexican population; and, as I write, the bells of the Catholic church toll the news of another departed" (*Weekly Arizona Miner*, 26 March 1875:1).

In short, unsanitary conditions, including contaminated food and water, increasingly crowded living conditions, and the convergence of people and goods in Tucson from multiple areas of the globe, contributed to the spread of disease while the cemetery was in use. Malaria was common and severe outbreaks of smallpox and other communicable diseases occurred. Other diseases affecting the population included tuberculosis, gonorrhea, syphilis, and dietary diseases like scurvy.

Burial of Diseased Individuals

Quarantining individuals with dangerous, communicable diseases and burning contaminated clothing and personal effects appears to have been a common medical response to disease in Tucson and other cities. The burials of individuals who died of disease or whose bodies had decomposed would also sometimes be treated with lime and their belongings buried with them in the grave. A newspaper account described the burial of a boy who had died in Phoenix, Arizona, in 1873, "the corpse was rearranged in the coffin, in which all the clothing, &c., which belonged to the boy in life were placed, lime being put in abundantly" (*Weekly Arizona Miner*, 12 April 1873:3). Lime was used to disinfect the body and the materials associated with the corpse, to neutralize odors, and to increase the rate of decomposition, although scientific studies have shown that lime kills the bacteria that cause decomposition and actually decreases the rate of decay (Laudermilk 1932; Leaney 1989; Will de Chaparro 2007). Evidence for the application of lime in burials has been observed in a number of historical-period cemeteries, including the Alameda-Stone cemetery (see below) and the earlier Tucson Presidio cemetery (Faught 1992). Bundles of clothing were also placed in a few burials at the Alameda-Stone cemetery, which might indicate related sanitation efforts. Lime, however, is not an unambiguous indicator of disease, as lime was sometimes placed in Mexican burials "to cleanse and purify the soul of the deceased" (Costello and Walker 1987; O'Mack 2006:48). Similarly, bundles of clothing and other personal effects could have been placed within burials to aid the deceased in their journey after death, as was the case with some Native American burials of the period.

Artifactual evidence for disease was not common in the Alameda-Stone cemetery, and perhaps expectedly so. Possible artifactual indicators of disease-related deaths within the cemetery include the inclusion of lime within the burial and, possibly, evidence for the burning of an individual and their effects and the placement of a bundle of clothing within the burial. All of these indicators are generally consistent with an attempt to contain or eradicate disease-contaminated items, but they are not in and of themselves diagnostic of such behaviors. We examined the distribution of artifactual and osteological indicators of disease but found no clear patterns, suggesting that individuals who died of disease were buried throughout the cemetery. However, there was a large concentration of young children, infants, and older adults in the eastern portion of Cemetery Area 3, which may suggest the use of that area for burying people during periods of epidemic disease. This pattern is discussed further in the section on demography.

Osteological Indicators of Disease

The following section details dental and skeletal indicators of disease identified in the human skeletal remains recovered from the Alameda-Stone cemetery. First, we identify dental evidence of nutritional deficiencies and developmental defects, such as enamel defects, dental caries, abscesses, and antemortem tooth loss. Next, we explore skeletal pathologies associated with various disease processes, with particular consideration to, and emphasis on, evidence of infection and malnourishment as identified in bone. Finally, we explore the distribution of these diseases within the cemetery and their differential impact on various segments of the Tucson community during the nineteenth century.

Dental Indicators of Disease

Diseases affecting a population can be assessed by documenting the frequency and severity of developmental defects of enamel, dental caries, and antemortem tooth loss in adult and juvenile dentition.

Enamel Defects

Enamel defects, or enamel hypoplasias, have been linked to a variety of diseases and stressors that occur when tooth crowns are developing in the jaw. Lincoln-Babb and McClelland (see Chapter 13, Volume 2 of this series) inform that these enamel defects suggest compromised

nutrition and poor health. The prevalence of enamel defects may be used as a proxy with which to measure the overall health status of a population.

The manifestation of enamel defects in permanent teeth comes in a variety of forms, but they typically present as a series of pits or a single horizontal groove. When a prolonged period of growth disturbance or retardation occurs during the enamel-laying process, such defects form telltale scars as evidence of the insult (Ortner 1996). Insults that can lead to the formation of enamel defects include environmentally related metabolic disturbances like childhood illnesses (Brickley and Ives 2006; Ritzman et al. 2008), trauma (Klaus and Tam 2010), and food shortage (Brickley and Ives 2006), but they may also provide evidence for more-specific forms of disease such as congenital syphilis or scurvy (Brickley and Ives 2006; Jacobi et al. 1992; Ritzman et al. 2008).

Evidence of enamel hypoplasias among adults recovered within the Alameda-Stone cemetery was well documented by Lincoln-Babb and McClelland in Chapter 13, Volume 2 of this series. They found evidence of enamel hypoplasia on at least one tooth in a little over one-quarter of the adults. The rate of enamel defects did not differ significantly between biological groups or between males and females. The frequency of enamel hypoplasias in Cemetery Area 1 was significantly higher than other areas, but this difference was likely an artifact of the overall condition and preservation of the remains recovered from within that area. One-third of the juveniles from the Alameda-Stone cemetery had a defect on at least one permanent or deciduous tooth. The juvenile rate exceeded the adult rate and was statistically significant, but this is not surprising because the juvenile sample was composed entirely of individuals who did not survive into adulthood and thus represented a segment of the community more susceptible to stressors. Environmental factors play a role in the prevalence of enamel hypoplasia. Lincoln-Babb and McClelland (see Chapter 13, Volume 2 of this series) argue that aggregation and poor sewage control were the two primary causative factors for the spread of illness in Tucson. Aggregation promotes disease transmission; poor sewage control leads to unhealthy living conditions, ideal for the accumulation and spread of disease-causing microorganisms.

Skeletal Indicators of Disease

The human skeleton responds to the stressors of disease in two ways—bone is either deposited in an effort to repair a damaged area or bone is resorbed (Ortner 1996). In other words, bone deposition (or the laying down of new bone) and bone resorption (or the taking away, or removal, of bone) represent the entirety of the skeletal responses to any insult, disease, or injury. Many of the conditions affecting the skeleton manifest as bony deposition and bony resorption in the same individual (Ortner 1996). Such limited responses mean that arriving at a definitive conclusion (i.e., a differential diagnosis) of one disease over another is often difficult, if not altogether impossible. However, we can use the pattern and distribution of these responses to better understand the nature of the disease process triggering either bony deposition or bony resorption.

Skeletal Manifestation of Infection

Observations of skeletal pathology in the Alameda-Stone sample revealed a great deal about the health problems in the population, although many of the diseases were not observed because of poor preservation or the limited impact of a disease on the skeleton. The following section discusses the various conditions that do affect the skeleton and were detected in the recovered osteological material, revealing important information on the health of nineteenth-century Tucsonans.

Periosteal New Bone

The formation of new bone within the periosteum of a long bone (periosteal new bone) is caused by any act that disrupts this thin layer of connective tissue (Grauer 1993). This can include trauma, cancers, or a response to acute or systemic infection. The most common cause of periosteal new bone formation, however, is a reaction to infection (Ortner 1996). Understanding the prevalence and distribution of infection provides important insight into the health of a population. The researchers documented a little over 200 individuals in the Alameda-Stone sample with periosteal new bone formation, or roughly 20 percent of the entire sample. The distribution of evidence for infection is explored below in-depth, complete with a discussion on the implications of the spatial distribution and the demographic profile of the affected individuals.

Treponemal Infection

Treponemal infection refers to any one of four conditions (yaws, bejel, pinta, and syphilis) caused by bacteria (spirochetes) of the genus *Treponema*, which enter the body through cuts or tears in the skin or through mucous membranes (e.g., nose, mouth, bronchial tubes, etc.), usually through contact with an infected individual (Smith 2006). Once these bacteria invade the body, a characteristic rash or lesion appears on the skin that does not heal and continues to spread throughout the body. In later stages, treponemal infections cause various skin, bone, and joint manifestations if left untreated (Smith 2006).

Osteomyelitis

Osteomyelitis is an infection in the bone caused by bacteria (Jackes 1983; Merbs 1992; Schultz 2001). This kind

Table 11. Percent of Individuals with Evidence of Infection by Age Category

Age Category	Observable Individuals (n)	Affected Individuals (n)	Percent (of observable)	Percent (of affected individuals)
Fetal	62	5	8.06	1.68
Infant	333	94	28.23	31.65
Child	130	24	18.46	8.08
Subadult	35	10	28.57	3.37
Young adult	240	62	25.83	20.88
Middle adult	171	70	40.94	23.57
Old adult	60	26	43.33	8.75
Adult	58	6	10.34	2.02
Total	1,089	297	27.27	100.00

Table 12. Comparison of Children and Adults with Evidence of Infection

Observation/statistic	Children	Adults
Active	16	17
Healed	10	49
$\chi^2 = 10.381$, df = 1, $p = .001$		
Localized	58	68
Systemic	75	96
$\chi^2 = 0.138$, df = 1, $p = .710$		

Table 13. Prevalence of Infection among Adults in the Northern and Southern Sections of the Cemetery

Observation/statistic	Northern	Southern
Active	12	3
Healed	31	8
$\chi^2 = 0.002$, df = 1, $p = .967$		
Localized	53	6
Systemic	61	17
$\chi^2 = 3.250$, df = 1, $p = .071$		

of infection is most common in the long bones of the body, but osteomyelitis can affect any bone in the body. Osteomyelitis presents as both bone-producing and bone-removing changes to an affected element. An involucrum (bony deposition on the outer, or cortical, bone) and at least one opening in the involucrum for pus drainage (cloacae) are necessary for diagnosis.

Evidence for Infection within the Alameda-Stone Sample

Table 11 presents the age profile of the individuals identified in the Alameda-Stone cemetery sample who suffered from some form of infection (active vs. inactive and systemic vs. localized). Among the infected individuals, males and females did not differ significantly. However, between children and adults there were significant differences in the level of activity of infection (Table 12). Children were much more likely than adults to suffer from an active infection at the time of their death. The higher rate of active infection suggests increased fatal susceptibility to infection among children, a finding supported by previous research. This finding must be considered throughout the analysis, particularly when examining the distribution of infection by cemetery areas because the northern areas contained more children than the southern areas.

There were no significant differences between cemetery areas in the distribution of individuals with infection. However, when children were removed from the analysis and Cemetery Areas 1 and 2 (southern) were pooled and Cemetery Areas 3, 4, and 5 (northern) were pooled (Table 13) significant differences were noted. In the southern areas, there were far fewer individuals suffering from infection at the time of death, but of those, nearly three-quarters (17 of 23) had evidence of a systemic infection. This was not comparable to the northern areas, where only one-half of the affected individuals suffered from a systemic infection. The exact cause of this discrepancy is unknown; however, as we previously noted, the demographic composition of the southern areas in the Alameda-Stone cemetery suggests these individuals were predominately adult males who migrated to the area, many of them Euroamerican or associated with the military. Historical descriptions indicate that individuals in the military reported medical complaints consistent with exposure to infectious agents causing problems such as diarrhea, fevers, etc. The movement of these individuals between posts and while out participating in troop movements would have exposed them to water sources, food products, and populations where infections could spread. Moreover, exposure to locally prevalent diseases or to diseases encountered while migrating to Tucson may have made recent migrants to Tucson more susceptible to infection. An alternative and opposing explanation for the discrepancy between cemetery areas in the incidence of indicators for systemic infection was that individuals buried in Cemetery Areas 1 and 2 more often survived systemic infections long enough to develop a bony response, whereas individuals in the other cemetery areas died earlier from similar infections.

Table 14. Prevelance of Infection among Children in Cemetery Areas 3 and 4

Prevalance	Cemetery Area 3		Cemetery Area 4		Total
	n	%	n	%	
Localized	50	48.08	5	26.32	55
Systemic	54	51.92	14	73.68	68
Total	104	100.00	19	100.00	123

$\chi^2 = 3.077$, df = 1, $p = .079$.

Turning attention to the northern areas of the cemetery (with Cemetery Area 5 removed because of sample size constraints), we did not find evidence for further distinctions in the incidence of infection according to sex. Males and females in Cemetery Areas 3 and 4 were equally vulnerable to systemic and localized infection. The same was not true for children (Table 14). Children in Cemetery Area 4, although fewer in number, were affected significantly more often by systemic, rather than localized, infection. Although there are several possibilities to explain the differences between Cemetery Areas 3 and 4, we suggest that a parsimonious explanation was deaths due to epidemic disease in Cemetery Area 3 that were not represented in Cemetery Area 4. As discussed above, epidemics, which often affect the very young and the very old more than other age groups, occurred in Tucson during the period the Alameda-Stone cemetery was in use. Because the period from incubation to death is so short, there is very little time for evidence of the infection to manifest on the skeleton and thus, the affected individuals do not present evidence from the affecting epidemic, but instead appear to be healthy when examined skeletally.

Wood and colleagues (1992) have established that such bias is inherent in the bioarchaeological record because of several factors, including the unknown effect of population growth on the demographic distribution of osteological samples, unknown population variation in morbidity and mortality, and the fact that individuals in an osteological sample represent only those who died and not necessarily those who survived similar risks. Such "selective mortality" also means that an individual skeleton without pathological lesions may not represent the skeleton of a healthy individual. Quite the contrary, a seemingly disease-free skeleton could in fact represent an individual with an immune system so compromised that the invading microorganism led to the death of the individual before skeletal lesions could form, thus leaving no visible trace of infection in the skeletal remains.

In addition to the generalized indicators of infection discussed above, the researchers were able to identify a few cases of treponemal infection and osteomyelitis. Three adults (two males and one female) were identified with lesions characterizing treponemal infection (see Chapter 11, Volume 2 of this series). Five children (four infants and one 10–12 year old) were identified with congenital syphilis, passed from the mother to the child during the late stages of venereal syphilis. Although indirect, the relatively large number of children with congenital syphilis suggests the frequency of treponemal infection among the adults could have been higher than identified in the skeletal remains.

Osteomyelitis was relatively rare in the Alameda-Stone cemetery sample. Twenty-nine elements, representing 13 individuals exhibited osteomyelitis. Most of the affected individuals were adults. The most affected elements were the tibia (n = 10) and femur (n = 6). Among the adults, 3 individuals had two or more elements affected. All of these individuals were interred within the civilian portion of the cemetery in either Cemetery Area 2 (n = 3), Cemetery Area 3 (n = 7), or Cemetery Area 4 (n = 3).

Comparative Examinations

Enamel Hypoplasias

As noted above, roughly one-quarter of adult individuals recovered from the Alameda-Stone cemetery showed evidence of enamel hypoplasias (Figure 67). Specifically, the adult male rate of hypoplasia was 26.87 percent, and the adult female rate was 22.42 percent. These observed rates were low compared to most other sites under consideration, save one. Enamel hypoplasia rates reported from Voegtly Cemetery were lower than those seen in the Alameda-Stone cemetery sample; at Voegtly, the male rate of hypoplasia was 17.1 percent, and the female rate was 12.0 percent. The magnitude of difference between the sexes was different between Alameda-Stone and Voegtly, but in both cases, males showed a higher rate of enamel defects than did females.

All other comparative sites exhibited higher rates of enamel hypoplasias than those seen in Alameda-Stone sample. At the Refugio Mission site, 33 percent of males and 46 percent of females showed enamel defects. Enamel defect rates of 79.7 percent for males and 63.9 percent for females were recorded for individuals from the Freedman's Cemetery. Similarly, males from the New York African Burial Ground showed a hypoplasia rate of 74.3 percent, and females showed a rate of 62.5 percent. These similarly high rates of enamel defects were likely the result of

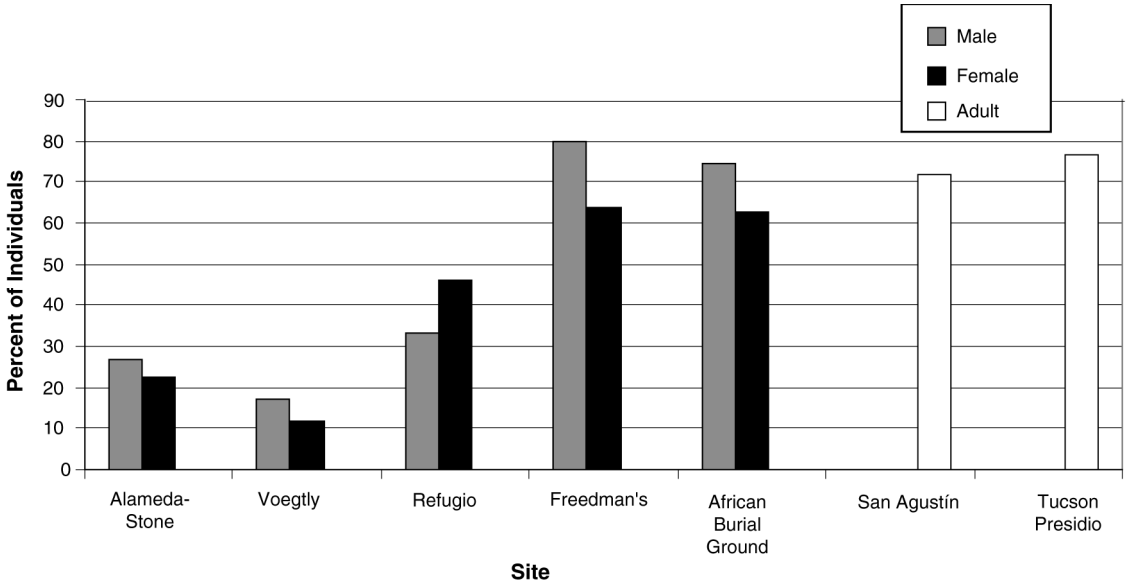


Figure 67. Percent of individuals with enamel hypoplasias at Alameda-Stone cemetery and six other sites.

hardships suffered by their respective burial populations, as each represented large numbers of enslaved or formerly enslaved individuals and their descendants.

Enamel defect rates from the San Agustín Mission and Tucson Presidio cemetery populations were limited to those among all adults under study. Nevertheless, both cemetery samples featured similar rates of hypoplasias. At San Agustín, the adult rate of enamel defects was 71.9 percent, and the Tucson Presidio sample showed a rate of 76.5 percent. Both of these enamel hypoplasia rates were much higher than those observed in the Alameda-Stone sample. Because these three sites shared a common geography, the dramatically lower rate of defects among the Alameda-Stone adults vs. those from San Agustín and Tucson Presidio was clearly the product of time. In other words, in the intervening century between the use of the cemeteries at the mission and presidio, and the use of the Alameda-Stone cemetery, improvements in medical care and resource availability may have aided in improving the health of individuals in the area.

Periosteal New Bone Growth

Observations of periosteal new bone in the Alameda-Stone sample were compared to those of six other sites: Voegtly Cemetery, Freedman's Cemetery, Refugio Mission, San Agustín Mission, Tucson Presidio, and the New York African Burial Ground (Figure 68). The frequency of periosteal new bone observed at Alameda-Stone cemetery was approximately 20 percent. The demographic underpinnings of these observations include a distinct (yet statistically not significant) predilection toward male individuals vs. female individuals in exhibiting evidence of periosteal new bone growth. The occurrence of periosteal new bone seemed to generally increase with age, save a dramatic and substantial spike among infant individuals. This is unsurprising, given the documented increased susceptibility to infection seen in young individuals.

The frequency of periosteal new bone observed at Voegtly Cemetery was much lower than that seen at Alameda-Stone cemetery. Indeed, just 3 percent of individuals recovered from Voegtly Cemetery displayed periosteal new bone growth, as opposed to the 20 percent seen at Alameda-Stone. More adult individuals displayed periosteal new bone than did juvenile individuals, a finding generally consistent with that from Alameda-Stone cemetery. Like Alameda-Stone cemetery, however, more males than females showed periosteal new bone growth at Voegtly Cemetery. It should be noted, though, that the low overall incidence of periosteal new bone growth observed in the Voegtly Cemetery sample undermines the reliability of conclusions drawn from the attributes of the relatively few individuals in that sample. More important is the low frequency (3 percent) itself, as compared to the 20 percent frequency seen at Alameda-Stone cemetery. This is likely because of the relative affluence of the Voegtly Cemetery population and the insulation from physical ailments that often result.

The Freedman's Cemetery sample exhibited a staggering amount of periosteal new bone growth. Among juvenile individuals from Freedman's Cemetery, 74 percent showed periosteal new bone, and 60 percent of adult individuals displayed periosteal new bone. At Alameda-Stone cemetery, by contrast, approximately 16 percent of juveniles and 23 percent of adults showed signs of the infection. Like the comparison to periosteal new bone frequencies in the Voegtly Cemetery sample, the high rates of infections

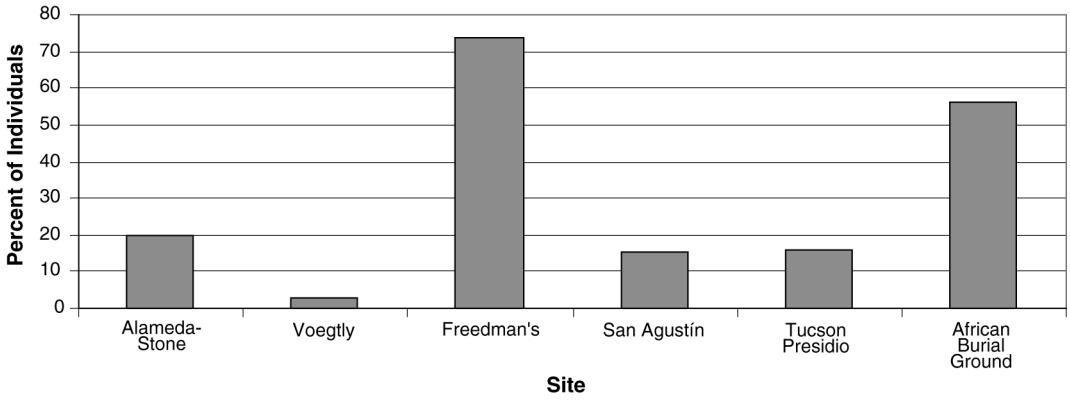


Figure 68. Percent of periosteal new bone in Alameda-Stone cemetery sample and five other sites.

seen at Freedman's Cemetery were likely the result of large-scale burial population attributes. The individuals from Freedman's Cemetery were under much higher physical stress than those from Voegtly and Alameda-Stone. Nevertheless, more adults than juveniles at Freedman's Cemetery exhibited periosteal new bone, and males were more affected than females. Apart from the magnitude of the differences among these three sites, the general distribution appears similar.

Statistical data for periosteal new bone from the cemetery at Refugio Mission were not available for direct comparison, but discussions of the individuals showing periosteal new bone does allow for some examination. As was seen in the samples from Alameda-Stone, Voegtly, and Freedman's, the individuals from the Refugio Mission cemetery appeared to present periosteal new bone along similar demographic lines: males were more affected than females, and adults were more affected than juveniles. Also similar to Alameda-Stone cemetery, the appearance of periosteal new bone in the Refugio Mission sample was disproportionately manifested on the lower limbs rather than upper limbs.

The San Agustín Mission and Tucson Presidio cemetery samples each showed similar frequencies of periosteal new bone growth. Seven of 46 individuals (15.2 percent) of San Agustín Mission individuals (all of whom were adult), and three of 19 (15.8 percent) Tucson Presidio adults exhibited periosteal signs of infection. These frequencies were slightly lower than the 20 percent recorded in the Alameda-Stone cemetery sample. It should be noted, however, that observable individuals from the Tucson Presidio were compromised by poor preservation. Additionally, differential diagnoses of general "infections" in the sample from the San Agustín Mission were unavailable in most cases.

Periosteal new bone was observed in the New York African Burial Ground sample at a rate of 55.9 percent. Among adults for whom sex could be determined, however, the rates were much higher. The rate of periosteal new bone among adult males from New York African Burial Ground was 70.4 percent and 70.6 percent for adult females. Again, these rates were dramatically higher than those seen in Alameda-Stone sample, but not dissimilar to those seen at Freedman's Cemetery. As noted elsewhere, the likely cause for the differences between these sites and the Alameda-Stone cemetery was the increased hardship suffered by the individuals buried in the Freedman's Cemetery and the New York African Burial Ground relative to that experienced by the individuals buried at Alameda-Stone.

Treponemal Infections

Data related to treponemal infections were available for comparison from three sites: Freedman's Cemetery, Refugio Mission, and the New York African Burial Ground. As noted above, a total of eight individuals in the Alameda-Stone cemetery sample showed evidence of treponemal infection, likely syphilis. These were distributed among three adults (two male and one female), and five juveniles (four infants, and one child). In most of these cases, the treponemal infection was evident on the dentition.

The reported incidence of treponemal infection at Freedman's Cemetery was also recorded on the teeth. Of 794 dentitions evaluated for treponemal infection, slightly over 25 percent showed evidence of the infection. The investigators differentiated between possible cases of treponemal infection and probable cases of treponemal infection. Unsurprisingly, the proportion of possible cases was greater than that of probable cases. Of the 241 juvenile dentitions, 14.9 percent showed evidence of possible infection, and 2.9 percent showed evidence of probable infection. Of the 553 adult individuals, 6.2 percent showed evidence of possible infection, and 1.4 percent showed evidence of probable infection. Among the adults evaluated for signs of possible treponemal infection, 4.3 percent of the males exhibited evidence of the condition, whereas 7.5 percent of the females showed evidence of infection. Clearly, evidence of treponemal infection was

more frequent at Freedman's Cemetery than it was at Alameda-Stone cemetery.

The Refugio Mission skeletal sample included five individuals with evidence of treponemal infection. Of these, three were adults (two males and one female) and two were juvenile (one aged 11–14 years and one premature fetus). Investigators examined evidence of the disease across the entire skeleton and concluded that four of the five cases of treponemal infection were likely syphilis. Although the number of cases was low, the frequency of the disease (3 percent of individuals) was still greater than that seen in the Alameda-Stone sample.

Finally, the New York African Burial Ground sample was evaluated for signs of treponemal infection. The investigators chose to assess tibiae for a common characteristic of the infection known as "saber shin." A total of 38 cases of saber shin were recorded among the individuals with assessable tibiae. These cases were all recorded on adult individuals and distributed among 28 males, 7 females, and 3 adults of indeterminate sex. The frequency of the condition was 16.1 percent of all individuals, or 21 percent of observable adults. Separated by sex, signs of treponemal infection were seen on 31.5 percent of the observable males, and 10.1 percent of the observable females. Again, the frequency of treponemal infection observed in the New York African Burial Ground sample was far greater than that seen at Alameda-Stone cemetery. Nevertheless, as noted above, the proportion of juvenile individuals at Alameda-Stone that exhibited evidence of treponemal infection may suggest that the adult incidence may have been higher than what was skeletally discoverable.

Combined Effects of Diet, Nutrition, and Infectious Disease on Stature

Stature is influenced by nutritional inadequacies, infectious disease, genes, and the environment (Akachi and Canning 2006, 2007; Martorell et al. 1987; Martorell et al. 1995). Stature has been shown to have declined from the late eighteenth century till the mid-to-late nineteenth century, not only in the United States, but in other countries as well, despite rapid economic growth and increasing real income per capita. In the United States, the physical stature of adults born between 1830 and 1880 declined universally. Referred to in demography as the "antebellum puzzle," this phenomenon has been related to rapid urbanization, the integration of disease environments at national and international scales, widespread migration and long-distance transportation of goods, and an increasing dependence on wage labor which made laborers more susceptible to periods of joblessness and fluctuating food prices (Haines 2004). The decline in stature is thus seen as multicausal, relating to both shortfalls in nutrition as well as increasing exposure to infectious disease (Haines et al. 2003).

Most research on growth has established that final adult stature is determined by the cumulative effects of nutrition and disease during the period of greatest growth. Proper nutrition from food intake is not enough to ensure adequate nutrition metabolically because the difference between the intake of nutrition and the absorption of those nutrients may be interrupted by disease. For instance, Akachi and Cannin (2006, 2007) found that variations in cohort height over time are sensitive to changing health and nutrition at both birth and adolescence.

Bozzoli and colleagues (2009) estimate that exposure to childhood disease may account for 20–30 percent of the disparity in adult heights between age cohorts. Most of the models developed to explain growth stunting advocate that early exposure to infectious disease is not only responsible for shorter stature (and high infant mortality) but such exposure "leaves a residue of long-term health risks for survivors, risks that express themselves in adult height, as well as in late-life disease" (Bozzoli et al. 2009). The leading childhood disease identified to explain this disparity in stature between cohorts was intestinal disease, a condition known to be quite prevalent in nineteenth-century Tucson.

Stature in the Alameda-Stone Cemetery Sample

Despite the indications that diets in Tucson may have been relatively healthful, a puzzling phenomenon observed in the Alameda-Stone cemetery osteological sample was lower stature, particularly for Hispanics. Euroamerican adult males were among the tallest in the sample, averaging an estimated 168.5 cm in height, but they were somewhat shorter than other contemporaneous samples, such as an 1864 anthropometric sample of almost 30,000 U.S. soldiers in New York, who averaged 171.2 cm in height. However, the average stature of Euroamericans in the United States declined from over 170 cm in 1860 to under 169 cm in 1870 (Haines 2004), suggesting that the Euroamerican males in the Alameda-Stone osteological sample were within the range of normal heights. The somewhat short stature of Euroamerican adult males in the sample may be a reflection of the "antebellum puzzle" mentioned above.

Native American males in the Alameda-Stone cemetery were the shortest on average (166.7 cm). Native Americans in the Alameda-Stone sample were also shorter than anthropometric samples of Native Americans in the Southwest, but the compared samples were measured in 1892 and did not include O'odham or Yaqui individuals, who may have made up many of the Native Americans

in the sample. Furthermore, the differences between the Native American sample from the Alameda-Stone cemetery and other compared Native American samples were not statistically significant.

Hispanic male adults were slightly taller than Native Americans on average (167 cm) as well as taller on average than a sample of Mexican prisoners dating from 1851 to 1925. Interestingly, women in the Alameda-Stone sample had very similar heights (156.2–156.4 cm), regardless of ancestry.

Many of the observed differences in stature likely have to do with the combined effects of genetics, nutrition, and infectious disease. However, it was difficult to understand the relative contributions of these effects, particularly because we were not able to examine growth for each group from infancy to adulthood. We were able to analyze growth and development for Hispanic juveniles by assuming that the vast majority of juveniles in the sample would have been Hispanic. Hispanic adults in the Alameda-Stone cemetery were relatively short with respect to some groups, but they were not necessarily outside the expected range of heights for this biological group and time period. Hispanic juveniles, by contrast, were substantially shorter than expected at some ages and appear to have experienced a period of catch-up growth toward the end of their maturation period. One possible explanation for this phenomenon is that Hispanic children were insufficiently nourished, but other available evidence discussed above suggests that they may have experienced healthful diets. We believe that a possible explanation for dampened growth followed by catch-up growth in the Hispanic population may have been infectious disease.

Between the ages of around 7 and14, juvenile heights in the Alameda-Stone sample were two standard deviations below the median height of an age cohort in the U.S. sample of Hispanic juveniles. Between the ages of 16 and 20, however, juvenile and adult Hispanic heights increased rapidly and fell within the range of modern Hispanic heights (Godoy et al. 2010). The rapid increase towards the end of the growth period suggests that Hispanics in Tucson may have experienced a period of growth stunting during infancy and early childhood, resulting in short statures during late childhood and subadulthood, followed by a period of catch-up growth during their late-juvenile and early adulthood years.

In Chapter 9, Volume 2 of this series, Keur explored the implications of genes and the environment on juvenile growth and development and found that juveniles from the Alameda-Stone cemetery were, on average, smaller than similarly situated individuals from other sites or contexts. He could not conclude that these differences were the result of childhood stress because the stature of individuals exhibiting evidence of metabolic conditions, growth disturbances, and systemic infections were indistinguishable from those who did not have evidence of such conditions. Keur's second important conclusion was that the smaller stature of the Alameda-Stone juveniles was not the product of slower growth velocities but was most likely a reflection of the genetic composition of the Alameda-Stone cemetery—predominately Hispanics who were relatively small in stature (Martorell et al. 1987). Harrison's (see Chapter 10, Volume 2 of this series), study of stature was centered on the adults excavated from the Alameda-Stone cemetery. She suggested that adults in the Alameda-Stone sample were of moderately short stature, even for the nineteenth century, but they were not outside of the range of variation among Hispanic samples. Because these two chapters focused on different segments of the population, it was difficult for these authors to account for catch-up growth and other issues that could explain the relatively short stature of the Alameda-Stone sample. In light of this, we will herein incorporate these two data sets and further test the hypotheses of Keur and Harrison.

To combine the juvenile and adult samples, we first established the mean stature estimates for a series of age cohorts, ranging from infant to old adult. For ease of comparison, it was necessary to partition the juvenile individuals into age cohorts consistent with those established for other stature data series. These age cohorts were based on 1-year intervals, beginning with birth to 8.9 years and then 2-year intervals beginning with 9.0–15.9 years. Because stature estimates were not included in Keur's chapter (see Chapter 9, Volume 2 of this series), it was necessary to calculate these from the raw data. Any available maximum long-bone lengths for each individual were used to derive estimates of living stature. For example, if maximum femoral length was the only available measurement for one juvenile and maximum tibia length for another, these two estimates were used concurrently. Applying the same procedure to the other individuals in each age cohort, we obtained enough data to derive descriptive statistics for each. For the adults in the Alameda-Stone sample, stature was estimated only for those individuals identified as Hispanic or indeterminate in order to remove any effects produced by the taller Euroamericans (see Chapter 10, Volume 2 of this series). Mean stature was estimated for each 5-year age cohort. These data were derived from raw data supplied by Harrison.

Figure 69 presents the entire range of mean stature estimates by age cohort for the Alameda-Stone sample. This distribution followed the typical growth curve for humans and did not have major deviations from the expected model for any age. Some of the dips and valleys represent individual idiosyncrasies as the sample sizes for those age cohorts were small. On the whole, the overall model (combination of juveniles and adults) fit closely with Keur's (see Chapter 9, Volume 2 of this series) and Harrison's (see Chapter 10, Volume 2 of this series) convictions that the Alameda-Stone cemetery sample was composed of shorter individuals.

To further test this hypothesis, we compared the Alameda-Stone sample to a large group of modern individuals

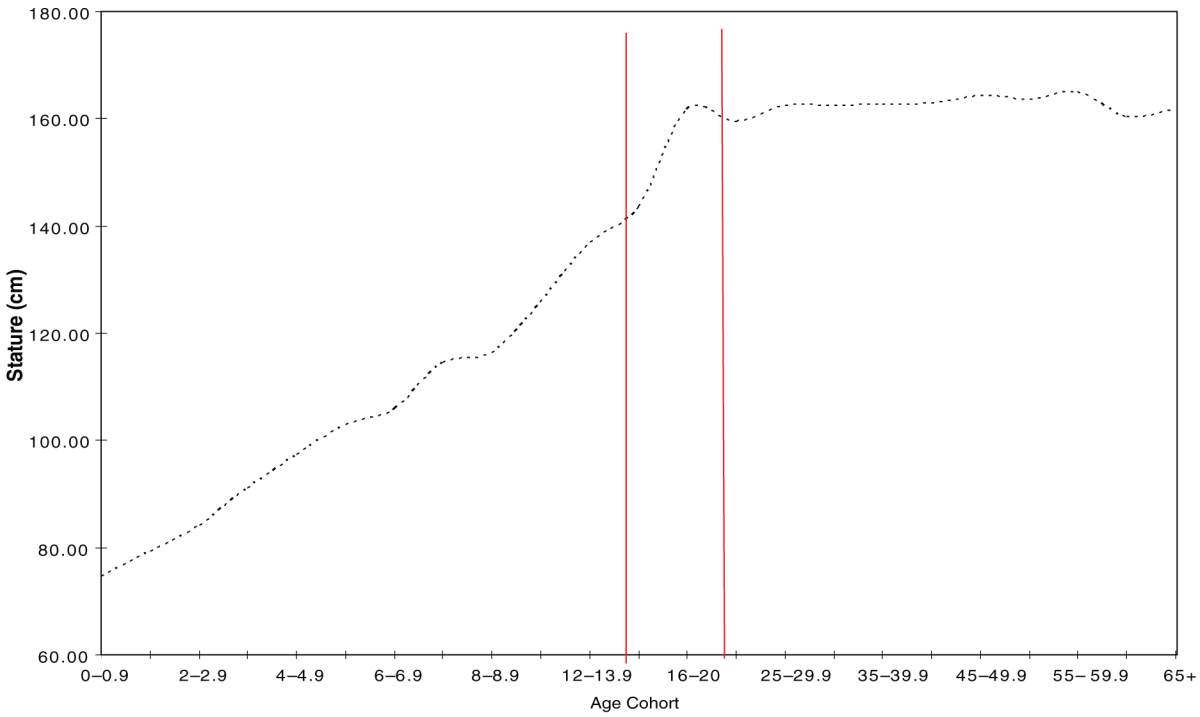


Figure 69. Estimated stature of juveniles and Hispanic adults from the Alameda-Stone cemetery.

composed of individuals of Hispanic, Euroamerican, and African American ancestry. These data were obtained from the National Health and Nutrition Examination Survey, a compilation of demographic and anthropometric data collected from over 10,000 individuals, ranging in age from 1 to 80 years old (CDC 2010). Stature data were available for a large number of these individuals (n = 8,873). A subset of this sample was also used, composed of only individuals self-identified as Hispanic (Mexican American). The individuals in this subset were males (n = 877) and females (n = 903), ranging in age from 1 to 80.

Figure 70 illustrates the shorter stature of the Alameda-Stone sample from birth up to 45 years. The vertical bars represent two standard deviations and encompass approximately 95 percent of the variation in the modern U.S. sample. At every age after 5.9 years, the Alameda-Stone sample was at least two standard deviations below the modern U.S. mean. As age increased, so too did the gap between the two, up to age 16 or so, when the Alameda-Stone sample spiked upward drastically (area between two red lines in Figure 69). This increase in stature is best explained by catch-up growth, or accelerated rates of growth following a period of interrupted growth. However, even after this period of catch-up, the Alameda-Stone sample remained shorter within every age cohort suggesting they were, on average, shorter than individuals of similar age in the modern U.S. sample. This is not surprising given change in adult heights in the United States from the nineteenth through the twentieth centuries. Adult heights decreased dramatically in the United States and other countries during the nineteenth century, as discussed above, and then increased during the late nineteenth and twentieth centuries. Figure 71 compares the stature of the Alameda-Stone sample to the modern Hispanic sample. Clearly the pattern is very similar to Figure 70, but in Figure 71, the only deviations outside of the normal range of variation again fall between the ages of 7 and 14 years, when the Alameda-Stone sample was on average 15 cm shorter than their modern Hispanic counterparts. Explanations for this period of delayed growth can be tied to nutritional deficiencies and dietary deficits during infancy and early childhood among the Alameda-Stone cemetery individuals. Although consistently smaller, the Alameda-Stone stature estimates of all other age cohorts did not differ significantly from the modern Hispanic sample, again suggesting a period of interrupted growth from the ages of 7 to 14, followed by a period of rapid catch-up growth.

Godoy et al. (2010) suggest three explanations for catch-up growth. These include (1) biases introduced by variables not identified, but affecting growth rates; (2) reallocation of resources by parents or guardians in an effort to drive growth rates up; and (3) the effects of developmental plasticity when growth rates are most rapid. Regarding the Alameda-Stone cemetery sample, identifying variable biases would be difficult and identifying reallocation of resources when all of the subjects in a study are deceased is next to impossible. Developmental plasticity is also difficult to assess from a skeletal population, but it seems a

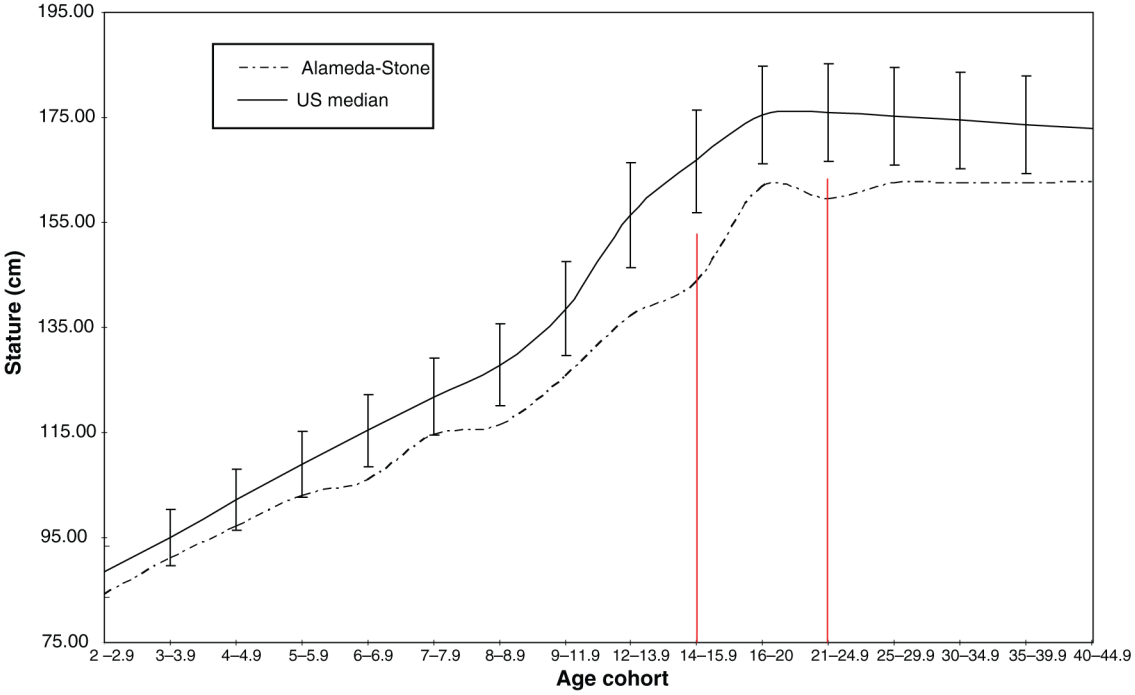


Figure 70. Estimated stature of juveniles and Hispanic adults from the Alameda-Stone cemetery, compared to the modern United States sample.

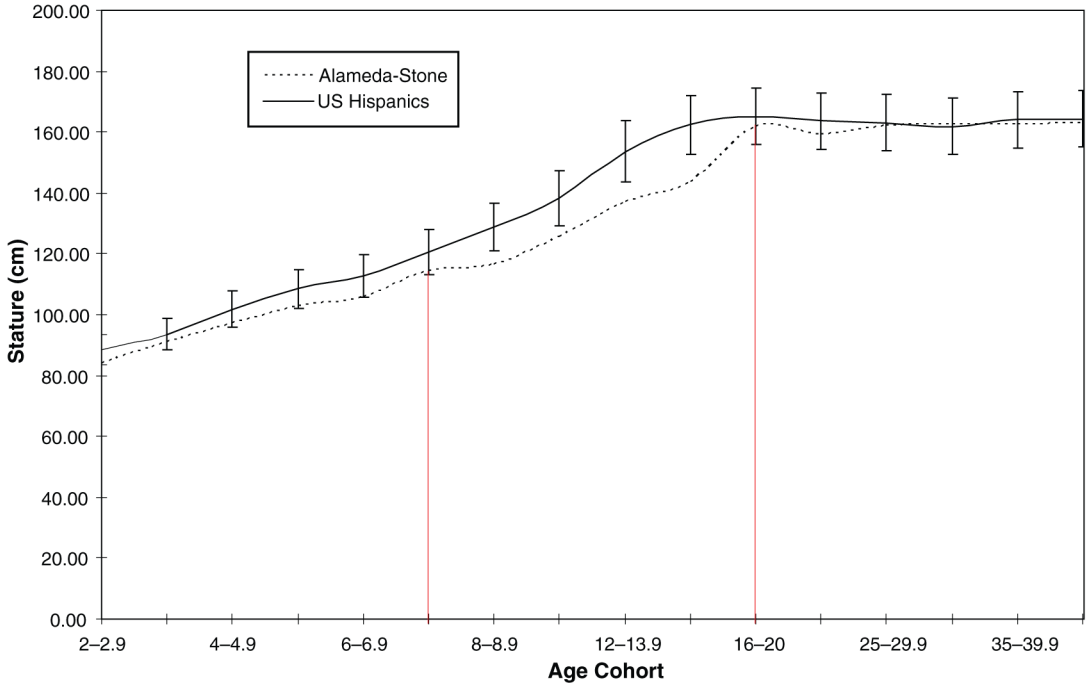


Figure 71. Estimated stature of juveniles and Hispanic adults from the Alameda-Stone cemetery, compared to the modern United States sample of individuals identified as Hispanic.

likely explanation given what we know of diets and disease in Tucson during the nineteenth century.

Of course, at sufficiently high levels of mortality, such as the pattern observed in the Alameda-Stone cemetery, differential mortality often leads to a taller population of adults, which could be confused in an osteological analysis with evidence for catch-up growth. Because we did not have the opportunity to examine longitudinal data on stature, but rather only osteological data for juveniles and adults who died during a relatively short period, the apparent period of catch-up growth in the sample could represent individuals whose growth had not been stunted.

Comparative Examinations

Stature information for adult individuals was available from four comparative sites: Voegtly Cemetery, Freedman's Cemetery, Refugio Mission, and the Secaucus Potter's Field. Because the reported statures for these comparative sites are provided irrespective of attributes other than age (all reported statures refer to adults) and sex, comparisons were made between mean statures for all adult males and all adult females at Alameda-Stone cemetery. The mean stature for adult males at Alameda-Stone was 167.33 cm (sd = 6.13 cm), and the mean stature for adult females at Alameda-Stone was 156.2 cm (sd = 4.73 cm).

At Voegtly Cemetery, the mean stature for adult males was reported as 170.0 cm (sd = 5.11 cm), and the mean stature for adult females was 160.2 cm (sd = 3.82 cm). From Freedman's Cemetery, the mean adult male stature was 171.9 cm, and the mean adult female stature was 159.6 cm. Refugio Mission adult males had a mean stature of 164–166 cm, and females had a mean stature of 153–155 cm. Finally, from Secaucus Potter's Field, the adult male mean stature was 168.69 cm, and the adult female mean stature was 162.30 cm (Figure 72).

As Figure 72 indicates, adults from the Alameda-Stone cemetery were, on average, among the smallest in the comparison. Indeed, only adults from the Refugio Mission sample had smaller statures. Males from Alameda-Stone were similar to those from the Secaucus Potter's Field sample, the former averaging just 1.36 cm smaller than their counterparts at Secaucus Potter's Field. The difference between adult females from these two sites was more dramatic. On average, adult females from Alameda-Stone were 6.1 cm shorter than adult females from the Secaucus Potter's Field sample. Interestingly, adult females from Secaucus Potter's Field were the tallest in the comparison. Adult males from both Voegtly Cemetery and Freedman's Cemetery were taller than those from Secaucus Potter's Field.

Clearly, a large amount of variability is seen in the mean statures of adult males and adult females from the five sites under consideration. The reasons are numerous, from either poor or good health, to underlying genetic contributors. Although the magnitude of difference among members of each sex vary, that variation is not enough to overcome the general trend in dimorphism, that males were typically larger than females. Indeed, no group deviated from this trend, and across all groups, on average, the tallest females were still smaller than the shortest males.

Evidence for Work

People living in Tucson prior to the opening of the Alameda-Stone cemetery were engaged in a variety of activities associated with agriculture, ranching, and mining; as well as activities associated with building and maintaining homes, churches, storage facilities, and defensive structures; manufacturing and maintaining tools; collecting firewood and water; and processing food for meals. Men were reported to have spent a lot of their time on horseback, consistent with their ranching lifestyles, and many would have been soldiers on campaigns against hostile Native American groups as well as in campaigns associated with the Mexican revolution and the Mexican American War. Women and girls would have engaged in regular domestic activities, including sewing, cleaning clothes, grinding corn with manos and metates, preparing meals, and the many other tasks associated with running a household, raising children, and organizing social events. Because Tucson was a remote frontier town, many of the activities necessary for the daily protection and maintenance of the settlement would have been left to the settlers (Herring 2009; Sheridan 1986). Although one could characterize Tucson as a sedentary population in that most residents lived there year-round, it seems that most Tucson residents would have led active lifestyles with many opportunities for strenuous, physical work. Native Americans living at the settlement were probably somewhat more mobile than other residents, as they moved more often between settlements, agricultural fields, and procurement areas. Native Americans would have also retained some traditional subsistence and craft activities, such as collecting cactus parts and agave for food, hunting, and making baskets and pottery.

Many of the daily activities that characterized Tucson before it became a U.S. town continued to characterize the town while the cemetery was in use. Ranching, agriculture, and mining remained important activities central to the economy, as did soldiering. As the population grew and Tucson functioned as a supply depot for the U.S. military, many people also worked as teamsters in order to bring supplies to Tucson on wagon trains and pack trains. At the same time, occupations diversified and a sizable number of white-collar jobs came to Tucson. Sheridan (1986) showed that during the period the cemetery was in use, many Euroamerican migrants to the town, along with a minority of Hispanics, held white-collar jobs. By contrast, the

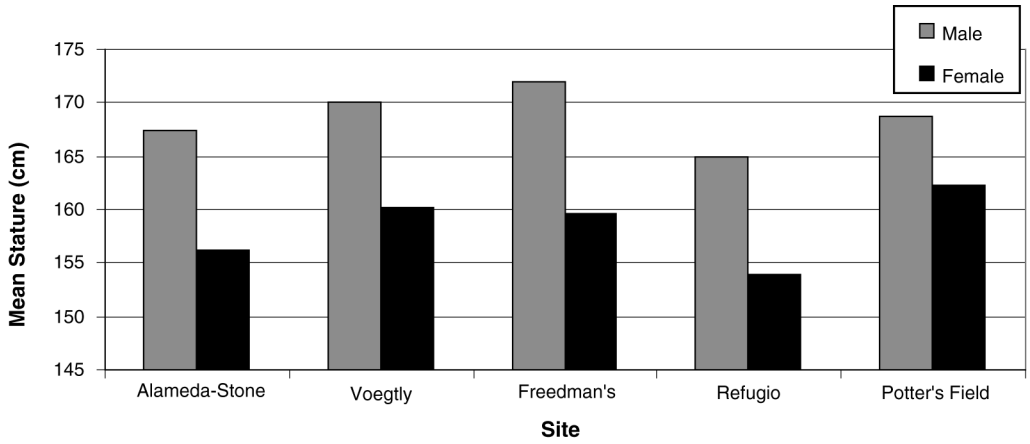


Figure 72. Stature at Alameda-Stone cemetery compared to four other sites.

majority of Hispanic residents held blue-collar jobs. Native American males were often hired as Indian scouts for the U.S. military and also worked in ranching and a variety of agricultural tasks associated with planting and harvesting. Native American women also worked as domestics for Tucson households. O'odham living at San Xavier del Bac, in addition to working in ranching and agriculture, made pots that they sold in Tucson, along with firewood.

In the 1860 census, the most common occupations listed for Hispanics included laborer, farmer, seamstress, servant, washerwoman, blacksmith, brick mason, and herder. Other jobs listed for Hispanics were diverse and included merchant, grocer, brewer, cooper, barber, butcher, tailor, miner, and landlady. The most frequently listed occupations for Euroamericans included laborer, carpenter, merchant, farmer, trader, stage driver, bookkeeper, clerk, and butcher. Other jobs for Euroamericans included machinist, miller, blacksmith, grocer, civil engineer, physician, and cabinetmaker. Native American jobs listed were laborer, servant, and washerwoman. An African American carpenter and an African American laborer were also listed.

Jobs generally diversified over the next decade and although many of the occupations of Hispanics, Native Americans, and Euroamericans overlapped in function, Euroamericans were generally paid substantially more than Hispanics or Native Americans for the same jobs. The most frequent occupations listed for Hispanics in the 1870 census included homemaker ("keeping house"), laborer, farm laborer, seamstress, domestic servant, laundress, carpenter, teamster, farmer, blacksmith, and brick mason. Other jobs included peddler, shoemaker, baker, brick maker, clerk, grocer, milliner, mule packer, miner, silversmith, and tailor. The most frequent occupations listed for Euroamericans included laborer, miner, homemaker, carpenter, teamster, clerk, cook, blacksmith, baker, and gambler. Other jobs included lawyer, butcher, farmer, stonemason, saloon keeper, freighter, and wagon master.

Obviously, people buried in the Alameda-Stone cemetery would have performed a wide variety of types of labor during their lifetimes, with a somewhat greater tendency among Euroamericans to hold skilled and specialized jobs. Nonetheless, many individuals would not have been strangers to strenuous manual labor that would have strained joints and muscles differentially, depending on the task and the frequency and intensity with which it was performed.

Osteological Evidence for Work

The brief snapshot of work in Tucson suggests that there could be observable differences in osteological evidence for work according to sex, cultural affinity, and cemetery area. In this section, we discuss evidence for degenerative changes to the skeleton, variation in body asymmetries and femoral robusticity, vertebral fractures potentially associated with behavioral activities, and spondylolysis, a vertebral condition sometimes associated with herniation of intervertebral discs.

Humeral Robusticity and Shape

The biomechanical responses of bone to physical stress can provide information useful for the reconstruction of activity levels in past populations (Bridges 1989). Harrison (see Chapter 10, Volume 2 of this series) used external dimensions of femurs and humeri as a proxy to measure femoral shape and robusticity and cross-sectional shape and symmetry of the upper arm.

Humeral and femoral midshaft shapes were calculated to determine whether the bone shaft was eurybrachic (flattened in the anterior-posterior plane) or platybrachic (approaching a more circular shape in the anterior-posterior plane) (Wanner 2007). Platybrachic humeri are considered to have been less stressed than eurybrachic humeri in the

anterior-posterior plane (Larsen 1999; Pietrusewsky and Douglas 2002). Femoral robusticity was calculated (Cole 1994; Ruff 1987; Wescott 2006) to determine if a femoral shaft was elongated in the anterior-posterior plane or elongated in the medial-lateral plane. Elongation of the femoral shaft in the anterior-posterior plane is associated with increased loading forces and suggests strenuous lower-body activity (Ruff 1987; Wescott 2006). For each measurement of shape and robusticity, sexual dimorphism was calculated by subtracting the female mean from the male mean, dividing by the male mean, and multiplying by 100. Body asymmetry was calculated in a similar manner. Variation within and between groups in long-bone shape, robusticity, body asymmetry, and sexual dimorphism offers insight into differential activity levels of individuals interred in the cemetery.

Degenerative Joint Disease

Degenerative joint disease—also referred to as osteoarthritis, osteoarthrosis, or hypertrophic arthritis—is a common degenerative articular disease resulting from overuse activity and aging (McCarthy and Frassica 1998:324). Rogers and Waldron (1995:32) (see also Hollinshead 1982:629–630; Steele and Bramblett 1988:215) characterize osteoarthritis as "a focal loss of articular cartilage and subsequent bony reaction of the subchondral and marginal bone."

There are two categories of degenerative joint disease: primary and secondary. Primary degenerative joint disease involves bony joint changes with no preexisting joint disease. Secondary degenerative joint disease occurs when there is a preexisting joint disorder, such as rheumatoid arthritis, trauma, or osteonecrosis (McCarthy and Frassica 1998:324; Ortner and Putschar 1981:419). The affected joints and the nature of the changes to the joint allow for a more thorough differential diagnosis between the two. Although degenerative joint disease can result from a wide variety of causes unrelated to work patterns and is age-related, differences in degenerative joint disease among a cemetery sample can suggest possible differences in work regimes among different segments of a population.

Spinal Injuries

Spinal injuries are different from general fractures, although the latter may include trauma to the spine. What sets spinal injuries apart is a distinct skeletal presentation of the injury that allows observers to infer a particular activity that led to the injury. One such spinal injury is spondylolysis. This injury involves a separation of the spinous process from the body of the vertebra (Capasso et al. 1999:24; Merbs 1983:120, 1996:357). When in the lower spine (lumbar vertebrae), spondylolysis may be the result of a largely predictable set of activities, such as heavy lifting. Spondylolysis has been associated with work postures among Alaskan natives and grain porters in Zambia and Cape Province (Capasso et al. 1999). This distinguishes spondylolysis and other spinal injuries from general fractures because the range of possible causes is relatively finite, and may suggest certain habitual behaviors in which the individual engaged.

Other types of vertebral fractures include compression fractures and clay shoveler's fracture. Compression fractures of the spine generally occur from falls and, in most cases, result from accidents (Ortner 2003:144). However, compression fractures can also occur from the combined effects of trauma and a preexisting condition, such as osteoporosis or tuberculosis of the spine. Once the structural integrity of the underlying bone is weakened, accident or stress more easily causes vertebral body failure. Clay-shoveler's fracture occurs when a fragment of the sixth or seventh cervical or first thoracic vertebra tears away from the main mass of bone. Clay shoveler's fracture usually results when the trapezius and rhomboid muscles suddenly contract, breaking the bone, but can also result from direct trauma to the bone (Solaroğlu et al. 2007:162; Unay et al. 2008:187).

An additional form of vertebral trauma considered here are Schmorl's nodes. Schmorl's nodes are small depressions on the superior and/or inferior surfaces of the vertebral body, usually occurring in the lower thoracic vertebrae or the lumbar vertebrae (Capasso et al. 1999:38; Jurmain 1999:163). The etiology of Schmorl's nodes is unclear, but some researchers assert that these fractures result from the herniation of the intervertebral disc, creating a nodule that, through repetitive mechanical activity and loading, forms lesions on the vertebral plate (Capasso et al. 1999:38). According to Rankin-Hill (1997:125), "the frequency of Schmorl's nodes can be indicative of strenuous activity."

Osteological Evidence for Work in the Alameda-Stone Cemetery Sample

Together, the osteological evidence for differences in work and activity patterns suggest that males and females in Tucson performed different kinds of daily activities and that Native Americans may have followed somewhat different work regimes from their Euroamerican and Hispanic counterparts. By contrast, Euroamericans and Hispanics appear to have shared fairly similar patterns in the shape and robusticity of long bones and in the incidence of degenerative joint disease, although Hispanics may have suffered trauma to the spine to a greater degree than other groups. Despite emerging differences in the kinds of occupations performed by Euroamericans, Hispanics, and Native Americans in Tucson while the cemetery was in use, these occupational differences were not strongly registered in the bones of the deceased.

Males and females in the Alameda-Stone sample were found to be largely symmetrical in humerus midshaft shape, although both sexes had slightly more-rounded left humeral shafts. Humerus midshaft shape was also more rounded for males than females. Males in Cemetery Areas 1 and 2 also displayed a more-rounded right humerus than males in Cemetery Areas 3, 4, and 5. The opposite pattern was found for females, with females in Cemetery Areas 1 and 2 displaying a more-flattened, left humerus than females in Cemetery Areas 3, 4, and 5. No significant differences were found between Euroamericans and Hispanics for either right or left humeri, but Native Americans had significantly flatter humeri than Euroamericans. Sexual dimorphism in humerus midshaft shape was found to be greatest for Native Americans for both right and left sides, whereas Euroamericans and Hispanics displayed a lower level of dimorphism and asymmetry and had nearly identical humeral midshaft shapes on their right sides. Overall, Harrison (see Chapter 10, Volume 2 of this series) concluded that the significant variation between males and females in humeral shape was a good indicator of differential behavior patterns between males and females. Significant differences between Native Americans and Euroamericans and Hispanics could also indicate differences in behavior, but Harrison cautioned that biological factors other than behavior could play a role in determining differences in humeral shape.

For femoral midshaft shape, males and females each exhibited a slight anterior-posterior elongation of the femoral midshaft, with males showing a significantly more-elongated femoral midshaft shape than females. Femoral robusticity was not significantly different between males and females overall. Unlike humeral midshaft shape, there was virtually no difference between cemetery areas for femoral midshaft shape or femoral robusticity. When analyzed according to sex and biological affinity, no significant differences were observed. However, the femurs of Native American females were less robust than those of Native American males and had more-pronounced medial-lateral elongation, whereas Native American males displayed anterior-posterior elongation of the femoral midshaft. Altogether, these results suggest few significant differences in femoral midshaft shape and robusticity, with the exception of differences between Native American males and females and between males and females in general, which may suggest differences in mobility patterns between males and females, particularly for Native Americans.

In comparison to measurements on other studied groups compiled by Wescott (2006), significant differences were found for male femoral-midshaft shape between Alameda-Stone Euroamericans and Hispanics and measurements taken on late modern industrialists; equestrian, maize, incipient and village horticulturalists; and broad-spectrum hunter-gatherers. Hispanics females also differed significantly from the same groups for femoral midshaft shape, but no significant differences between the Alameda-Stone cemetery and samples from other groups were found for Euroamerican or Native American females. The lack of significant differences for Euroamerican or Native American females could be the result of a small sample size for these segments of the population. Together, these data seem to indicate that mobility patterns in Tucson differed from those of a wide range of mobile, sedentary, and industrialized groups.

Vertebral fractures were relatively rare in the Alameda-Stone cemetery sample. Spondylolysis affected only 3 percent of adults, with males and females being affected equally, and Hispanics affected slightly more often than Euroamericans. All cases of spondylolysis were on individuals from Cemetery Areas 3, 4, and 5, with most in a fairly clustered distribution in Cemetery Area 3, suggesting a possible genetic or behavioral connection between these individuals. Only three adult males had clay shoveler's fracture, or approximately 1 percent of males observable for the condition. Like spondylolysis, vertebral compression fractures affected approximately 3 percent of adults, with males affected much more often than females. In addition, Hispanic individuals were affected by vertebral compression fractures more often than Euroamericans or Native Americans.

Schmorl's nodes were observed considerably more often than vertebral fractures. They were noted on the vertebrae of 106 adults, or approximately 14.5 percent of all adult individuals recovered from the Alameda-Stone cemetery. Like vertebral compression fractures, Schmorl's nodes were much more common on males, in comparison to females, and were most commonly seen on the vertebrae of Hispanic individuals. Perhaps, strenuous activities resulting in vertebral compression or herniation of intervertebral discs were most common for males, in comparison to females, and for Hispanics, in comparison to other biological affinities.

The expression of degenerative joint disease in the Alameda-Stone sample differed significantly between males and females, with the exception of the right ankle. The shoulder, elbow, wrist, and lower backs of males were affected much more than in females. Conversely, the lower limbs of females, particularly the knee, were much more likely to be affected by degenerative joint disease. The differential expression of degenerative joint disease throughout the body suggests that men and women were participating in different activities and thus the mechanical stressors acting on individual joints were expressed differently.

Not surprisingly, the young, middle, and old age groups were all significantly different in the expression of degenerative joint disease throughout the skeleton, with evidence for degenerative joint disease increasing from young to old age. Males and females presented a very similar pattern according to age.

Differences in the expression of degenerative joint disease were also observed between biological affinities.

Native Americans had the highest percentage of individuals affected by degenerative joint disease (74 percent), followed by Hispanics (69 percent) and Euroamericans (55 percent). Hispanics showed significantly more degenerative joint disease in both shoulders and both elbows than did Native Americans or Euroamericans, which may indicate differences in mechanical loading; strain from habitual, repetitive motions is a possible source.

Several general patterns were also established. For all individuals with some form of degenerative joint disease, the temporomandibular joint showed the lowest frequency and the elbows showed the highest frequency (Figure 73). When left and right sides of joints were combined, the trend remained unchanged, with the temporomandibular joint complex displaying the lowest frequency and the elbow joint complex displaying the highest frequency, followed by the shoulders and the knees (Figure 74).

Comparative Examinations

In order to understand how life in Tucson affected early Tucsonans and whether their experience was shared or unique to other populations, comparisons were made to contemporaneous cemetery samples in the United States and Canada. Because each project collected and analyzed data according to disparate methods, most comparisons cannot be made on a one-to-one basis in a quantitative fashion.

The incidence of degenerative joint disease was compared to the samples from the Tucson Presidio, San Agustín de Tucson, Freedman's Cemetery, Refugio Mission, Voegtly Cemetery, the Secaucus Potter's Field, and the New York African Burial Ground. Dayhuff (2002:10, 13, 93) found that females from the Tucson Presidio and San Agustín de Tucson exhibited a higher likelihood of bilateral degenerative joint disease, specifically at the shoulder, whereas males from Refugio Mission tended to exhibit a unilateral expression in the same joint. By contrast, there was no difference in the expressions of degenerative joint disease between right and left sides for individuals interred in Tucson.

In the New York African Burial Ground sample, appendicular joint disease was most common in the ankle. For males, 48.3 percent of evaluated ankles showed evidence of osteoarthritis. Similarly, in the females, 49.4 percent of ankles showed joint disease. The hip was next most commonly affected, with 39.1 percent of male joints and 39.8 percent of female joints affected. Overall, the frequencies of joint disease were similar between males and females, with the exception of the elbow. For that joint, 34.4 percent of male elbows showed degenerative change, whereas just 22.5 percent of female elbows were affected. By and large, the females from the New York African Burial Ground exhibited more degenerative change in the upper limbs, whereas males showed more arthritic change in the lower limbs.

At Freedman's Cemetery, Refugio Mission, Secaucus Potter's Field, and Voegtly Cemetery, more males than females presented extreme arthritic changes, similar to the patterns in the Alameda-Stone cemetery sample. In comparison to other cemeteries, the Freedman's Cemetery sample closely matched the frequencies of male/female affected joints from Alameda-Stone. However, there were higher frequencies of degenerative joint disease in the knee joint in the Freedman's Cemetery sample than seen in the Alameda-Stone sample, and lower frequencies of degenerative joint disease in the hands and wrists were observed in the Freedman's Cemetery sample.

Detailed information by joint was not immediately available for the Secaucus Potter's Field sample. Nevertheless, 56 cases of degenerative joint disease were noted from the burial sample of 409 individuals, giving a frequency of 13.7 percent. This was dramatically lower than the 65.33 percent rate of joint disease seen in the Alameda-Stone cemetery sample. Of these 56 cases, 78.7 percent were male, 19.6 percent were female, and 1.8 percent were of unknown sex. Across the burial sample, 16.2 percent of adult males were affected, as were 22.9 percent of adult females, and 4.5 percent of adults of indeterminate sex. Again, these frequencies were in contrast to those observed in the Alameda-Stone sample (71.43 percent of males, 63.50 percent of females, and 40.38 percent of adults of unknown sex). The reasons for this disparity are not immediately clear.

In the Voegtly Cemetery sample, extreme arthritic change was not confined to individuals of older age, and the shoulder and elbow were frequently affected. This follows a pattern similar to that seen in the sample from Alameda-Stone. However, the high frequency of degenerative joint disease in the wrist seen in the Alameda-Stone sample was not present in the Voegtly sample. The general similarities between the Freedman's Cemetery, Voegtly, and Alameda-Stone samples suggest some similarities in lifestyles and daily activities, with degenerative changes occurring at a young age and in some of the same joint complexes.

The results from the analysis of the Alameda-Stone sample were particularly different from the Refugio Mission cemetery, where a high frequency of degenerative joint disease for older adults was observed, specifically in the knees. In general, the rate of degenerative joint disease within the Refugio Mission cemetery sample was low, especially when compared to other populations, suggesting a relatively low level of physical stress (Jantz et al. 2001). The general trend at the Refugio Mission suggests a higher frequency of degenerative joint disease for older adults compared to young adults, and males more often affected than females. In the Refugio Mission sample, the lower limbs, particularly the knee, was the most affected joint, whereas elbows and shoulders were most frequently affected in the Alameda-Stone sample. Leher et al. (see Chapter 11, Volume 2 of this series) suggest that the individuals buried in the Alameda-Stone cemetery may have

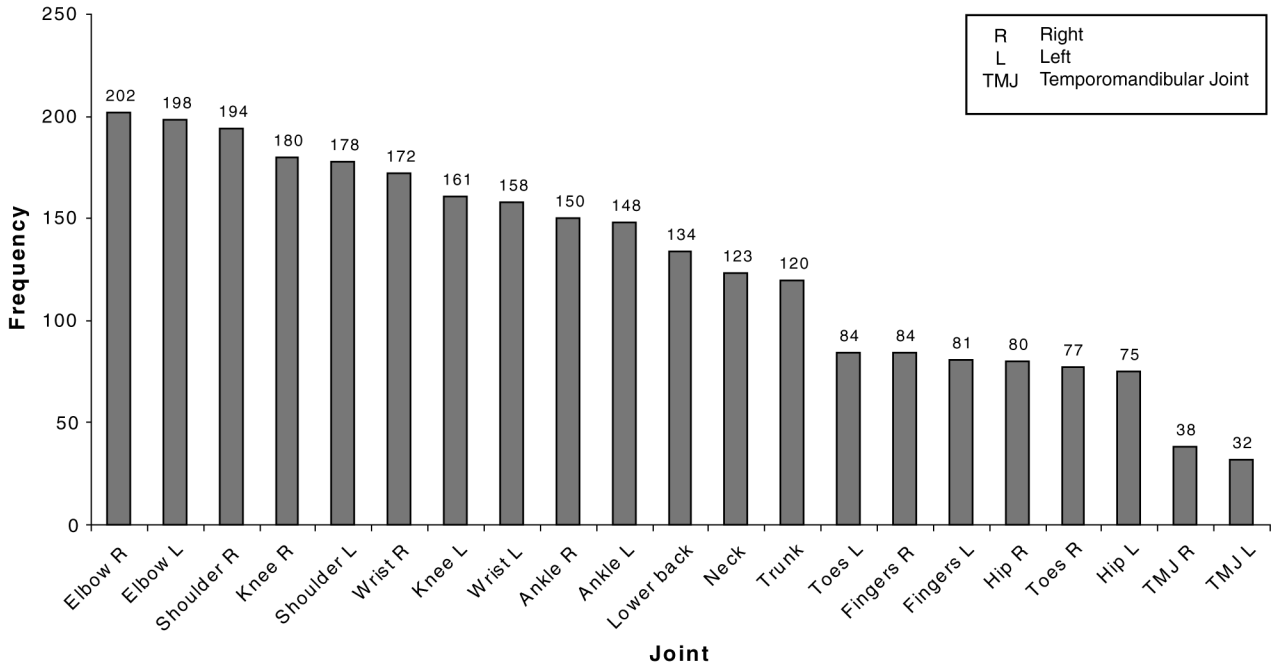


Figure 73. Distribution of degenerative joint disease at each joint complex.

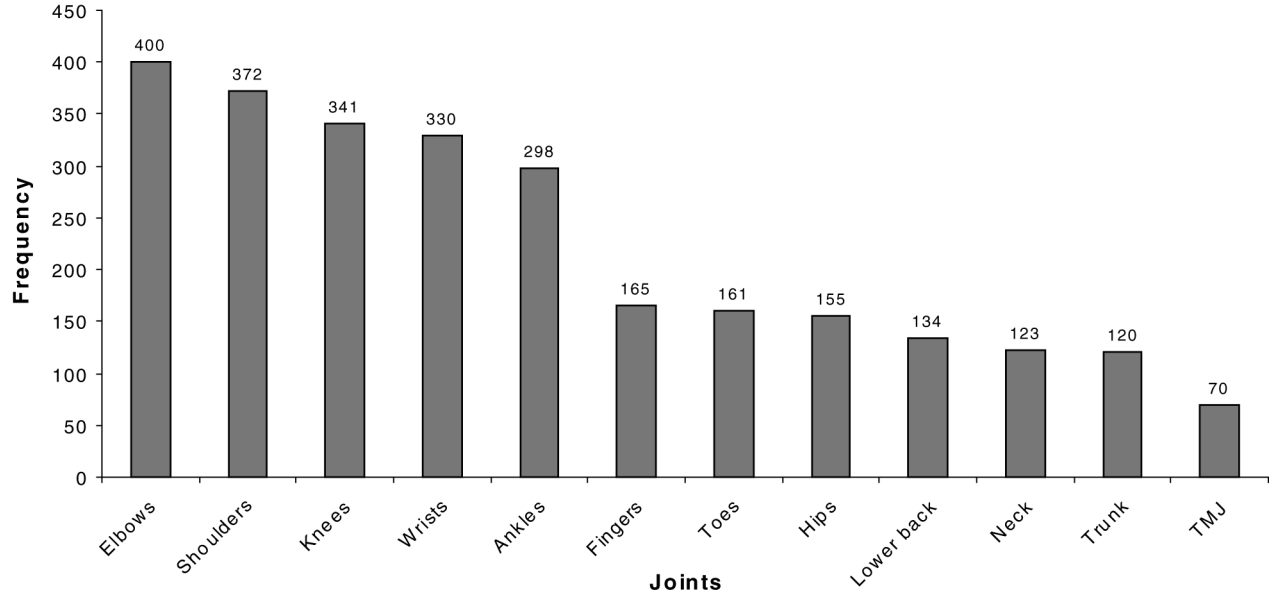


Figure 74. Distribution of degenerative joint disease at combined joint complexes.

experienced more strenuous activity than those buried in the Refugio Mission cemetery, based on higher frequencies of degenerative joint disease as well as in a greater diversity of joint complexes.

Trauma

By the time the Alameda-Stone cemetery had opened, Tucson had developed a reputation as a lawless, violent town full of ruthless criminals and cutthroats. For instance, J. Ross Browne (1869:22) had nothing but the grimmest words to describe Tucson in the late 1850s:

> Tucson became the head-quarters of vice, dissipation, and crime. It was probably the nearest approach to Pandemonium on the North American Continent. Murderers, thieves, cutthroats, and gamblers formed the mass of the population. Every man went armed to the teeth, and scenes of bloodshed were of every-day occurrence in the public streets. There was neither government, law, nor military protection. The garrison at Tucson confined itself to its legitimate business of getting drunk or doing nothing. Arizona was perhaps the only part of the world under the protecting ægis of a civilized government in which every man administered justice to suit himself, and where all assumed the right to gratify the basest passions of their nature without restraint. It was literally a paradise of devils.

Even the soldiers themselves were considered unruly and prone to vice. Assistant Surgeon Henry Durant wrote in 1869 that

> The men select as a means of recreation the dance houses and groggeries of Tucson. And here it may not be amiss to suggest that it is a matter which for the good of the service is worthy of investigation, why it is, that the vicious, the depraved, and the drunken, always fly to the army as a last resource. It is a deplorable fact that a large proportion of the Army is composed of the Outcasts of Society—men from their very natures, incapable of earning an honest livelihood—and those who by their crimes and misdemeanors, have forfeited the esteem of all who know their careers. The bravado; the thief, and the fugitive from prison, are to be found in the ranks, and it requires no homily to convince that one or two such as these in a Company, will corrupt and render comparatively worthless, whatever good men may find their way therein [National Archives and Records Administration, Record Group 94, Entry 547, Book 13:15–16].

Although violent crimes occurred in Tucson, the level of violence in this frontier town could have been exaggerated. Bourke (1891), for instance, suggested that the legendary violence in Tucson originated in a very specific manner and was limited to a relatively short period, particularly from 1859 until the arrival of the U.S. military in 1862, during which time

> Arizona had received a most liberal contingent of the toughs and scalawags banished from San Francisco by the efforts of its Vigilance Committee, and until these last had shot each other to death, or until they had been poisoned by Tucson whiskey or been killed by the Apaches, Arizona's chalice was filled to the brim, and the most mendacious real-estate boomer would have been unable to recommend her as a suitable place for an investment of capital [Bourke 1891:119].

The same understanding was echoed by Acting Surgeon Durant, who said that between 1859 and 1862 "the town had been the resort of murderers, thieves, and vagabonds of every grade who had fled from the Vigilance Committee of San Francisco" (National Archives and Records Administration, Record Group 94, Entry 547, Book 13:2). With the arrival of the U.S. military in 1862, Tucson was placed under martial law and heavy restrictions were placed on gambling and alcohol sales (Masich 2006). By 1868, one correspondent for the *Weekly Arizona Miner* commented that "notwithstanding its hard name abroad, I should say that Tucson was a very peaceable, orderly town, for the frontier" (*Weekly Arizona Miner*, 24 October 1868b:2).

Although sensationalized to some degree, southern Arizona remained a violent area during the period the cemetery was in use. Soldiers were frequently engaged in campaigns against Apache groups and travelers were repeatedly attacked, robbed, and murdered. Newspaper accounts described the level of violence from Apache attacks with a tone of despair and urgency. For instance, an article in the *Weekly Arizonan*, titled "Murders and Robberies by Indians," reported

> The Indian troubles during the past two weeks have been of a more serious character than usual. These are at all times sufficiently terrible, but of late have been carried on with a recklessness that is truly surprising. Reports of depredations reach us from every direction. . . . Thus it will be seen that the condition of the people is gradually becoming more and more terrible, and life and property more and more insecure. It is not therefore surprising that in some instances we

> find men sacrifice the fruits of their labor to enable themselves to leave the Territory; that they may at least save their lives. Under the present condition of affairs life is in danger at a distance of 300 yards outside the limits of any town or military post in the Territory [*Weekly Arizonan*, 11 December 1869a:3].

Similar comments were made in hospital records. In January 1870, the records for the hospital in Tucson indicated that "the Apaches in this portion of the Territory have become troublesome lately, roving in small bands, and murdering and plundering unfortunate travelers" (National Archives and Records Administration, Record Group 94, Entry 547, Book 13:153). The following month, the hospital records noted that "Captain Remy 1st Cav, Wife, and Child, also Capt Adams and Wife, and Lt. Rogers…were 'jumped' by a party of Indians near the Picacho, and the entire train containing their baggage, together with 22 mules, captured. Two discharged soldiers, who were unarmed, and one teamster lost their lives in the attack" (National Archives and Records Administration, Record Group 94, Entry 547, Book 13:157). The threat of Apache attacks remained high during the early 1870s, to the extent that travel was "never attempted except by well armed parties, and even these are frequently attacked, when the probable gain to the Indians is proportionate to the risk. Government trains are always accompanied by a sufficient Escort, generally about 10 men exclusive of the teamsters" (National Archives and Records Administration Record Group 94, Entry 547, Book 13:71).

Newspaper descriptions of people slayed by Apaches were gruesome, with many victims being tortured and disfigured. For instance, the body of a soldier stationed at Camp Lowell was found "stripped of his clothing, his hands were tied behind him and his body was pierced with spears from head to foot, and his heart cut out in savage style" (*Arizona Citizen*, 7 September 1872a:2). Another newspaper article indicated that Apaches "have tied white men by the heels to trees, then built slow but consuming fires under their heads, and kept them up until life was extinct" (Recent Indian Crimes and Depredations, *Weekly Arizona Miner*, 20 November 1869:3).

In part spurred by newspaper accounts, the citizens of Tucson sometimes struck out in retaliation against the Apache. The most flagrant of such actions was the Camp Grant Massacre of 1871 in which 148 men assembled in Tucson, including 94 Tohono O'odham, and headed out to the Apache camp at Camp Grant. They arrived at the camp in the early morning of April 30, 1871, at a time when most of the men of the settlement were away hunting. Within a few short minutes, 100 Apaches were gruesomely murdered, most of them women and children, with the remainder taken captive to be enslaved in Mexico (Wagoner 1970:124–131; Papers of Reuben Augustine Wilbur, University of Arizona Special Collections, AZ 565, Folder 2).

Gruesome murders as well as executions were also reported in Tucson, such as the tragic case of Vicente and Librada Hernandez and their alleged killers. Former teachers who had run a school in Albuquerque before moving to Tucson, Vicente and Librada Hernandez were horrifically murdered on the evening of August 6, 1873, in the living quarters of their general merchandise store and pawnshop. Both individuals "had their skulls broken with a club, and to make sure of death, the jugular veins were severed with a knife" (*Arizona Citizen*, 9 August 1873c:3). Three men accused of the deed, who had allegedly committed the crime in order to steal "money, fire arms, jewelry and other valuables," were soon taken into custody. After the funeral of Vicente and Librada Hernandez, said to be "the largest… ever witnessed in Tucson," citizens set up forked posts in front of the Tucson jail, where the accused had been held, and hung all three, along with another man, John Willis. The latter was believed to have gotten away with a previous murder. Tucson's citizens apparently felt the need to take the law into their own hands, as many accused criminals in southern Arizona at the time routinely escaped prosecution and rarely paid for their crimes.

In addition to trauma resulting from interpersonal violence, newspapers also reported trauma from suicide attempts. A gambler in Tucson named Sloan, who suffered from intermittent fever, fatally shot himself in the head with a pistol (*The Weekly Arizonan*, 23 October 1869b:3). Michael Keegan (Private, Company A, 21st infantry), a cooper from Ireland stationed at Tucson also fatally shot himself in the head on Feb 29, 1872 (*Weekly Arizona Miner*, 9 March 1872:3), and Augustine Shea (Private, 21 U.S. Inf Co D), also from Ireland, committed suicide by cutting his throat with a razor on October 29, 1870.

Analysis of church burial records from central New Mexico, where fatal attacks by Apache as well as Navajo and other Native American groups were considered common, showed an unexpectedly low number of deaths resulting from violent conflict with Native Americans. Although the possibility exists that some individuals died outside of towns and were not recorded in burial records, Baca (1995) has suggested that the death toll resulting from conflict with Native Americans could have been exaggerated. Church burial records from Tucson did not often record cause of death, but mention was made in a few records that an individual was "killed by Indians." Many deaths at the hands of Apaches were reported in newspapers, often in sensationalistic fashion, but even these may have constituted a relatively small percentage of deaths overall. Despite the gun violence so often talked about in the newspapers and in descriptions of Tucson, much trauma probably was associated with accidents. For instance, a substantial number of the trauma cases listed in the military hospital records, including those resulting in death, were the result of accidents involving guns, horses, alcohol, or plain bad luck, rather than violent conflict (Heilen et al. 2008). Similarly, most of the skeletal trauma observed in

the cemetery sample could not be attributed to gun violence, as discussed below, although the causes of trauma were difficult to discern.

Osteological Indicators of Trauma

By and large, the examination of trauma in past groups is controlled by the level of preservation of the recovered individuals. In instances where soft tissues such as skin, fascia, and organs are preserved, bruises and lacerations are often still observable (Lynnerup 2007). In the case of the Alameda-Stone cemetery, however, all recovered human remains were in skeletal form, without any soft tissues. Although the preservation of this skeletal material was generally quite good, the lack of soft tissue limited the types of trauma that could be evaluated. In other words, only injuries affecting the skeleton could be observed in the Alameda-Stone cemetery sample.

This limitation is important for two reasons. First, it is reasonable to assume that the observed skeletal trauma represented only a fraction of the total number of injuries suffered by the individuals interred in the cemetery. Any trauma, no matter how severe, would be undetectable on the Alameda-Stone cemetery individuals if the injury left no skeletal markers. Likewise, many injuries must reach a level of severity to appear on the skeleton. For example, a moderately twisted ankle may lead to a sprain, likely unobservable on skeletal remains. If the ankle twists enough to fracture, however, the injury becomes skeletally observable. Thus, skeletal remains provide a limited view of individual trauma because, to be observable, the injuries must involve the skeleton, and feature enough severity to affect the skeleton.

Because bone responds to biomechanical stresses in a limited number of ways, it is often impossible to determine the precise cause of skeletal trauma. For example, a fractured wrist may be the result of an accidental fall or a violent interaction. Any number of events may produce a sufficient force in a particular direction to cause a fracture, and investigators typically choose to avoid speculating beyond what the evidence permits. There are a small number of skeletal injuries with definitive characteristics that allow investigators to reasonably conclude the activities and circumstances that led to the trauma. In the previous section on work, we presented information on the distribution of vertebral trauma. In this section, we discuss general fractures and weapons trauma.

General Fractures

General fractures were those of an indeterminate cause, occurring anywhere on the skeleton. Rather than attempting to reconstruct without adequate evidence the events leading to the injury, investigators instead focused on compiling the demographic information of the individual (age at death, sex, and biological affinity), the location of the individual in the cemetery, and the location of the general fracture on the body. Without speculating as to the particular cause of the general fractures, investigators were able to draw comparisons among the various groups of individuals and look for patterns in the distribution and magnitude of general fractures.

Weapons Trauma

Weapons trauma is a special category of trauma that, more than other types of trauma, provides more specific information of the circumstances surrounding the incidence of the trauma. As is the case with all types of trauma, care must be taken not to presume more than the evidence allows. A heavy object falling from a height and striking an individual may result in injury closely resembling that of an assailant wielding a blunt object and attacking a victim. Simply put, an object is not a weapon unless its design or use is intended to cause bodily harm. Even so, weapons trauma can result from accidents in addition to intentional acts of violence. Thus, weapons trauma is not itself an unambiguous indicator of violent intent.

The other perspective from which to examine weapon use and injury is the physical evidence of the weapons, regardless of whether skeletal injury is present. Clearly, injuries from weapons may leave no skeletal trauma at all. The discovery of artifactual evidence for weapon use in close contact with human remains, however, can be sufficient to infer bodily injury. As with the examination of skeletal trauma, the interpretation of weapon use or injury from artifactual evidence is made easier when the artifact is related to an object designed to be a weapon. A gunshot wound is a clear indication of weapons trauma, just as a spent shell casing or fired bullet is a clear indication of weapon use.

Distribution of General Trauma

A total of 143 general fractures was recorded among individuals recovered from the Alameda-Stone cemetery. These included 135 fractures that clearly occurred before death (antemortem), as evidenced by healing or other skeletal response to the injury. The remaining 8 general fractures showed no healing or skeletal response, indicating that they occurred within a range of no more than a few weeks before or after death (perimortem). Of these 8 perimortem fractures, 5 were associated with the head, including the cranium, mandible, and hyoid, and may have contributed to the deaths of the individuals. The remaining perimortem fractures included 2 fractures to arm elements and 1 to a leg element.

Adult individuals exhibited significantly more trauma than did juveniles. Evidence for trauma was found on nearly 45 percent of the 405 adult individuals observable for trauma, but on only 5 percent of the 359 juveniles observable for trauma. Clearly, the hazards that resulted in skeletal trauma were more pervasive and substantial for adults than those for juveniles. Although not statistically significant, trauma was more often observed on middle and old adults and less often on young adults, in keeping with the expectation that episodes of trauma should accumulate with age.

As is seen in many skeletal collections, males were significantly more affected by trauma than were females. Evidence for trauma was observed in more than half of observable males and in slightly less than 30 percent of observable females. Males exhibited more trauma in every region of the skeleton and exhibited significantly more trauma in the cranium, thoracic region, and hands. Clearly, males in Tucson were exposed to hazards resulting in skeletal trauma to a much greater degree than females.

Differences among biological affinities were not significant, suggesting that Hispanics, Euroamericans, and Native Americans were exposed to similar levels of trauma. However, with the exception of Cemetery Area 1, where little osteological material was available for analysis, significant differences were observed between cemetery areas in the incidence of trauma among males. Trauma frequency was greatest for males from Cemetery Area 2, suggesting that individuals buried in that cemetery area may have faced greater hazards that resulted in skeletal trauma than individuals buried in Cemetery Areas 3, 4, and 5.

Comparative Examinations

Evidence of skeletal trauma observed on the Alameda-Stone cemetery sample was compared to that seen at six other sites: Voegtly Cemetery, Freedman's Cemetery, the Tucson Presidio, San Agustín Mission, the Secaucus Potter's Field, and the New York African Burial Ground (Figure 75). It should be noted that trauma analysis and reporting do not enjoy strict standardization, and investigators employ different criteria and definitions for what constitutes "skeletal trauma." To address this problem, the following comparisons were based, as much as was practicable, on reported frequencies of skeletal fractures.

Skeletal trauma was noted on 44.6 percent of the observable adults from the Alameda-Stone cemetery. This frequency reflects a 54.6 percent rate for adult males and a rate of 30.7 percent for adult females. Keur, Stanton, and Dayhuff discuss these observations in greater detail in Chapter 12, Volume 2 of this series, including the methods used to calculate trauma frequencies and number of observable individuals.

The frequency of trauma noted in the Alameda-Stone sample exceeded those of all other sites under consideration. The Voegtly Cemetery featured the lowest frequency of trauma. Just 4.5 percent of males and 1.2 percent of females were recorded as exhibiting skeletal trauma. These frequencies represent 11 adult individuals in the burial sample who showed evidence of fractures. In each case, the fracture was well healed, indicating that the injury was not immediately contributory to the death of the individual.

The burial sample from Freedman's Cemetery showed a collective trauma frequency of 30.8 percent. Juvenile individuals presented a rate of trauma of 14.7 percent. Adult individuals displayed skeletal trauma at a frequency of 32.2 percent, including an adult male trauma rate of 42.1 percent and a female rate of 19.8 percent. Most of the skeletal fractures observed on individuals from Freedman's Cemetery occurred on elements of the leg, whereas the cranium was most often injured among Alameda-Stone individuals.

Trauma frequencies among individuals from the San Agustín Mission and Tucson Presidio cemeteries were generally equivalent to each other. Seventeen individuals from the San Agustín sample exhibited skeletal trauma, resulting in a frequency of 39.5 percent. Similarly, seven individuals from the Tucson Presidio showed trauma, giving a frequency of 38.8 percent. A comparison of the incidence of trauma according to sex was not immediately available for the San Agustín and Tucson Presidio samples. Nevertheless, both of these burial samples showed a lower overall rate of trauma than the 44.6 percent seen in the adults from the Alameda-Stone cemetery.

Trauma frequencies between the sexes typically show that males exhibit more injuries than do females. The Alameda-Stone, Voegtly, and Freedman's samples followed this trend. In the New York African Burial Ground sample, the difference in trauma frequencies between the sexes was almost negligible. Among New York African Burial Ground adult males, 23.5 percent displayed evidence of skeletal trauma. The rate for adult females was nearly equal, at 23.1 percent. Interestingly, although the frequencies of individuals exhibiting trauma were nearly equal, the elements affected differed by sex at the New York African Burial Ground. Of the fractures recorded on adult males, 23.5 percent were located on the cranium. The cranium only accounted for 11.1 percent of fractures recorded for adult females. The location of fractures recorded on females was more evenly distributed throughout the skeleton, with the femur most commonly affected (12.4 percent of fractures). For both sexes in the New York African Burial Ground sample, the vast majority of skeletal fractures showed little or no evidence of healing.

Finally, the Secaucus Potter's Field sample was assessed for skeletal trauma. The general trend of males showing more skeletal injuries than females did not appear to apply to this burial sample. The trauma frequency for adult males was 14.7 percent, whereas trauma frequency for females was 20.8 percent. This

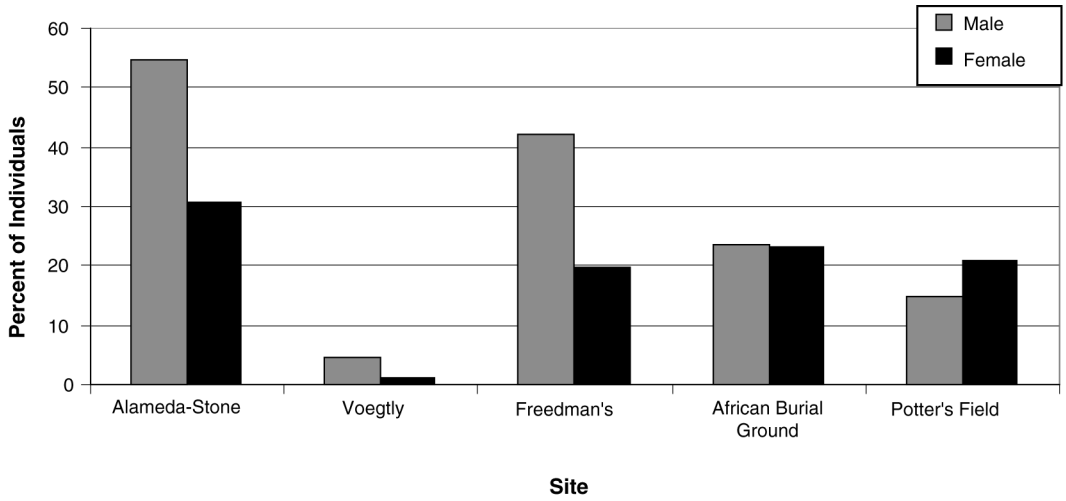


Figure 75. Percent of individuals affected by trauma at Alameda-Stone cemetery and at four other sites, according to sex.

curious distribution may have been the product of sampling anomalies. Indeed, the set of observable male individuals from which trauma could be evaluated was over five times larger than the observable set for females. Indeed, skeletal trauma was noted on 10 of 48 observable females and 40 of 272 observable males. The sample population of 409 individuals (from the 4,571 total number of individuals) included 50 individuals with skeletal trauma, resulting in a sample frequency of 12.2 percent.

A large number of factors influence the incidence of skeletal trauma observed in a burial population. And as noted above, the particular behaviors and activities leading to skeletal injury are not frequently discoverable from the skeletal evidence alone. Similarly, inconsistencies in analysis and reporting make direct comparisons among several sites difficult. Nevertheless, the observed skeletal trauma in the sample from the Alameda-Stone cemetery seems to suggest a population at greater risk of injury.

Skeletal Trauma from Weapons

A total of 18 individuals recovered from the Alameda-Stone cemetery exhibited skeletal trauma associated with weapons. These included injuries from fired projectiles (gunshot and arrow wounds), sharp-force trauma, and blunt-force trauma. Table 15 lists the individuals with skeletal evidence for weapons trauma, the type of injury observed, and indicates whether or not artifacts associated with the skeletal trauma were recovered. It is interesting to note that no artifacts corresponding to the weapons trauma were recovered for 12 of these 18 individuals. The 6 individuals for whom artifacts relating to their injuries were recovered are discussed in the following section.

The lack of a weapon associated with skeletal evidence of weapons trauma is a fairly common finding in trauma analysis. The weapons used to inflict sharp- and blunt-force trauma rarely accompany the victim beyond the location where the injury occurred. By contrast, fired projectiles, may stay with the individual long after the injury occurred, unless exiting the body as part of its original flight path or removed during a medical procedure.

The 12 individuals with skeletal evidence of weapons trauma, but no artifactual evidence of weapons, included 6 individuals with gunshot wounds, 2 individuals with sharp-force trauma, 1 individual with blunt-force trauma, 2 individuals with both sharp- and blunt-force trauma, and 1 with an arrow wound.

Three of these individuals exhibited weapons trauma so profound as to be inconsistent with prolonged life. For instance, the cranium of the individual in Grave Pit 534/Burial 1278 was discovered in a fragmentary state during excavation. Laboratory reconstruction of the cranium revealed a substantial gunshot wound in the upper-back region of the head. Beveling on the margins of the injury indicate that it was an exit wound. The location of the defect suggests a bullet trajectory that would have passed through a significant portion of the brain. Although there are cases of individuals surviving such injuries, the overwhelming likelihood in this case is that the injury was lethal.

The other two individuals, contained in Grave Pit 22157, both sustained numerous injuries, which individually may have been survivable, but the cumulative effects of these injuries likely would have been fatal. One was a young adult female who suffered a fractured hyoid, fractures to at least two right ribs and at least two left ribs, and sharp-force trauma to at least one left rib. The other individual in the grave was a middle adult male with several facial fractures and a cut mark on the left side of the mandible.

Table 15. Individuals with Evidence for Weapons Trauma

Grave Pit No.	Burial Feature No.	Individual Name	Sex	Age	Cemetery Area	Biological Affinity	Condition	Healing?	Associated Weapon Artifact
534	1278	P	male	middle adult	2	Euroamerican	gunshot wound	no	no
592	2595	P	male	middle adult	2	Hispanic	gunshot wound	no	yes
1479	2506	P	male	young adult	2	Euroamerican	gunshot wound	no[a]	yes
3244	3417	P1	male	middle adult	2	Hispanic	arrow	no	no
3288	7199	P	male	old adult	2	Euroamerican	gunshot wound	yes	yes
5196	8659	P	male	young adult	5	Hispanic	gunshot wound	no	no
5392	8899	P	male	old adult	5	indeterminate	gunshot wound	yes	no
7529	8941	P	indeterminate	child	3	Euroamerican	gunshot wound	yes	yes
7797	13206	P	male	middle adult	4	Hispanic	gunshot wound	no	no
7810	13131	P	female	middle adult	4	indeterminate	gunshot wound	no	no
10138	23296	P	male	middle adult	3	indeterminate	sharp-force trauma	no	no
13539	21747	P	male	young adult	3	Hispanic	gunshot wound	yes	yes
13614	21829	P	male	middle adult	3	Euroamerican	gunshot wound	yes	no
13699	28544	P	male	middle adult	4	Hispanic	arrow	yes	yes
13848	28554	P	male	middle adult	3	Hispanic	blunt-force trauma	yes	no
17765	19780	P	indeterminate	middle adult	3	Hispanic	gunshot wound	yes	no
22157	21848	P1	female	young adult	3	Euroamerican	blunt-force and sharp-force trauma	no	no
22157	21848	P2	male	middle adult	3	indeterminate	blunt-force and sharp-force trauma	no	no
24758		2	male	old adult	4	indeterminate	sharp-force trauma	no	no

[a] No skeletal weapons trauma observed.

Table 16. Individuals with Weapons Artifacts Directly Associated with Trauma

Grave Pit No.	Burial Feature No.	Weapon Type	Weapon Location	ASM Age	Sex	Biological Affinity	Cemetery Area
592	2595	bullet	coffin fill	middle adult	male	Hispanic	2
3288	7199	pellet	lodged in right side of fourth lumbar vertebra	young adult	male	Euroamerican	2
7529	8941	pellet	torso	child	indeterminate	Euroamerican	3
13539	21747	bullet	pelvis	young adult	male	indeterminate	3
13699	28544	stone projectile point	femur	middle adult	male	Hispanic	4
1479	2506	bullet	ribs	young adult	male	Euroamerican	2

Note: ASM = Arizona State Museum.

The injuries on each individual all appear to have occurred at or around the same time for each, near the time of death. In concert, these injuries would likely not have been survivable and no evidence for healing was observed.

Skeletal and Artifactual Evidence of Weapons

Five individuals recovered from the Alameda-Stone cemetery exhibited skeletal trauma from weapons for which artifacts associated with the trauma were encountered. One additional individual showed compelling evidence of gunshot trauma without skeletal involvement; several pellets were collected from the torso region. Five individuals suffered gunshot wounds, and one suffered injuries from arrows. Table 16 details these six individuals, the nature of their injury, and whether or not the skeletal trauma showed evidence of healing.

Interestingly, three of these individuals—each a victim of gunshot—showed clear evidence of healing, indicating that they survived at least several weeks after the injury. The individual in Grave Pit 13539/Burial 21747 showed a perforation with slight healing through the right ilium. A deformed lead ball of unknown size was recovered in the fill near the injury, and it appears consistent with the injury to the ilium. Based on the beveling and direction of fractured bone, the shot appears to have come from the front of the individual. This is consistent with the bullet being retained by the soft tissue behind the ilium, rather than a "through-and-through" shot. The bullet remained in the soft tissue until decompositional processes released it to the area in the grave below the ilium.

The individual in Grave Pit 7529/Burial 8941 suffered a nonfatal gunshot wound to the vertebral border of the right scapula. A lead ball measuring 0.36 inches, possibly a 000 buckshot pellet or 0.36-inch bullet, was recovered near the injured scapula. Indeed, as the bone healed, it had begun to grow around the ball lodged in the individual's back. Surviving this injury was all the more remarkable by the fact that this individual was a child, 7–9 years old at death. The healing process obliterated characteristics that could have been used to infer directionality of the projectile; it was unclear from where the shot originated. Nevertheless, because none of the ribs opposing the scapula was injured, and the individual survived the shot, it is likely that the shot came from the back of the individual.

The individual in Grave Pit 3288/Burial 7199 exhibited two gunshot wounds, one passing through the right ilium and one to the lower spine. A lead ball measuring 0.469 inches from this latter shot was retained in the posterior aspect of the third and fourth lumbar vertebrae.

Artifacts Related to Weapon Use

Owing to bullet deformation and imperfect preservation, not every piece of recovered ammunition could be precisely matched to a size or caliber of firearm (cf. Davidson 2008). However, historical documentation provides insight on the types and calibers of firearms in use in and around Tucson during this time, so some reasonable inferences were possible based on the recovered ammunition artifacts.

A total of 46 graves contained ammunition, and more than half of the projectiles were in unfired condition. In many cases, however, ammunition was considered to have been intrusive to the grave and not directly associated with the human remains. In other cases, unfired ammunition appears to have functioned as a personal object, appearing to have been kept within the pocket of the deceased. Ammunition was interpreted as intrusive if it was recovered from fill within the grave pit and was not directly associated with an individual's remains. Although it is not impossible for artifacts to migrate away from the body because of disturbance, the likely cause for the distance between the remains and the recovered ammunition was

that the artifacts were unintentionally introduced to the grave pit during burial, and were not directly associated with the individual interred in that pit.

Ammunition interpreted as personal effects were recovered in close proximity to the remains and were likely buried with the individual as personal objects. This was the primary interpretation of unfired ammunition or bullet cartridges that were likely in pockets or other clothing when the individual was interred. Four graves contained ammunition interpreted as personal objects.

Relationships between Weapons Artifacts and Weapons Trauma

Efforts to compare the artifactual evidence of weapon use and the skeletal evidence of weapon use across groups and space revealed frustratingly few results. The most notable conclusion was that there were relatively few weapons artifacts and cases of weapon injury, given the size of the cemetery population, its location, and its period of use. The Alameda-Stone cemetery contained 1,083 graves, yet just 4.2 percent of these contained ammunition artifacts, and just 1.6 percent of the individuals showed evidence of weapons trauma of any kind. Attempts to extract meaningful patterns from these small numbers were inconclusive. Across cultural groups, no patterns emerged different from the total size of each group's population in the cemetery.

Despite the level of gun violence reported in Tucson, skeletal evidence for weapons trauma was rare and evidence for gun violence in the cemetery was rare even if all ammunition artifacts were considered. Because many people who suffered violence were killed outside the city, it is possible that at least some individuals who died near Tucson were not brought to the Alameda-Stone cemetery for burial. It is also possible that some individuals who suffered weapons trauma were not affected skeletally and that ammunition from gunshot wounds was removed or exited the body. However, the sum total of the evidence suggests that most trauma that could be observed skeletally resulted from events other than weapons trauma, such as strenuous physical activity and accidents.

Medical Beliefs and Practices

During the Spanish Colonial period, there were no doctors or surgeons in Sonora. Medical treatments were administered by Native American medicine men or by missionaries. The Jesuit Father Ignaz Pfefferkorn reported that numerous healing herbs were used in medical treatment in the eighteenth century, but the lack of doctors prevented the administration of bloodletting. Other works of the time indicate a melding of Spanish and indigenous practices that relied on curatives made from native and introduced plants, often administered as poultices (Quebbeman 1966).

By the end of the eighteenth century, a more scientific medicine began to develop in parts of Europe and in America along with advances in the natural sciences of biology, chemistry, and physics, but medical advances did not reach the frontier areas of northern New Spain. The missionaries respected the treatments applied to regular injuries by medicine men, but they were offended and concerned about healing ceremonies and curing rites. These they felt to be witchcraft and "in conflict with Catholic dogma" (Quebbeman 1966:20).

Medicine in nineteenth-century America was practiced by a wide variety of individuals, from medical practitioners who used bloodletting to cure their patients to the doctors like Walter Reed, whose discovery of the cause of malaria forever changed attitudes about medicine (Dary 2008). Doctors in the frontier American West included quacks, university-trained physicians, and earnest individuals with college education, but no medical training. Although some possessed medical education, a large number of practitioners were dilettantes who knew "very little about what made a person sick or well" (Dary 2008:31). The first contract surgeon hired by the U.S. military in Tucson, for instance, had training in pharmacology, but no training as a physician (Faust and Randall 2003). Trained physicians often found the pay to be less than could be earned in other careers, however, and abandoned the practice of medicine for more-lucrative pursuits, such as gold and silver mining.

The nineteenth century saw a drastic increase in the number of university-educated medical doctors, a rise in the number of hospitals, and an interest in the formal development of pharmacology. Morphine, quinine, atropine, codeine, and iodine were all first manufactured for general use in the 1800s. The nineteenth century was also a notable period in the identification, classification, and description of diseases. All of these advances seemed to promise a healthy nation, a promise far from realization. In practice, physicians and surgeons were not always able to cure diseases and mend broken bodies.

Progress in medicine was largely the outcome of advances in the natural sciences and the application of this knowledge to the medical field. Clinical observation and practical knowledge slowly replaced speculation and the often authoritative reliance on theories of the "four humors," bloodletting, and the miasmatic transmission of disease. The significant advances that followed—germ theory, antiseptics, anesthetics, and superior pharmacology—slowly replaced earlier theory and practice. Germ theory did not begin to be accepted until after 1860 and was still only slowly incorporated into medical practice over the following several decades (Dary 2008:117). Unfortunately, some physicians continued practicing outdated medicine in Arizona throughout the nineteenth century.

Euroamerican medical doctors began filtering into the western United States in the early nineteenth century but their presence was rare. American trappers in the Southwest also provided some health care in the early nineteenth century. For instance, the trapper James Ohio Pattie, who traveled through Arizona on the way to California, claimed to have vaccinated some 22,000 Californians for smallpox in the 1820s (Quebbeman 1966), a claim which is likely exaggerated as Pattie was known for his embellishment (see e.g., Sheridan 1995:43). Army doctors entered the Southwest during the Mexican American War, accompanying expeditions and serving at army posts. Dr. John Strotter Griffin, who accompanied Colonel Stephen Watts Kearney's march from Santa Fe to San Diego (which passed through Arizona) in 1847, treated soldiers mostly with "purging and bleeding with location applications of blisters and cupping" for fevers and congestion (Quebbeman 1966:29).

Through the nineteenth and into the early twentieth century, heavy metals such as mercury, arsenic, and bismuth were used to treat a variety of venereal diseases, such as syphilis and gonorrhea. Mercury chloride, or calomel, was liberally used as a purgative, with the unfortunate side effect of causing hair and teeth to fall out if taken in large doses. Arsenic and bismuth treatments were administered through intravenous injections. Although the purpose of these treatments was the elimination of external symptoms and to minimize transmission of disease, the effectiveness of these methods is uncertain.

Reducing a fracture or setting a dislocation does not require advanced medical knowledge, although it certainly helps. Ranchers, miners, and other professionals working in hazardous and often secluded conditions have, by necessity, some knowledge of how to mend a broken body. So evidence of these conditions may represent folk remedies or the handiwork of a professionally trained physician. Dary (2008:110) noted "broken bones were sometimes set [reduced] with splints of sticks and leaves as bandages, or with old pieces of clothing" in the American frontier. Whatever the medical practitioner's training, the goal of reducing a fracture or a luxation is to return the broken bone or dislocated joint to its original position to maintain alignment and restore mobility.

Many early-nineteenth-century physicians received most of their training on the battlefield during the Civil War, so amputations were not foreign. Serious blood loss, septicemia, and shock likely accompanied these operations, which would have been conducted in less than ideal conditions and with little or no anesthesia, although "a swig of whiskey for the pain" was often the prescribed antidote to pain (Dary 2008:35).

Assistant Surgeon Bernard Irwin documented three amputations performed while stationed at Fort Buchanan in 1858. In place of chloroform for anesthesia, he administered tincture of opium to dull the pain and performed the surgery in relatively impromptu settings. Remarkably, two of the patients survived amputation, but the third who had developed an infection from a gunshot did not recover and the doctor himself suffered an infection that seems to have originated from treatment of the patient (Quebbeman 1966:34–36).

Many of the more common illnesses were treated with therapies that were, for all intents and purposes, home remedies passed from neighbor to neighbor. Dary (2008:33) indicates that many home remedies seemingly worked, including "gunpowder to treat wounds; whiskey to treat sore throats, snakebites and burns; and tobacco mixed with an onion and held to the ear to cure earaches." In predominately Hispanic communities like Tucson, residents often relied on *curanderos* to cure the sick, deliver babies, and respond to other medical needs. These folk healers generally used both herbal remedies and religious ritual in their practices (Dary 2008:180).

The history of medical doctors and medical practices in early Tucson is not entirely clear, but several individuals working in and around Tucson are worthy of mention. In 1857, south of Tucson in the town now known as Sonoita, Dr. Bernard J. D. Irwin practiced medicine at Fort Buchanan (Arizona Medical Board 2010). Much of his career was spent working with the military men stationed at Fort Buchanan, although he was considered an excellent physician and surgeon. We do not know for certain that Dr. Irwin ever practiced medicine in Tucson, but considering the proximity of Sonoita to the city and the need for doctors around the area, it seems safe to assume that he may have. Dr. Clarence B. Hughes, who practiced medicine from Tubac, treated Dr. Irwin. Dr. Hughes typically treated employees of the Sonora Exploring and Mining Company in Tubac and patients in the surrounding area of the Santa Cruz River Valley. Dr. Hughes purchased a house in Tucson in 1862, suggesting he could have treated patients in Tucson as well, but he moved to San Francisco by sometime in 1864. The 1860 census also listed the occupation of one Tucson resident, D. C. Glascock, as a physician, but it is not clear that he actually practiced medicine in Tucson (Quebbeman 1966).

One medical practitioner known to work in Tucson was the dilettante, Mr. Charles Meyer, who serves as an excellent example of how medicine was practiced on the American frontier (Arizona Medical Board 2010). Before coming to Tucson, Meyer earned a degree as a chemist from Heidelberg University in Germany. He moved to the United States to open a drugstore in Rio Grande, Texas, but after Mexican raiders burned his store, Meyer headed west. By 1858, Meyer had opened the first drugstore in Tucson. The store, called *La Botica*, was used by Meyer as an outlet to prescribe and sell pharmacological medicines. By the end of the Civil War, university-trained physicians were arriving in Tucson, effectively forcing Meyer to step aside from medicine.

In addition to hiring Charles Meyer to act as post surgeon for several months in 1866, the U.S. Army post at Camp

Lowell hired at various times at least seven other doctors between 1866 and 1873, including Captain Charles Smart, Assistant Surgeon Henry Durant, and Assistant Surgeon J. A. Callendar. These doctors typically treated soldiers stationed at the post or casually at the post and held the position of post surgeon anywhere from a few months to slightly less than a year. Sanitary conditions in the military hospital were considered to be poor, even by standards of the day, as clean water could only be obtained at a distance of 300 yards, heat inside the hospital was unbearable on warm days, and the hospital building was surrounded on all sides by unsanitary facilities that regularly generated fecal matter (Faust and Randall 2003).

In addition to trained doctors, Tucson apparently had no shortage of quacks. In one instance in 1872, a coroner's inquest was held because it was suspected that Dr. Jacinto Giardo had performed "false treatment" on Manuela Bosci, who had become ill and died shortly after medical treatment. In reporting on the inquest, the *Arizona Citizen* opined that "Dr. Giardo is surely a dangerous man as a physician, and nothing but the charitable plea of insanity ought to shield him from severe punishment, and in such event, he should be deprived of his liberty to prevent others falling victims to his practice. The country is too full of sane quacks, and thousands of people suffer a long life from their criminal work" (*Arizona Citizen*, 2 March 1872b:3).

In Tucson, sickness and disease would have regularly overwhelmed local medical practitioners. Smallpox, cholera, malaria, and dysentery each plagued this desert community, at times reaching epidemic levels. The aforementioned advances in medical knowledge concerning good sanitation and cleanliness did not reach many western towns until the 1870s (Dary 2008:209), and even then it was difficult to achieve a level of cleanliness necessary for good health because the towns were overwhelmed with trash, rotting animal carcasses, and smoky conditions from indoor fires. During the 1870s and 1880s, citizens repeatedly decried problems with unsanitary conditions in Tucson (O'Mack 2006).

Although the military maintained a hospital in Tucson in association with Camp Lowell until the camp moved to a new location along the Rillito in 1873, no public hospitals were operating in Tucson during the time the cemetery was in use. An 1875 Surgeon General's report on hygiene at military posts noted, "in Tucson, there are a number of heavy mercantile houses, a tin-shop, blacksmith and wagon shops, two flour-mills, and restaurants, but no hospitals" (Billings 1875:540).

U.S. military hospital personnel apparently administered to civilians in Tucson on occasion, but it is unclear how consistent or available treatment was. For instance, a few civilians are noted in hospital records as having received treatment, and notes in hospital records during a smallpox epidemic in the winter of 1870 indicate that the military made an effort to inoculate the local populace (National Archives and Records Administration, Record Group 94, Entry 544, Volume 118). Treatment must not have been universally available, however, as one of Salpointe's major efforts early in his missionary career in Tucson was to erect a hospital. Salpointe noted that medical care was virtually unavailable to the poor and people with means generally sought medical care provided by private doctors in local hotels (Correspondence of Jean Baptiste Salpointe, University of Arizona Special Collections, MS 276).

An unusual form of medical intervention practiced in the American Southwest and Mexico, and possibly practiced in Tucson, was actually performed by Catholic religious specialists for the purposes of salvation of the soul. This practice, referred to as postmortem caesarian, involved removing the fetus from a deceased mother through caesarian section, with the hope of removing the fetus alive in time to perform the sacrament of baptism. The practice was not necessarily geared towards saving the life of an unborn child, as this would have been rarely possible unless the fetus was near term. Rather, Catholic belief specified that baptism was a requirement of achieving salvation and only the baptized could be buried in sanctified ground. In fact, ensuring that baptism had occurred in an appropriate fashion prior to death was considered a prerequisite for burial in the *campo santo*, and the failure to do so was a matter of extreme concern for friends and family (Will de Chaparro 2007). A possible signature of a postmortem caeserian section may be the discovery of fetal remains placed with a deceased mother in a position indicative of being buried outside of the womb. Some authors have attributed the recovery of fetal remains discovered below the pelvis of a deceased adult female as the result of coffin birth, but historical evidence and evidence from the Alameda-Stone cemetery suggests a more compelling explanation is the practice of postmortem caesarian.

Osteological Indicators of Medical Treatment

Finding and documenting evidence of medical practices from the skeleton is not always a straightforward process, particularly because not all forms of medical intervention leave evidence on bone. Some medical practices involve skeletal structures, for instance reducing a fracture (i.e., setting a broken bone); other medical practices, such as drug therapies, can leave a chemical signature in bone which may serve as circumstantial evidence of medical intervention. Still other medical practices, however, leave no evidence and must be inferred from known practices or through artifactual evidence. For example, bloodletting, a common medical practice in the United States up to the end of the nineteenth century, leaves no evidence on skeletal elements, but knowledge of this practice can be gleaned from historical documents and artifacts associated with

the process. Other medical practices have to be assumed based on other, more-circumstantial skeletal evidence. For example, among the dislocations, or luxations, noted in the Alameda-Stone cemetery sample, there is no obvious evidence of medical intervention; however, the lack of prolonged dislocation (e.g., secondary articular facets, eburnation, etc.) suggests the joint was reduced to its original position in an effort to relieve pain.

A variety of evidence for medical intervention was uncovered with the human skeletal remains from the Alameda-Stone cemetery. These practices were common throughout the United States and their discovery in the Alameda-Stone sample is consistent with what is known about Tucson in the nineteenth century. However, detecting these medical practices in the archaeological record is an exciting prospect, particularly the detection of mercury as a curative for venereal disease. Recognizing fracture and dislocation reduction are both clear examples of medical intervention, although a medical degree or advanced knowledge of human anatomy and physiology were not necessary to carry out these procedures. In contrast, amputations and autopsies are generally regarded as complex procedures, generally limited to practicing medical professionals.

As noted above, mercury and other heavy metals were frequently used in nineteenth-century medicine. Leher and colleagues (see Chapter 11 and Appendix E, Volume 2 of this series) used X-ray fluorescence spectroscopy to test for the presence of various heavy metals in a series of pathological and normal biological tissues to determine whether the use of heavy metals was practiced in Tucson while the Alameda-Stone cemetery was in use. High levels of mercury were found in several skeletal elements which the authors believe may indicate the medicinal use of mercury as a topical salve. The skeletal remains of a female buried in the Alameda-Stone cemetery presented a suite of pathological lesions that could not be associated with a particular disease. However, several bones contained levels of mercury inconsistent with the surroundings. Moreover, the well-preserved pubic hair and the soil matrix recovered from what would have been the genital region in life contained exceptionally high levels of mercury (from 59.63 $\mu g/cm^2$ to 306.1 $\mu g/cm^2$). This evidence, although circumstantial, strongly suggests the medicinal use of mercury in Tucson and the most parsimonious explanation for the location of mercury, at least in this individual, was that it was used a topical salve to treat a venereal disease. Although no other evidence for the use of mercury as a curative was uncovered in the Alameda-Stone cemetery, the fact that one of the few individuals tested for heavy metals was identified as being treated with mercury suggests the practice may have been common.

Keur, Stanton, and Dayhuff (see Chapter 12, Volume 2 of this series) identified nearly 200 instances of trauma in the Alameda-Stone cemetery sample. Fractures were by far most common, affecting approximately 8 percent of the total population. Most of the fractures identified in the Alameda-Stone sample were antemortem fractures that occurred well before death and presented very obvious signs of healing. If a fracture did not appear to have been healing and it likely occurred near the time of death, no meaningful information concerning medical intervention could be inferred. Therefore, only those fractures that occurred prior to death and showed signs of healing are considered herein. Moreover, fractures to skeletal elements other than long bones very rarely necessitate reduction. For example, cranial fractures cannot be reduced, but they often require a craniotomy (a surgical opening through the skull) to relieve pressure.

All evidence for medical intervention was on long bones. Thirty-four antemortem long-bone fractures were identified by Keur et al. (see Chapter 12, Volume 2 of this series). Of those, almost 30 percent (n = 10) were misaligned, but this frequency may be misleading. A middle-aged Hispanic male and a Euroamerican young adult male shared 6 of the 10 misaligned fractures. Both individuals presented fractured (and misaligned) left radii and ulnae consistent with clinical descriptions of misaligned fractures of the forearm. None of these fractures presented evidence of reduction or realignment. The Euroamerican male also had a misaligned fracture of the left tibia and fibula. The angle and degree of misalignment suggested that no attempt had been made to reduce these fractures. Despite misalignment, none of these fractures showed evidence of infection. In fact, of all the misaligned antemortem fractures, only one presented signs of bony infection. Figure 76 shows the foreshortened radius.

Infection in bone from a local fracture is known as secondary osteomyelitis and is most readily identified by the presence of sequestra (dead bone), involucrum (hypervascular new bone surrounding the sequestrum), and cloaca (openings in bone for pus drainage). The radius in question clearly presented a cloaca surrounded by remodeled bone at the fracture site. It does not appear that the infection was active at the time of death, which may imply that some form of antibiotic treatment had been administered.

Infection resulting from fractures was relatively common prior to the advent of antibiotics. Nearly one-quarter of the 34 antemortem fractures in long bones presented secondary osteomyelitis. Of those, only 2 were misaligned. The frequency of bony infection following a fracture increases as the severity of the fracture increases. Open, comminuted fractures are more likely to become infected than a simple, greenstick fracture, as the former is directly exposed to bacteria when the skin is punctured. The incidence of infection (together with the low incidence of misalignment) suggests medical intervention was available, although not necessarily effective in preventing infection. The remote locations in which many fieldworkers, ranchers, and miners were often working could easily have lead to a prolonged period of time before medical care was administered. Any misaligned, fractured bone left untreated would naturally have begun to heal and remodel after a day or two, setting

Figure 76. Left radius with antemortem fracture and periosteal reaction, Individual P, Grave Pit 13848, Burial 28554, a middle adult Hispanic male.

the fracture and negating future attempts at reduction without breaking the bone a second time.

Another explanation for the misaligned fractures in cemetery populations has been suggested by Dudar and Solano (2007). These authors suggest that the presence of misaligned fractures does not necessarily mean that medical care was not available, but rather, these misalignments may reflect inadequacies in the reduction techniques and trauma technologies available at the time.

Dislocations, or luxations, are difficult to identify in dry bone. However, several compelling examples were documented in the Alameda-Stone cemetery sample. Dislocation was identified in less than 1 percent (n = 9) of the individuals buried in the Alameda-Stone cemetery. These dislocations were limited to the shoulder and hip joints. Only one of these dislocations appears to have been chronic and out of position for an extended period of time (permanent). Typically, when dislocation occurs and is not corrected (reduced), a secondary joint forms on the affected element, along with degenerative joint disease and eburnation on the corresponding surface. Figure 77 shows the right femoral head of an older adult male with good evidence of dislocation. The observed condition did not suggest congenital dislocation; however, the expanded and arthritic condition of the femoral head, eburnation, and porosity were all consistent with luxation. Unfortunately, the acetabulum (where the head of the femur meets the pelvis) was not available for analysis because of severe postdepositional fracturing and erosion.

Three individuals in the Alameda-Stone sample exhibited evidence of amputation: two lower legs and one forearm. Two of these individuals had clear evidence of infection that was not associated with the amputation, suggesting amputation was likely the course of treatment. None of the individuals showed evidence of healing around the margins of the cuts. In other words, they did not survive long after the procedure was completed.

Amputations like those documented in the Alameda-Stone sample have been identified at multiple historical-period sites and generally the story is the same: amputation is evident, but the procedure did not necessarily sustain life. Many of the amputated limbs documented in these other cemetery samples showed signs of a traumatic event and infection but, like the amputations in the Alameda-Stone sample, very few of the amputations showed signs of healing.

Among the individuals recovered from the Alameda-Stone cemetery, three had potential evidence of autopsy, although only two of these could be unequivocally associated with the procedure. Two individuals each had the signature saw marks and cuts associated with removal of the brain for observation during an autopsy (Figure 78). Why these two individuals (one Euroamerican male and one Hispanic male) were autopsied is unclear. Other than the degenerative conditions associated with the aging process, no other evidence of disease was identified. Interestingly, both men suffered a head injury, but in both instances the wound was well healed and showed no sign of infection

Figure 77. Femoral head of an older adult male of indeterminate biological affinity with good evidence of dislocation.

Figure 78. Sawed crania, indicative of autopsy (Individual P, Grave Pit 10126, Burial 19954, an old adult Hispanic male; Individual P, Grave Pit 3239, Burial 3799, a young adult Euroamerican male).

or other complications. In all likelihood, the cranial fractures these men suffered prior to their death were coincidental and were not a contributing factor in the decision to autopsy.

Autopsies at the time appear to have been performed when misconduct was suspected or when an individual died from unusual medical circumstances thought to require further investigation. A number of soldiers who died in Tucson were subjected to postmortem examination at the military hospital. Although these seem to have involved opening the body to investigate the cause of death, it is unclear whether this would have also involved removing the top of the head to examine the brain and whether such procedures could be observed skeletally. In any case, those individuals were exhumed from the Alameda-Stone cemetery in 1884. The most commonly encountered evidence of an autopsy in skeletal assemblages is the saw cut that removes the top of the head for access to the brain. Although both anatomical dissection and autopsy use this same cut to access the internal areas of the skull, outside of medical schools an autopsy is the most parsimonious explanation for the two individuals in the Alameda-Stone cemetery inferred from skeletal evidence to have been autopsied. Unfortunately, no other clues for the differential treatment of these two individuals could be discerned.

Dental Treatment

During the frontier period, the most common treatment of dental disease was tooth extraction. However, evidence of professional dental care other than extraction was noted among the Alameda-Stone cemetery individuals. The availability of such care seems to have been limited and could reflect the patient's economic status or access to dental care outside of Tucson. In fact, some of the people of Tucson may have traveled to larger cities where dentists were more readily available. A dentist was permanently located in Tucson as early as 1879 (*The Arizona Daily Citizen*, 14 June 1879:1) and this undoubtedly increased the availability of dental treatment.

Although extraction was by far the most common treatment for dental diseases, dental amalgams, or fillings, were also used to reduce tooth decay. However, dental amalgams are expensive today and were more so 150 years ago. Only a very small percentage of the individuals from the Alameda-Stone cemetery apparently had access to professional dental care (see Chapter 13, Volume 2 of this series). Thirty-nine dental fillings were associated with 11 individuals; the actual number of individuals who received this treatment was likely greater, but evidence of those amalgams were lost either during life (e.g., tooth extraction or loss) or after burial as a result of the decomposition process. Drilling is a necessary step in the process to remove decay prior to inserting the amalgam. Evidence of drilled teeth without any sort of amalgam in situ was identified in 2 individuals, so it is reasonable to assume that the number of individuals with dental amalgams was higher than the 1 percent noted (n = 11/1,049, or 1.05 percent).

Ten of the 11 individuals with fillings were male, and but for only one exception, all were recovered in Cemetery Area 2 of the Alameda-Stone cemetery—an area hypothesized to have consisted mostly of recent migrants to Tucson.

Gold fillings were identified by inspection. Other materials were identified with the use of X-ray fluorescence spectroscopy (see Appendix E, Volume 2 of this series). Most individuals had gold fillings, although one individual had a filling that was composed almost entirely of tin, and three individuals had fillings that were probably amalgam (typically a mixture of tin, silver, and mercury). These alternate materials were presumably less costly and more available than gold.

The distribution of fillings throughout the dental arcade is shown in Table 17. Most fillings were found in the upper jaw. The most commonly filled tooth in both the maxilla and mandible was the second molar. The cheek teeth (premolars and molars) had most of the fillings (30 out of the 39 fillings identified), whereas fillings in anterior teeth (9 out of 30) were found almost exclusively in the two individuals from Grave Pits 533 and 534. These two men shared 24 gold fillings, nearly two-thirds of the fillings identified in the Alameda-Stone cemetery sample. Interestingly, these two men were buried beside each other. That fact, coupled with the exceptional quality of dental care, seems to suggest that they shared some sort of relationship.

Most fillings were located on occlusal (n = 17) or interproximal surfaces (n = 16). There were also a few instances of fillings on buccal or lingual surfaces. The individual in Grave Pit 533 had small fillings in the lingual fossae of both lateral maxillary incisors. A deep fossa is sometimes present in this tooth and is susceptible to the development of caries, but there was no evidence of carious destruction in these locations in this individual. It is possible that there was minimal demineralization, which was covered by the filling, but it is also possible that this was a case of prophylactic dental treatment.

Other types of dental treatment were extremely rare in the burial population. The adult male individual in Grave Pit 22157 had two fillings and also had a dental appliance, consisting of a plate with an artificial maxillary tooth crown (Figure 79). The crown was porcelain and the plate was either gold plated or a gold/copper alloy. The porcelain crown replaced the left central maxillary incisor and was anchored in the mouth by a bracket that attached to the neck of the left first premolar. This was the only instance of a dental prosthesis found with an individual buried at the cemetery.

Demography

One particularly interesting and unique aspect of the Alameda-Stone cemetery was its demography. As discussed

Table 17. Location of Dental Fillings in the Dental Arcade

Tooth	Maxilla	Mandible	Total
M3	1	4	5
M2	6	6	12
M1	1	2	3
P2	4	1	5
P1	5	—	5
C	1	1	2
I2	4	—	4
I1	3	—	3
Total	25	14	39

Note: C = canine; I1 = first incisor, I2 = second incisor; M1 = first molar, M2 = second molar, M3 = third molar; P1 = first premolar, P2 = second premolar.

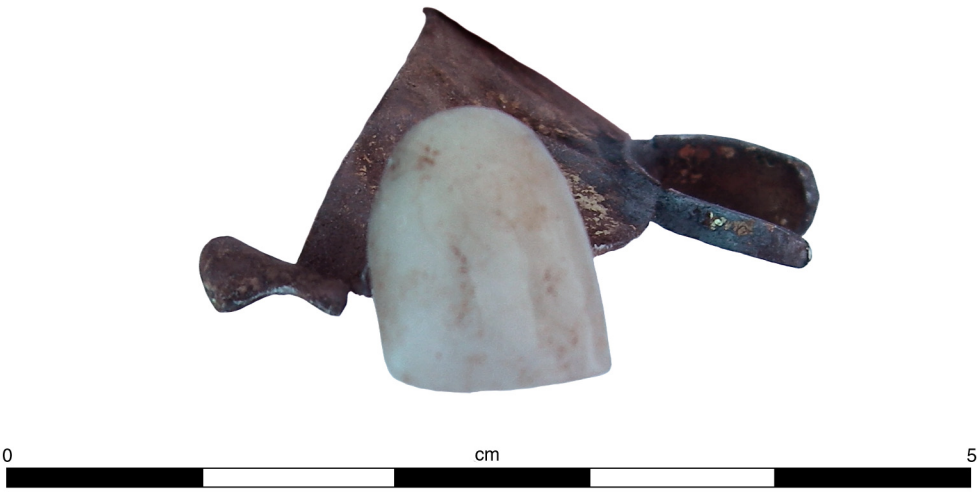


Figure 79. Dental plate with artificial tooth, Individual P2, Grave Pit 22157 Burial 21848, a middle adult male of indeterminate biological affinity.

elsewhere in this report, use of the cemetery was relatively brief and the cemetery appears to have been used by the entire population of Tucson. While the cemetery was in use, Tucson was a diverse and changing community. Prior to the opening of the cemetery, Tucson was a multiethnic community consisting of Mexican Americans and Native Americans, with a small number of Euroamericans who had migrated to Tucson after the Gadsden Purchase in the early years of the community as a newly integrated part of the United States. As the settlement grew, during the 1860s and early 1870s, large numbers of migrants from northern Mexico, the United States, Canada, Europe, the Caribbean, South America, and the Middle East began moving into Tucson, changing the face of the community. Many of the recent arrivals were adult males, as is common for frontier populations, whereas the local population had been more evenly distributed according to age and sex. As a result, analysis of the cemetery offers a unique opportunity to examine the demographic composition of the cemetery and the community and differences in mortality among different segments of the community.

Paleodemography is "the study of vital rates, population distribution, and density in extinct human groups, especially those for which there are no written records" (Buikstra and Konigsberg 1985:316). Paleodemographic studies often assess mortality, population structure, hazard rates, and fertility through the analysis of historical and osteological age and sex distributions.

Paleodemographers compare skeletal age-at-death distributions to model life distributions from living or simulated

populations (Buikstra 1976). The processes that create age-at-death distributions in skeletal populations, however, are disputed and are not clearly understood. Some scholars have argued that the use of life tables for mortuary populations can result in highly inaccurate demographic profiles and the reconstruction of populations without ethnographic precedent (e.g., Howell 1982). Other scholars have criticized age estimation and the effect of errors in estimation on paleodemographic reconstruction (e.g., Bocquet-Appel and Masset 1982). Infants, in particular, are often considered to be underrepresented in skeletal samples as a result of factors such as poor preservation (Ubelaker 1978). Some scholars exclude infants from analysis for this reason (Dumond 1990; Sattenspiel and Harpending 1983). Common sense suggests that age-at-death distributions are a reflection of mortality, but a variety of studies have argued that variation in fertility substantially influences age-at-death distributions (Johansson and Horowitz 1986; McCaa 2002; Sattenspiel and Harpending 1983). To address some of the problems with paleodemographic research, some scholars have called for standardized aging techniques, including refined methods for estimating age in older adults and the development of better statistical techniques (Buikstra and Konigsberg 1985; Greene et al. 1986; Van Gerven and Armelagos 1983).

Three problems typically complicate paleodemographic interpretation: (1) demographic nonstationarity, (2) selective mortality, and (3) hidden heterogeneity. Demographic nonstationarity refers to the problem that most paleodemographic studies conveniently assume a stationary state of "closure to migration, constant age-specific fertility and mortality, zero growth rate, and an equilibrium age," when, in fact, most populations are not stationary (Wood et al. 1992:344). Clearly, the population in Tucson was not stationary, but in a state of flux, with large numbers of people migrating to the settlement when the cemetery was in use. In a changing population, fertility has major effects on age-at-death distributions, and mortality has only minor effects. Selective mortality refers to the problem that skeletal samples that correspond to a particular age are not representative of the original population at risk of death for that particular age. Instead, individuals in the skeletal sample are the individuals who succumbed to age-specific risk and do not necessarily represent the hazards faced by the entire population. Hidden heterogeneity refers to the situation in which different individuals in a population have different susceptibilities to disease and death, making it difficult to link aggregate age-specific mortality inferred from skeletal samples to individual risks of death (Wood et al. 1992). These problems in paleodemography also offer some prospects for understanding differences in mortality when historical demographic data are used in combination with osteological data. Of course, there are inherent errors and biases and both sources should be used with caution. However, balancing historical mortality records against osteological data provides some opportunity to develop hypotheses to explain differences between records. Below, we derive estimates of fertility, mortality, and survivorship from historical records and the Alameda-Stone osteological sample to compare the two records.

Fertility

When examining the demography of cemetery samples, it is important to consider the effects of both fertility and mortality, as fertility has been recognized as having a major effect on the composition of skeletal samples. Estimating fertility rates, however, has proven difficult, because of the presence of confounding unknowns. Presumably, baptismal records of the Tucson Diocese could be used to develop a partial understanding of fertility, but these records only represent that portion of the population that received the official rite and whose baptism was recorded.

As a result of the demographic transition, total fertility rates in the United States generally declined during the nineteenth century. In the United States during the 1860s and 1870s, the number of lifetime births per female ranged from 4.5 to 5.2 for Euroamerican women and around 7.6 to 7.7 for African American women (Haines 2010). It is difficult to assess what the total fertility rate would have been in Tucson, but we might expect it to have been somewhere within this range, or perhaps from 4 to 8 births per childbearing female during her lifetime.

We estimated fertility using census data in two ways: by calculating the number of births per census year per 1,000 women of childbearing age (14–40) and the number of children aged 0–4 per census year per 1,000 women aged 20–44. Both measures are complicated by the effects of mortality for women, infants, and young children, however, and cannot be interpreted as true reflections of fertility. For the former metric, referred to here as annual fertility, we used an age range for females from 14 to 40, as the census data indicate the marriage of females as young as 14. For the latter metric, referred to as child-to-woman ratio, we used an age range of 20–44 for women in order to compare the numbers with an available study of fertility in the United States during the nineteenth and twentieth centuries (Haines 2010. Each metric was calculated for the years 1860, 1864, 1870, and 1880 as well as for the Tucson Diocese burial data and the osteological sample from the Alameda-Stone cemetery.

The annual fertility estimates likely underestimate fertility, as large number of infants died in any given year. For instance, the Tucson Diocese burial records indicate that at least 44 infants died from June 1869 through May 1870, and 66 infants under the age of 1 are recorded in the census for that same period. An additional problem is that some infants who were less than a year old or more than a year old may have been recorded in some cases simply as 1 year old. In the case of the 1880 census, age was rounded

to the year, making it impossible to easily separate infants between 1 and 2 years of age from those less than 1 year of age. We calculated a range of annual fertility estimates by calculating a low estimate using only infants listed in the census data as less than 1 year in age. A high estimate was calculated using infants listed in the census data as 1 year in age or less than 1 year in age.

Estimates of fertility using the census records suggest that there may have been somewhere between ca. 80 and 180 births per year per thousand females of childbearing age in Tucson while the cemetery was in use (Figure 80). Fertility appears to have been fairly similar for the census years of 1864 and 1870, but around 50 percent higher for 1860 and possibly lower for 1880 in comparison to other years. If we consider these disparities to have resulted from differences in enumeration methods rather than differences in fertility, than they might suggest fairly similar fertility throughout the period of cemetery use. If, for instance, infants who died in 1859–1860 were counted in the 1860 census, then the higher estimate derived from the 1860 census may register an infant mortality rate of around 50 percent. By contrast, if infants equal to or less than 1 year of age were enumerated as 1 year of age in the 1880 census, and infants between 1 and 2 years old as 2, then the fertility rate for 1879–1880 would be roughly equivalent to that estimated for 1864 and 1870. Because infant mortality was likely high (see below), we might expect fertility to have been closer to perhaps around 120–140 births per year per thousand females of childbearing age.

Another way to assess fertility from available records is to calculate the number of children aged 0–4 per female aged 20–44. This measure also underestimates fertility, as it cannot account for infant and child mortality. Calculations for Euroamerican and African American women in the United States for the 1860s, 1870s, and 1880s, suggest that there were typically around 800–1,100 children aged from 0 to 4 per thousand women aged 20–44 (Haines 2010). In Tucson, this ratio appears to have been substantially lower, ranging from around 500 to 700, and it decreased during the period the cemetery was in use. If fertility in Tucson was roughly comparable to fertility in other parts of the United States during the same period, then a potential explanation for this trend is comparatively high and possibly increasing infant mortality during the period the cemetery was in use. In fact, studies of fertility in the nineteenth-century United States have concluded that fertility was higher in the western United States than in the eastern United States (Steckel 1988), making stronger the possibility that mortality strongly affects these metrics as applied to Tucson.

Comparison of fertility calculations based on the census data, the Tucson Diocese burial records, and the Alameda-Stone cemetery osteological sample also suggest a strong adverse effect of infant mortality on measures of fertility. We calculated the child-to-woman ratio using the sample of individuals listed in the Tucson Diocese records and likely to have been buried in the civilian section, as well as for primary individuals from the Alameda-Stone cemetery. Calculations of the child-to-woman ratio were quite similar between the Tucson Diocese burial records and the Alameda-Stone cemetery osteological sample, but around four to five times higher than calculations based on the census records. The close similarity between the osteological sample and the burial records suggests that the osteological sample may closely reflect the demographic composition of the burial population. The wide disparity between census records and the other records likely reflects high mortality among infants and very young children.

Mortality

Estimating mortality from historical records is difficult because of the bias and incompleteness of reporting on death and its causes. Newspapers reported some deaths, but as the *Arizona Citizen* reported in 1877, they "published the deaths that occur among the American and European population" and seemed to have mostly excluded other segments of the population, such as Mexican Americans, and Native Americans (*Arizona Citizen*, 7 April 1877:3). Based on newspaper reporting, the *Arizona Citizen* estimated mortality at 4 deaths per 1,000 per annum, which is certainly an underestimate. The *Arizona Citizen* was responding to the reporting of very high estimates of mortality in other newspapers and complained that these estimates made Arizona seem an unsafe place to live. The *Arizona Citizen* expressed concern that high mortality estimates would decrease interest in economic development of the region. Furthermore, as noted above, *Arizona Citizen's* estimate was likely biased towards adult Euroamerican deaths reported in the newspapers and probably did not take into account the many deaths of juveniles as well as those of many Hispanic and Native American citizens.

Although numerous biases in the available records make a precise estimate impossible, our estimates of mortality using a combination of U.S. federal census data (1860–1880), territorial census data (1864), the U.S. Federal Census Mortality schedule (1870), and the Diocese records (1863–1875), suggest that mortality was probably at least several times higher than *Arizona Citizen's* estimate and likely varied considerably among different segments of the population (see Chapter 4, Volume 2 of this series). Infants and young children suffered the highest mortality. Given the nature of available records, it is difficult to discern to what degree mortality varied among Hispanic, Euroamerican, African American, and Native American adults.

It is also difficult to discern whether wealth or economic status had any positive or negative effects on mortality. Individuals in western frontier populations generally were able to acquire wealth more rapidly and according to a more egalitarian basis during the mid-nineteenth century than in other parts of the United States, which may have allowed people from a wider range of backgrounds to have similar

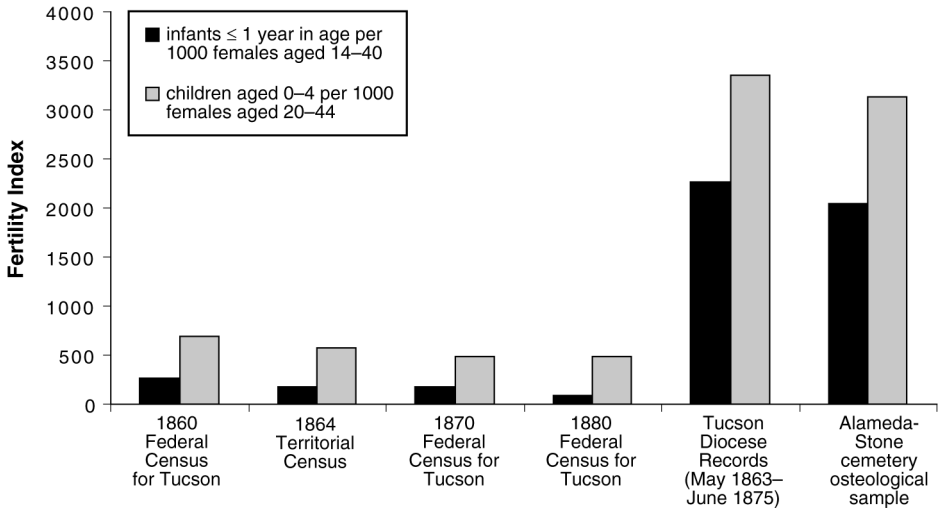


Figure 80. Estimates of fertility based on census data, the Tucson Diocese burial records, and the Alameda-Stone osteological sample.

access to health care and other resources (e.g., Steckel 1990). However, as part of his early efforts to establish a hospital in Tucson, Salpointe noted that the poor had little access to health care. Wealthier Euroamericans and Hispanics, as well as individuals associated with the U.S. military, may have had greater access to health care, which could have reduced mortality among those individuals. This may not have been a tremendous advantage for survival, however, given broadly similar diets, the state of frontier medicine at the time, and a near-universal exposure to infectious disease. Furthermore, Steckel (1988) found no statistical association between household wealth and mortality in his analysis of the U.S. federal census data from 1850 and 1860. Lee (1997:47) noted that, in the absence of adequate health care, "the most important link between economic status and health should have been the quality of nutrition and housing." In the case of Tucson, it appears that residents may have generally been exposed to similar housing conditions and nutrition, so economic status may have not played a strong role in mortality. Typically, a relationship between mortality and economic status emerges in situations where disease environments are relatively benign, leading Lee (1997:47) to hypothesize that the weak relationship between economic status and mortality in the mid-nineteenth-century United States may have resulted from the strong influence of "nonnutritional infectious diseases," or infectious diseases whose health outcome would not be directly affected by the quality of nutrition.

Mortality Estimates Using the Diocese Records

One particularly valuable record for investigating mortality in Tucson was the Tucson Diocese burial records. Although pertaining to a portion of the individuals who died in Tucson, most of whom appear to have been Hispanic Catholics, the record can be considered a good barometer of mortality according to age and sex, if not cultural affinity. The Diocese records indicate that juvenile mortality may have typically been 50 percent higher than adult mortality while the cemetery was in use, with child mortality significantly exceeding adult mortality in most years. Infant and child mortality increased substantially in 1868, 1869, and 1870, likely as a result of series of epidemics that struck the two age groups in those years. Infant and child mortality peaked in 1870 during the same period the town suffered a smallpox epidemic that was particularly devastating to infants and children. After that point, infant mortality appears to have remained high, but child mortality decreased somewhat. The divergence in mortality between infants and children after 1870 may reflect an increasing exposure of infants to unsanitary conditions associated with the growing city, but it could also possibly indicate a higher birth rate, as more adult females migrated into the area. This scenario is difficult to assess given the records available, but the limited data we have on fertility favor an increase in infant mortality over an increase in the population of fertile women. In contrast to infants and children, mortality for subadults appears to have remained relatively low while the Alameda-Stone cemetery was in use, a finding which is generally consistent with many studies that indicate relatively low mortality among subadults.

To get a better sense of the mortality for adults listed in the Diocese records, we used the census records to estimate the size of the population according to age and sex for individuals indicated in the census records as having been born in Mexico or the southwestern United States. These segments of the community likely better approximate the population from which individuals in the Tucson

Table 18. Temporal Groups Established for Analysis of Tucson Diocese Burial Records, 1863–1875

Temporal Group	Date Range	Deaths	Tucson Diocese Burial Records?
1	May 1863–July 1864	35	yes
2	August 1864–May 1865		no
3	June 1865–March 1866		no
4	Apr 1866–May 1867	28	yes
5	June 1867–May 1868	30	yes
6	June 1868–May 1869	102	yes
7	June 1869–May 1870	122	yes
8	June 1870–May 1871	121	yes
9	June 1871–May 1872	126	yes
10	June 1872–May 1872	94	yes
11	June 1873–May 1874	124	yes
12	June 1874–May 1875	162	yes

Diocese records was drawn. To organize these data according to time, we organized the data into a series of 12 temporal periods, each corresponding roughly to a year (Table 18). These periods are useful for comparison as they divide the data into relatively equal temporal units that correspond closely to census years. Diocese records were missing for two of these periods (Temporal Groups 2 and 3), resulting in no data for those years. The size of the population born within the region was estimated using linear equations. Annual estimates of population size were used to estimate a mortality rate for infants, children, and adults in the Diocese records, as well as adult males and females.

Juvenile Mortality

Historical studies of infant and child mortality in the United States during the nineteenth century have tended to show that infant and child mortality was highest in urban areas, ranging from 180–200 per thousand, and lower in rural areas, ranging from 100–150 per thousand. Lack of adequate sanitation and low bioavailability of nutrients as a result of disease, such as diarrheal disease, were likely contributing factors to infant and childhood mortality, which has also been shown to be weakly correlated with periods of reduced stature. Although wealth and class distinctions are sometimes shown to have played a role in variation in infant and childhood mortality, ethnic and regional distinctions seem to have been particularly important (Alter 1997). Steckel (1988) showed that in the United States during the mid-nineteenth century, mortality between the ages of 1 and 4 was highest in the West and frontier states and lowest in the Midwest as well as higher in large cities. Families with larger numbers of children also had a higher incidence of infant or child mortality, which Steckel (1988) argues may have resulted from the continual spread of childhood diseases among a family's children, particularly in cases where older children had developed immunity.

The average age-at-death for juveniles was typically between 2 and 3 years in the Diocese records for any given period, but it peaked in 1870 and subsequently declined for the remainder of the time the cemetery was in use, being under 2 years of age for the last 2 years of use by the civilian population. It appears that this trend was the result of an increasing percentage of infant deaths among juveniles beginning in 1870. From 1870 to 1875, infant deaths typically comprised two-thirds or more of juvenile deaths, while in earlier years, infant deaths more often comprised half or fewer of juvenile deaths.

This trend is evident in estimated mortality rates for juveniles, with infant mortality rising dramatically through time in comparison to children and subadults (Figure 81). The increase for infants after 1870 might reflect some bias in the census records. However, it seems at least plausible that sanitation problems contributed to infant and early childhood diseases, such diarrheal disease, as poor sanitation in the city and a large number of uncovered wells and poorly regulated privies could have been particularly dangerous health hazards for infants. Interestingly, child mortality seems to have increased temporarily during the years 1869 and 1870, possibly as a result of epidemics that occurred during those years, but remained comparatively low thereafter. The lack of an increase in child or subadult mortality after 1870 provides some support for the hypothesis that mortality generally increased through time after 1870 for infants and young children.

Adult Mortality

When viewed simply in terms of raw numbers of deaths, the number of deaths of young, middle, and old adults in the Diocese records shows a trend that generally reflected the age structure of the growing population, with the largest number of deaths among young adults, followed by middle adults. Most adults in the Diocese burial records were under the age of 50 at the time of death, with an average age of around 30 for the period the cemetery was used. However, the population of adults in Tucson was a relatively young one, with large numbers of young adults and middle adults living in the settlement. When the size of the population born within the region was taken into account, the trend in adult mortality was reversed, with mortality being highest among old adults, followed by middle adults (Figure 82). Old and middle adults also appear to have been most susceptible to hazards such as epidemic disease, as there was some apparent spiking in the number of adult deaths in a few periods when disease epidemics were reported (June 1868–May 1869; June 1870–May 1872). This was particularly the case among older individuals. As noted in the section on disease, epidemic disease struck Tucson in early 1869 and appeared to have

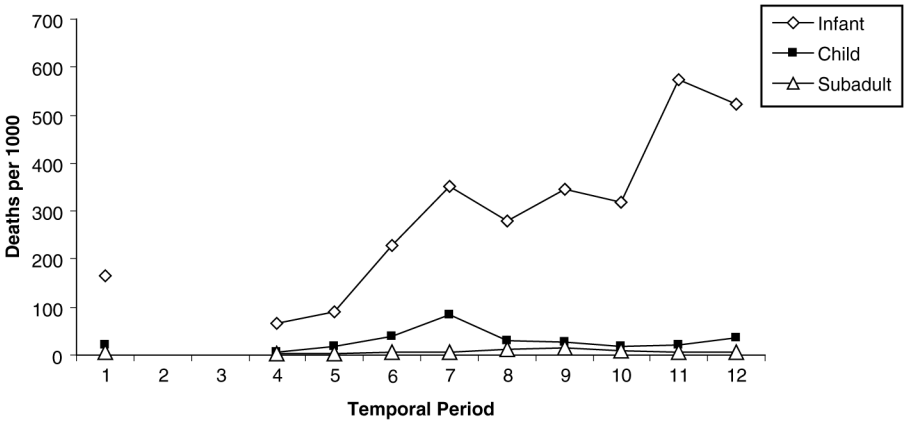


Figure 81. Juvenile mortality calculated from the Tucson Diocese records.

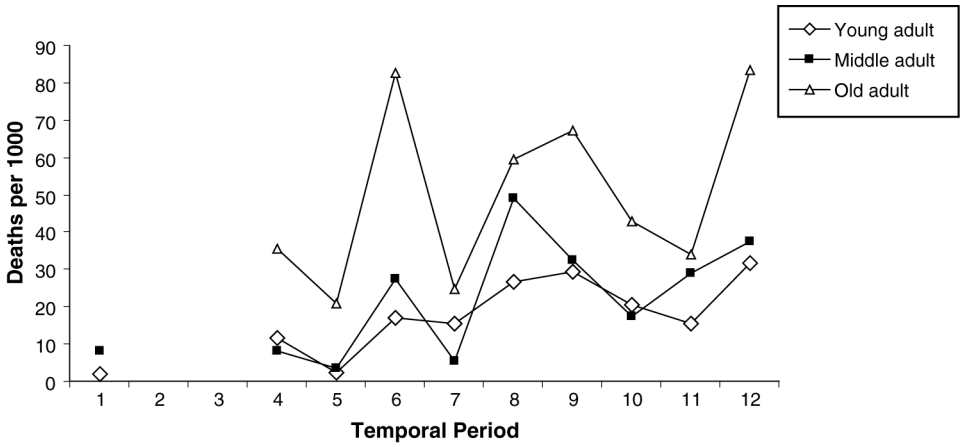


Figure 82. Adult mortality calculated from the Tucson Diocese records.

affected the entire population, which might account for the elevated number of deaths of adults during that period in the Diocese records.

An interesting temporal trend in the mortality estimates for adults was that they appear to have generally increased through time for each age category. One possible explanation is that the Diocese records became more inclusive over time, recording a larger proportion of the deaths of people born in the region. Alternatively, the 1880 census records obtained for this study and used to estimate change in population size between 1870 and 1880 may poorly represent the population born within the region. If there actually was increased mortality, this trend might indicate that mortality increased as the city grew and became more urbanized, despite increasing modernization and efforts to improve sanitation. Mortality appears to have increased most for old adults, followed by middle adults.

Comparison of the age distribution of adults by biological affinity in the osteological sample shows that a larger percentage of deceased Euroamericans were young adults. Deceased individuals of Hispanic or Native American biological affinity were also most often young adults, but tended to be middle adults or old adults more often than individuals of Euroamerican biological affinity. The difference between individuals of Euroamerican biological affinity and other biological groups was not surprising because most migrating populations tended to be composed of young adults and many recent migrants to Tucson would have been Euroamericans. Comparison of the age distribution of adults per cemetery area showed that age distributions were fairly similar for Cemetery Areas 2, 3, 4, and in the sample from the excavations for the Tucson Newspapers basement. Young adults were more prevalent in Cemetery Areas 1 and 5, in comparison to other areas. The prevalence of young adults in Cemetery Area 1, the military section, makes sense because most soldiers were in the young adult age group. Although the sample size was small for Cemetery Area 5, the greater percentage of young adults in that area was interesting and may provide some clues to the use of that area. Possibly, older established adults were rarely buried in Cemetery Area 5, which might suggest that individuals in Cemetery Area 5 could have been outsiders or members of a restricted social group.

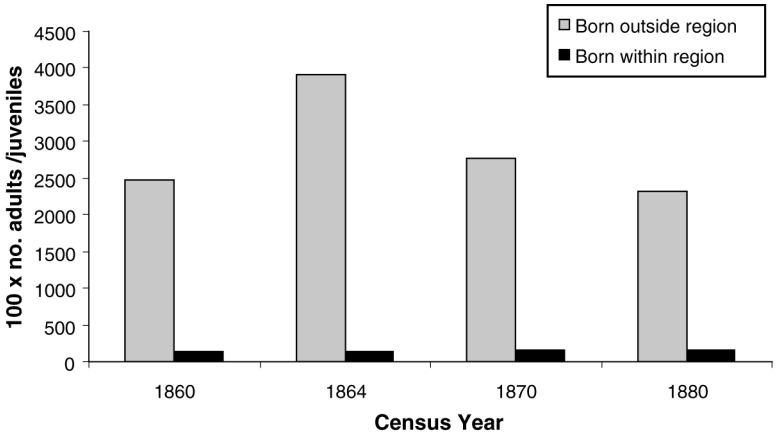


Figure 83. Adult juvenile ratio calculated from census data.

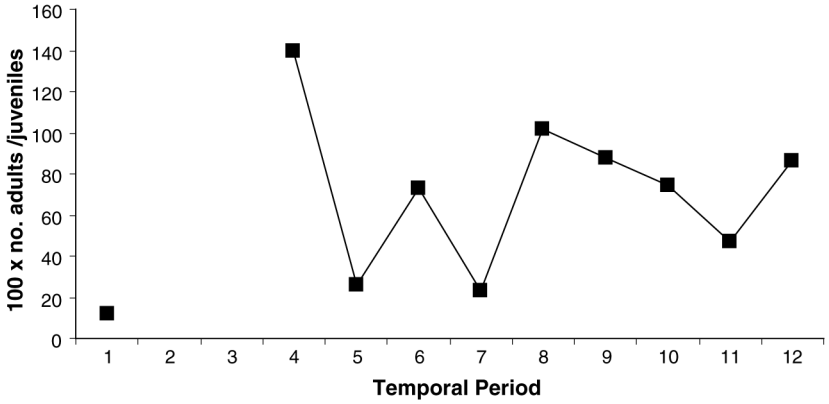


Figure 84. Adult juvenile ratio calculated from the Tucson Diocese burial records.

Adult-Juvenile Ratios

We calculated adult-juvenile ratios (100 × number of adults/number of juveniles) for the census records, the Tucson Diocese burial records, and the Alameda-Stone osteological sample. As expected, those born outside the region, as recorded in the census records, were mostly adults throughout the period the cemetery was in use (mean = 2,870), with the highest ratio of adults to juveniles occurring in 1864 (Figure 83). By contrast, the ratio calculated for those born within the region was much lower and hovered around 150 while the cemetery was in use. Like other vital statistics calculated using the Tucson Diocese burial records, the adult-juvenile ratio fluctuated while the cemetery was use, probably as a result of variation in the selective mortality of adults and juveniles in response to epidemics and other hazards (Figure 84). Overall, however, the adult-juvenile ratio calculated using the Diocese records was always below 150 in every period and often substantially so, averaging 67 while the cemetery was in use. Again, the disparity between the census data and the Tucson Diocese burial records was likely the result of exceptionally high mortality among the very young.

The adult-juvenile ratio could not be calculated according to biological affinity for the osteological sample because most subadults could not be reliably assessed for biological affinity, and biological affinity could only be assessed for a fraction of adults. However, the ratio was calculated according to cemetery areas (Figure 85). The ratio was lowest and most similar to the Tucson Diocese burial records in Cemetery Areas 3 and 4 and was slightly higher in Cemetery Area 5, providing some support for the idea that individuals listed in the Tucson Diocese burial records were typically buried in the northern section of the cemetery and perhaps most often in Cemetery Areas 3 and 4. The adult-juvenile ratios calculated for Cemetery Areas 1 and 2, by contrast, were much higher than in other areas, providing support for the notion that most individuals in the southern cemetery areas were from outside populations. However, the ratios were not nearly as high as computed for those born outside the region as noted in the census records, which might have resulted in part from higher mortality among the young. In Cemetery Areas 1 and 2, juveniles tended to be fetuses, infants, or young children, which might indicate that these individuals were the offspring of recent migrants to Tucson. The ratio computed for the sample from the Tucson's Newspapers Building excavation was similar to that computed for Cemetery Area 2, but this was likely spurious. Although only 8 of 48 individuals curated at the Arizona State Museum (and analyzed for this project) were juveniles, a 1953 report provided by graduate students of the University of Arizona

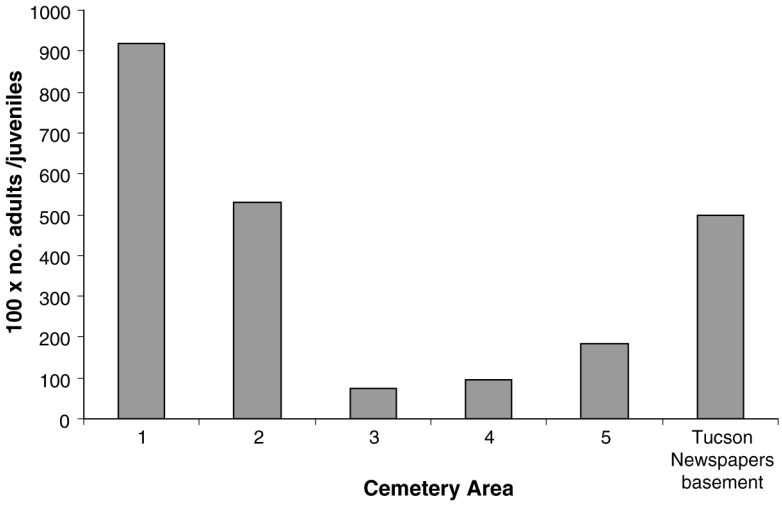


Figure 85. Adult juvenile ratio, per cemetery area.

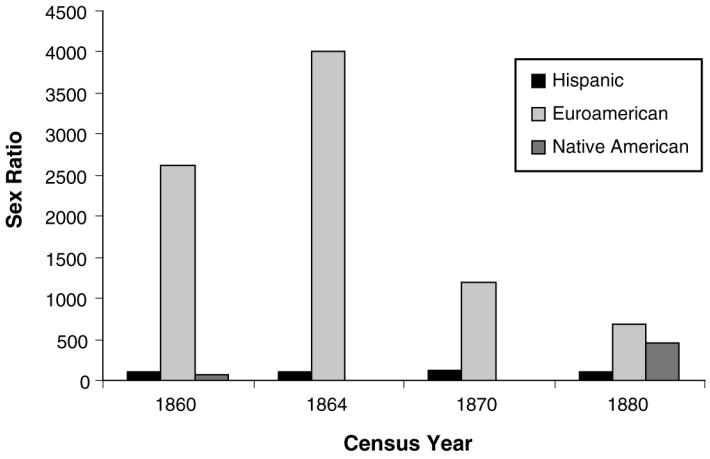


Figure 86. Sex ratio computed from the census data, per cultural affinity.

Anthropology Department to the *Tucson Citizen* indicated that 44 percent of aged individuals were juveniles, which would translate to an adult-juvenile ratio of 127, closer to those calculated for Cemetery Areas 3, 4, and 5 (O'Mack 2006; *Tucson Citizen*, 9 July 1953).

Mortality According to Sex

To compare mortality for adult females and males, we calculated sex ratios according to cultural affinity for the census data, Tucson Diocese burial records, and the osteological sample from the Alameda-Stone cemetery. The census data indicate that the sex ratio among Hispanics hovered slightly in favor of males throughout the period the cemetery was in use (Figure 86). By contrast, the sex ratio among Euroamericans was strongly in favor of males, although it declined from 1864 through 1880. Sex ratios could be computed for Native Americans for the 1860 and 1880 data, but Native Americans were not clearly represented in the census in other years. The available data for Native Americans indicated a ratio in favor of females in 1860 and a ratio in favor of males in 1880. African American adults were rare in the census records and thus computing sex ratios for African Americans did not show any interpretable trends.

The Tucson Diocese burial data generally followed the same patterns as evident in the census data for sex ratios, but with fewer and more-female dominant numbers for each cultural affinity (Table 19). In some ways, this trend may reflect higher mortality among adult females, but it may also reflect the fact that few Euroamericans were recorded in the Tucson Diocese burial records, and possibly that Native American women were more likely to appear in historical demographic records, perhaps because of an association with Hispanic or Euroamerican households. Native American women may have served as domestics, for instance.

We also compared adult female to adult male mortality through time using the Diocese records and census records (Figure 87). Adult male mortality was similar or higher than adult female mortality in three periods early in the cemetery's use, but female mortality generally exceeded adult male mortality in the later years of cemetery

Table 19. Sex Ratios Computed from the Tucson Diocese Records

Cultural Affinity	Sex	Young Adult	Middle Adult	Old Adult	Total
Hispanic	female	79	51	24	154
Hispanic	male	89	37	33	159
	sex ratio	113	73	138	103
Non-Hispanic Euroamerican	female	1	1	—	2
Non-Hispanic Euroamerican	male	3	—	3	6
	sex ratio	300	—	—	300
Native American	female	9	1	1	11
	male	3	—	1	4
	sex ratio	33	—	100	36

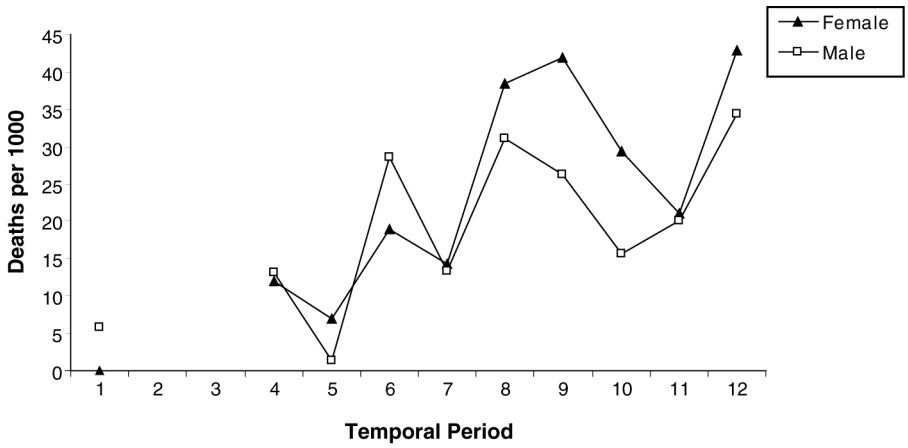


Figure 87. Adult mortality calculated from the Tucson Diocese records, by sex.

use, and often substantially so. Not surprisingly, the same general trend in increasing mortality through time, as was seen in young, middle, and old adults, was also seen in estimates of mortality for males and females, with a more pronounced increase through time in female mortality, in comparison to male mortality. Spikes in mortality for adult males and females were also evident and mirrored those seen for adults according to age, suggesting that the population was particularly affected by hazards in those years, with adult females much more affected than adult males. Alternatively, some apparent spikes in mortality might represent an influx in the adult population during some years.

Particularly interesting was the finding that the osteological data do not closely conform to the historical demographic data for sex ratios (Table 20). The Hispanic ratio computed from the osteological data was relatively close to what we would expect based on historical records. Although higher than computed for most census years, the ratio might reflect a slightly greater influx of Hispanic males into the community during the late 1860s and early 1870s or a slightly higher mortality among Hispanic adult males in comparison to females. The Euroamerican sex ratio computed from the osteological data, by contrast, was much lower than what was computed from historical data, suggesting either that Euroamerican female mortality was much higher than Euroamerican male mortality or that some Hispanics were misclassified as Euroamericans. The close biological relationship between the two groups makes this situation understandable. Another confounding factor was that some Euroamerican males would have been buried in the military section of the cemetery, and because many of the burials of these individuals were exhumed historically, their bones were not available in sufficient quantity to assess biological affinity, age, and sex. This factor, along with elevated female mortality in comparison to males, could account for the discrepancy between the Euroamerican sex ratios computed using census data vs. the osteological data.

Although it is difficult, if not impossible, to distinguish between the various hypotheses offered to explain patterns discussed above—we suspect that biases in the records are responsible for at least some of the apparent increase in mortality after 1870—comparison of mortality estimates does allow for some general conclusions to be drawn. Infant mortality was particularly high, in comparison to child and subadult mortality. Adult

Table 20. Sex Ratio according to Biological Affinity in the Alameda-Stone Osteological Sample

Biological Affinity	Young Adult	Middle Adult	Old Adult	Adult	Total
African American					
Female	—	—	—	—	—
Male	—	1	—	—	1
Sex ratio	—	—	—	—	—
Euroamerican					
Female	14	7	—	—	21
Male	34	19	7	2	62
Sex ratio	243	271	—	—	295
Hispanic					
Female	49	28	12	—	89
Male	41	48	20	3	112
Sex ratio	84	171	167	—	126
Native American					
Female	9	10	1	—	20
Male	7	5	4	—	16
Sex ratio	78	50	400	—	80

Note: The Native American count includes two middle adult males identified as Apache, whereas the remainder in that category were identified biologically more generally as Native American.

female mortality was generally higher than adult male mortality. Old adults and middle adults suffered higher mortality than young adults. In some sense, these conclusions are not unexpected, as the young and old tend to suffer the greatest mortality risks, and historically, women have suffered greater mortality than men, particularly because of the risks of childbearing prior to modern medical care. There is at least weak evidence that there might have been a general rise in mortality as the city grew rapidly in population, and this may have been the result of the oft-cited effects of urban crowding and poor sanitation, which would have contributed to the spread of disease.

Survivorship

In order to further explore how closely the osteological data reflect the historical record, we applied several paleodemography models to both data sets and used those results for comparisons. In the past, life table analysis was used to reconstruct skeletal demography; however, recent advances in demography provide much more robust analyses without some of the inherent flaws noted in earlier studies. By the mid-1980s, growing dissatisfaction with life table analysis led various researchers, who were borrowing from modern demography, to suggest hazard analysis as an alternative method for paleodemography. These methods are used to estimate trends and determinants of mortality in a given population using a survivorship function.

In our study, we used the Siler-Gompertz mortality models to examine the association of the osteological data to the Diocese records. We compiled the skeletal data based on the determined age range and the estimated sex for each individual. To facilitate the comparison of the survivorship and mortality hazard, parameters of the Siler and Gompertz functions were modeled using a maximum likelihood estimation method. The method of maximum likelihood corresponds to many well-known estimation methods. For example, suppose you are interested in the length of a particular type of bottle and have recorded the length of a sample of these bottles, but not the entire population. If we assume that these lengths are normally distributed with some unknown mean and variance, the sample mean we recorded is used as the maximum likelihood estimator of the population mean, and the sample variance can be used as a close approximation of the population variance. The assumptions of this approach can likewise be used to estimate the survivorship (or mortality) in a population.

In our analysis of the skeletal sample, age ranges were used to estimate the age-at-death distributions. Large age ranges were selected to provide a less-biased age-at-death distribution compared to the restricted 1–5-year age ranges associated with the specific age codes often incorporated in traditional skeletal analysis. For the data from the Diocese records, specific ages were bracketed by 1 to 6 months for the subadults and 1 year for the adults.

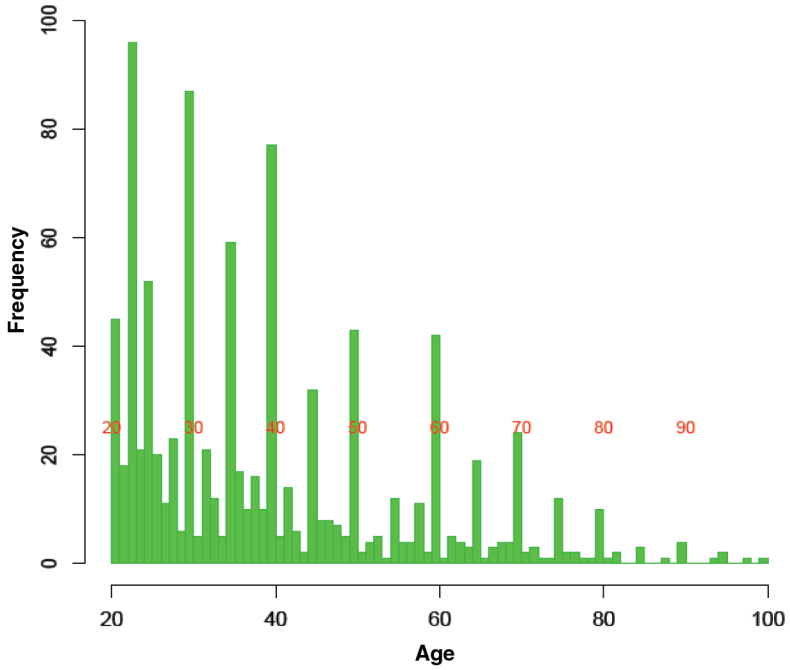


Figure 88. Age heaping in the historical record.

A four-parameter Siler model was used to examine the entire age-at-death distribution for both the Diocese records and the skeletal sample:

$$S(a) = \exp\left(-\frac{a_1}{b_1}\left(1 - e^{-b_1 a}\right) + \frac{a_3}{b_3}\left(1 - e^{b_3 a}\right)\right)$$

$$h(a) = a_1 \exp(-b_1 a) + a_3 \exp(b_3 a)$$

The resulting survivorship curves were used to identify differences in mortality and survivorship between biological groups, sexes, and cemetery areas.

A two-parameter Gompertz model was employed to examine differences in mortality and survivorship between adults and males and females:

$$S(a) = \exp\left[\frac{a}{b}\left(1 - e^{b a}\right)\right]$$

$$h(a) = a \ \exp(b a)$$

A number of biases complicate our efforts to calculate these functions using age distributions derived from historical and osteological records. Examination of the Tucson Diocese burial records indicates age heaping (Figure 88). Age heaping occurs when the age of a deceased individual is estimated or rounded to the nearest half decade. For example, the inordinate number of 25-year olds is an artifact of age heaping and not increased hazards during this period. Likewise, age biases are suspected in the osteological data. Together, these biases likely create artificial disparities between the two data sets.

Examining the Siler model for the two data sets, we can see that the skeletal data and historical documents are not distributed in a similar fashion (Figure 89), and, in fact, based on a likelihood ratio test, these differences are statistically significant. Clearly, age biases play a role in the differences observed between the Diocese records and the cemetery remains. The individuals identified in the Diocese records show a much lower survivorship until the fourth decade, when survivorship drops suddenly and drastically among the individuals recovered from the cemetery. This sudden decrease is likely an artifact of the skeletal aging methods employed during laboratory analysis, which tend to overestimate age for younger individuals and underestimate age for older individuals.

Examination of sex-specific mortality within the osteological sample revealed a pattern of high female mortality through early adulthood, which is consistent with the analysis presented above (Figure 90). Male deaths overtake female mortality in the fourth decade. Males maintain a higher mortality until the seventh decade when females, on average, outlive their male counterparts. Similar mortality patterns have been documented in numerous historical and osteological assemblages. Both biological and cultural reasons have been cited to explain this sex-specific pattern of mortality, including but not limited to childbirth, women's role in daily life, and unequal access to resources.

Survivorship was also different between cemetery areas, particularly between the northern and southern sections of

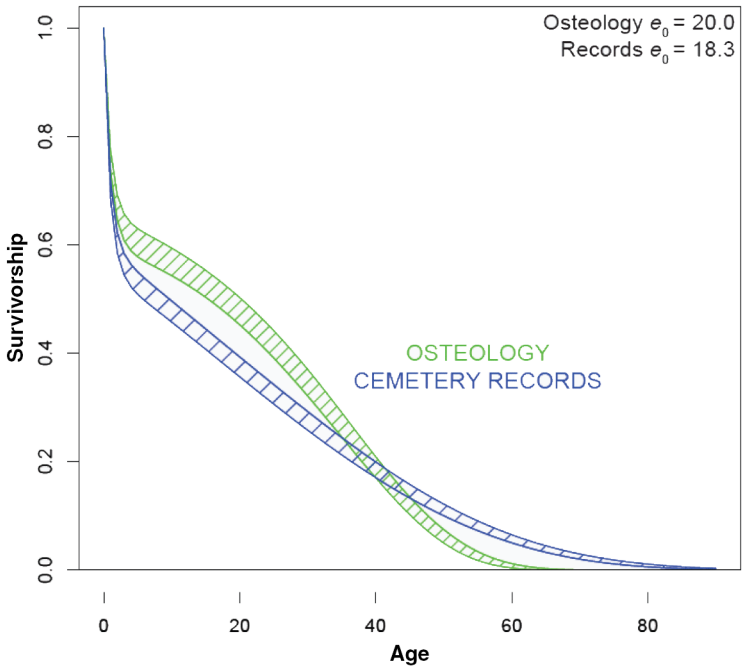


Figure 89. Siler Model age-at-death: records vs. osteology.

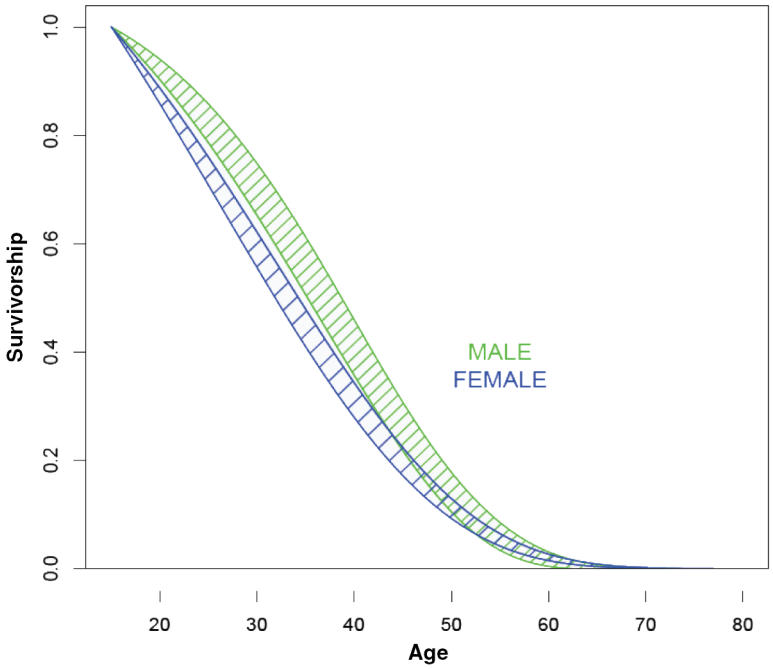


Figure 90. Age-at-death, by sex.

the cemetery. Survivorship in Cemetery Areas 3, 4, and 5 roughly matched the Tucson Diocese burial records, whereas survivorship in Cemetery Areas 1 and 2 differed markedly from those data (Figures 91 and 92), again suggesting that many of the individuals listed in the Diocese records were buried in Cemetery Areas 3 and 4.

Conclusions

In this chapter, we have presented information on the diet, disease, stature, trauma, and demography of individuals interred in the Alameda-Stone cemetery. Evidence for medical intervention has also been discussed. The evidence suggests that individuals interred in the cemetery may have had relatively well-balanced diets, with generally adequate access to a variety of animal and plant foods, and that people living in Tucson during and prior to the opening of the cemetery may have shared similar diets. The availability of some foods fluctuated at times as a result of Apache raiding activities as well as periodic droughts and variation in the availability of food products on the open market or at the U.S. military supply depot in Tucson. Nutritional status could have been affected by occupation and wealth, but we have no clear information indicating social or economic disparities in access to quality nutrition except to say that goods transported to Tucson from other areas were much more costly than in other areas of the country because of shipping costs. Consumption of such foods probably would not have improved nutrition, however.

Osteological evidence for diet and nutrition suggests that the diet of individuals interred in the Alameda-Stone cemetery may have been relatively good overall, although recent Euroamerican migrants to the area may have had greater access to sugars and processed flours and suffered from their negative health consequences. The local diet appears to have been gritty, but of low cariogenicity, and the diet of recent migrants appears to have been softer and more cariogenic. Male teeth were more frequently and more severely worn than female teeth, possibly indicating differences in diet between sexes or differences in habitual activities involving the teeth, such as pipe smoking or grasping tools or weapons with the teeth.

Historical records document multiple disease epidemics in Tucson while the Alameda-Stone cemetery was in use. Osteological evidence generally corroborates the occurrence of epidemics, particularly when confounding factors, such as the osteological paradox, are taken into account. The incidence of periosteal new bone, for instance, was relatively high in comparison to other cemeteries, but many individuals who died of infection may not have lived long enough for periosteal new bone to form. Evidence for active infection was most common among juveniles as well as individuals in the northern areas of the cemetery, but evidence for systemic infection was relatively rare in those areas. By contrast, the cases of active infection in Cemetery Areas 1 and 2 were mostly indicative of systemic infection, suggesting that individuals buried in those areas were either more prone to systemic infection (and died from it) or survived longer from systemic infection than their counterparts in other areas of the cemetery. Given the time necessary for a skeletal response to infection to manifest, it is likely that the incidence of infection was much higher than was noted in the osteological sample, particularly among the young and old. In addition to generalized evidence for infection, osteomyelitis and treponemal infection, including congenital syphilis, were observed in the cemetery population, albeit at low levels.

One possible effect of rampant infection among the populace was evidence for dampened growth among juveniles interred in the cemetery. Analysis of stature for a sample of juveniles and Hispanic adults suggested that the growth of Tucson's juveniles was dampened between the ages of 7 and 14, after which point juveniles may have experienced a period of catch-up growth. This pattern suggests the possibility that juvenile stature was depressed by the combined effects of nutrition and disease until stature rebounded during late juvenility and early adulthood. An alternative explanation is that individuals who survived past their mid-teens were taller than individuals who died at an earlier age.

Other evidence of infection in the populace was the high mortality experienced by the very young and old. Mortality among infants and young children was much higher than other age groups and spiked in sync with the timing of known epidemics. Many of these individuals would not have presented skeletal evidence of infection because of their rapid deaths, and thus it is their sheer numbers that signal the presence of epidemic disease. The old also experienced high mortality rates when their population proportion is taken into account, suggesting that they too were more susceptible to infectious disease than other age groups.

A somewhat surprising finding was that, although trauma was relatively common in Tucson in comparison to other contemporaneous settlements, clear evidence for weapons trauma was rare, despite the reputation of Tucson as a town rife with gun violence. The limited evidence for violent trauma suggests the possibility that violence in Tucson could have been exaggerated to some degree and that most trauma cases resulted from other causes. However, the comparatively high level of trauma compared to other cemeteries, particularly among males and individuals interred in the southern portion of the cemetery, suggests that Tucson remained a rough and dangerous town where traumatic injury was common.

Historical evidence suggests that Tucsonans would have performed diverse jobs, many of them involving physical labor, and that there were differences in labor between the sexes and between biological affinities. Evidence for

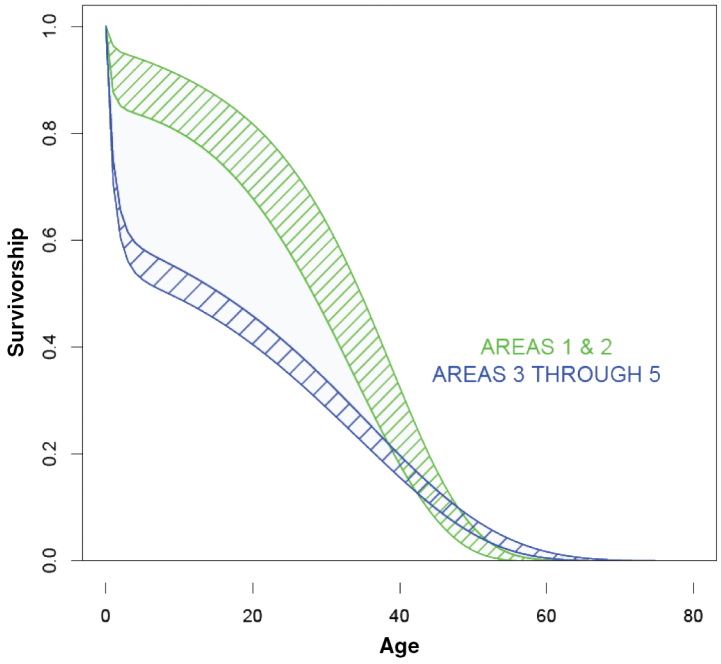


Figure 91. Siler Model survivorship, by cemetery area.

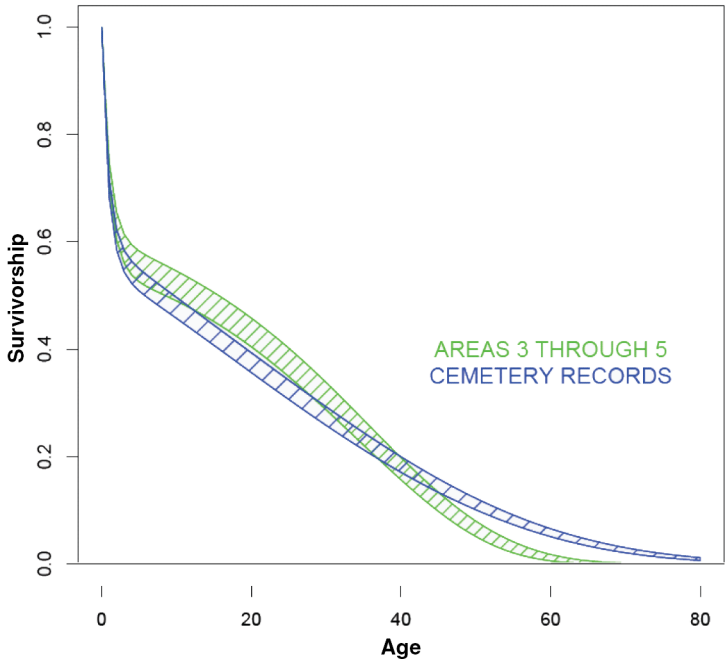


Figure 92. Siler Model survivorship: Cemetery Areas 3–5 vs. Tucson Diocese records.

variation in work practices was investigated through examination of long-bone shape, femoral robusticity, body asymmetry, sexual dimorphism, vertebral trauma, and variation in the location and frequency of degenerative joint disease. Comparisons suggest that males and females followed different work patterns and that males were more likely to suffer from conditions resulting from heavy lifting and use of the upper body. The shoulder, elbow, wrist, and lower backs of males were affected much more than in females, and the lower limbs of females, particularly the knee, were much more likely to be affected by degenerative joint disease. Hispanics, also, appear to have experienced greater loading on some joints, possibly as a result of work habits involving heavy lifting and strain on the back, shoulders, and elbows. Hispanics showed significantly more degenerative joint disease in both shoulders and both elbows than did Native Americans or Euroamericans and also experienced a higher frequency of vertebral trauma, possibly the result of heavy lifting. These results are generally consistent with historical evidence suggesting that many of the blue-collar jobs in Tucson were performed by Hispanics. Interestingly, comparison of femoral shape and robusticity to a broad sample of groups, including horticulturalists, hunter-gatherers, and industrialists, suggests that mobility patterns among individuals in Tucson were different from those observed in other studied groups, although what behaviors made that difference is unclear.

Historical evidence suggests that consistent access to professional medical care in Tucson was probably uncommon, and care likely varied widely in quality. Nonetheless, evidence for medical care was observed in the Alameda-Stone cemetery sample. It appears that infection resulted from a substantial proportion of fractures and that medical treatment (or the lack of it) was not always successful in setting fractures or restoring mobility to dislocated joints. Autopsy, as evidenced by removal of the top of the skull, was observed in rare instances, although postmortem medical investigations could have occurred at a higher rate, particularly among individuals in the military cemetery (whose bones were mostly removed during exhumation in 1884). Evidence for professional dental care was confined to a handful of individuals in the southern portion of the cemetery and appears to reflect access to dental care outside of Tucson and perhaps by relatively wealthy individuals.

If there is one thing that the analysis of the historical and bioarchaeological evidence shows is that death comes to everyone—young and old, male and female—but in nineteenth-century Tucson it preferred some groups over others. Overall, mortality rates were high for infants and young children, old adults, and for adult females. Disease was a likely culprit behind the deaths of the very young and old. High mortality among adult females was likely a reflection of the hazards of childbearing prior to modern medical care, which could have been further complicated by disease and poor sanitation. Mortality rates also appeared to have been somewhat higher among individuals buried in Cemetery Areas 1 and 2, which could reflect a more hazardous lifestyle, a finding supported by the higher incidence of trauma among individuals interred in the southern portion of the cemetery and historical evidence suggesting these young adult and middle adult men were more often exposed to hazards than other groups.

Overall, the evidence for the life and death experiences of individuals interred in the Alameda-Stone cemetery presents an intriguing picture of a growing, frontier settlement and one that stands in contrast to the picture that has emerged from many other cemetery investigations. It is clear that the individuals interred in the Alameda-Stone cemetery had life experiences somewhat different from individuals interred in other cemeteries. They were in relatively good health in terms of diet and nutrition but were heavily affected by trauma and disease, and they had only limited access to professional medical care. Work habits were fairly intensive physically, with differences between males and females as well as between Hispanics and individuals of other affinities. At the same time, individuals in Tucson may have been experiencing health effects—including reduced stature and increased exposure to infectious disease—that were common to many urbanizing settlements of the time, where sanitation was poor and people and goods from all over the globe were increasingly concentrated. One particularly unique aspect of the Alameda-Stone cemetery was its demographic diversity. The cemetery was populated by people of all ages and from multiple cultural backgrounds who converged in a changing place in a changing land. This situation has allowed us to investigate the health effects and disparities for an entire community in the nineteenth-century American West during an important period of transition.

CHAPTER 8

Deathways and Tucson's Living Population 1860–1880

Kristin J. Sewell, Michael Heilen, and Lynne Goldstein

Introduction

All groups approach death and burial in ways that reflect worldview, traditions, and the specific circumstances surrounding death. Deathways are not immutable or fixed for any particular group; they vary within and between groups and change through time. However, there are regularities in burial practices that emerge in specific historical, cultural, and situational contexts, and some of these have material correlates that can be recognized archaeologically within a cemetery. This chapter provides the cultural context for the diverse groups that could have been buried in the Alameda-Stone cemetery.

As has been discussed in other chapters in this volume, Tucson at the time of the Alameda-Stone cemetery was in a state of economic and cultural transition. Tucson was a cultural and economic crossroads, where people, practices, and technologies were exchanged, resisted, accommodated, assimilated, and transformed. Hispanic Catholics, Euroamerican Protestants, Jewish Euroamericans, Apache, O'odham, Yaqui, and the U.S. military each had distinctive ways of approaching death and burial, but not all people who were buried in the Alameda-Stone cemetery would have been buried by people of their same background and affinity. In this way, the burial practices evident in some grave pits in the Alameda-Stone cemetery reflect the attitudes and traditions of the mourners and burial parties, rather than those of the deceased themselves. Given the multiethnic historic context, multiple traditions could be represented in a single burial.

In addition to multiple burial traditions being practiced in Tucson, burial traditions for many groups were changing. Both Hispanic Catholics and Euroamerican Protestants had deathways, for instance, that were undergoing fundamental change during the nineteenth century. New approaches to death and burial championed by reformists in Mexico were resisted in the American Southwest, but in general, burial practices and places of burial went from being organized and controlled by families, churches, and religious groups to becoming more secularized and institutionalized.

Burial practices were increasingly influenced by professional organizations and municipalities in order to accommodate growing concerns about sanitation, egalitarianism, and the role of cemeteries in urban development. The places of burial shifted from under church floors, in churchyards, or family plots, to public cemeteries placed on the outskirts of town. Particularly as a result of the Civil War, pan-religious approaches to death and burial that crosscut Catholic, Protestant, and Jewish belief systems were also emerging. These too could have influenced the attributes of individual burials in the cemetery.

In examining the deathways of the living population of Tucson when the Alameda-Stone cemetery was in use, we discuss cosmology, eschatology, ritual, and the potential archaeological or material visibility of funerary practices in the cemetery. We pay particular attention to Hispanic Catholic deathways and Euroamerican Protestant deathways, as most of the burials in the cemetery were likely placed in accordance with these traditions. Attention is also paid to general change in deathways in the United States and Mexico during the nineteenth century, in order to place the deathways likely practiced in Tucson within a larger temporal and geographic context. In addition to these larger discussions, we present information on Apache, O'odham, Yaqui, and Jewish deathways, as well as on military and fraternal funerals, as individuals of these affinities were buried in the cemetery as well. Although traditional and non-Christian Native American burial practices were not noted in our excavations, we provide information on indigenous non-Christian deathways practiced by Native Americans as a point of comparison to what was observed in the cemetery.

Hispanic Catholic Burial Practices in Mexico and the American Southwest

Roman Catholics perceived death as a great battle for the soul. The battle was either won or lost depending on preparations made for the soul's journey and carrying out instructions given by the dying to the family and community for care of the soul after death. As such, the Catholic model of a good death emphasized putting the soul to rest and continued concern for the soul postmortem. Absolution and contrition were the last acts of the dying before receiving the Host, or viaticum, from the administering priest. These last rites delivered the dying from evil and prepared the soul for the journey toward salvation. Death was attended by family, neighbors, and the parish priest, and the dying confessed and tried to correct for their sins. Reis (1992:36) described one deathbed request in which a dying man attempted to correct the "sins of the flesh" by marrying his longtime companion so that she would become his legal heir. Deathbed confession was an act of faith and fairness to the living. In 1835, Luis Pedro de Carvalho confessed that he had denied the legitimacy of his two daughters and accused their mothers of prostitution. His disclosure was part of "settling his account with the Creator" (Reis 1992:36). Vigil was held over the sick and dying until the moment of death as the soul was particularly vulnerable to malevolent forces as death approached (King 1954; Lomnitz 2008; Reis 1992).

Prior to death, the dying were given opportunities to settle debts and obligations. The will was not only a legal instrument for settlement of debts and disbursement of goods but was also written as a set of binding instructions to family and community as to the care of the soul. Foremost in this instruction were requests made by the testator for the place of burial. Some locations were holier than others (Voekel 2002; Will de Chaparro 2007). Burial in churches or churchyards with their collection of sacred relics, images of saints for whom the church was dedicated, consecrated grounds, and community of the faithful were preferable to public cemeteries or other locations. Typically, the more coveted burial locations were more costly to obtain or were controlled by religious confraternities that reserved burial spaces within churches and convents for members.

In addition to burial in consecrated space, the dying also preferred proximity in death to the saints they prayed to during life (Voekel 2002; Will de Chaparro 2007). Saints were viewed as advocates and intercessors in the great battle for the soul. Testators often gave specific instructions for prayers on their behalf and masses dedicated to the saints of their choosing (Ariès 1975; King 1954; Lomnitz 2008; Reis 1992; Voekel 2002; Will de Chaparro 2007). Prayers from the faithful were mediated by the saints. Therefore, the dead in closest proximity to them were given an implied spiritual advantage. After burial, the deceased became a permanent member of the church's subterranean population. In this space, the dead were an integral part of the community's spiritual life in perpetuity and a constant reminder to the living. As Voekel (2002:39) observed, "how much easier [it was] for a communicant to remember his religious duties when kneeling directly over another's mortal remains!" The soul and the body were inextricably linked in the minds of the faithful. Sacred corporeal relics decorated the altars of churches where the devout knelt in prayer over the mortal remains of their ancestors. Confidence in the reconstitution and resurrection of the body, and security of the physical remains in consecrated ground were of paramount importance. In these spaces, the souls of the dead benefited from the attention of the living.

Children were considered free from mortal sin and did not have to face judgment or the fires of purgatory to find their place in heaven. In death, children were referred to as little angels (*los angelitos*) and their death, while mournful, was a cause for celebration because the child would ascend to the glory of heaven and into the comforting arms of Santa María (Will de Chaparro 2007:96–98).

In order to go to heaven, however, children needed to be baptized, which presented a dire problem if an infant, young child, or even a fetus had not been given the sacrament of baptism prior to death and burial. Baptism was the first religious ceremony in the lives of most Roman Catholics and was a necessary ritual for salvation. As José Ventura Pastor observed in the late eighteenth century, "religion teaches us that it is necessary to be washed by the salutary waters of baptism to be able to enjoy the glory of Paradise" (quoted in Rigau-Pérez 1995:377). Baptism was as indispensible for unborn fetuses as it was for infants and children. The royal cedula of 1804 issued by Carlos IV of Spain demanded that the fetus from any woman who died during pregnancy be removed in a postmortem cesarean procedure. Once the living fetus was delivered, baptism was quickly performed to assure the fetus, no matter how premature, a place in heaven (Rigau-Pérez 1995; Will de Chaparro 2007:129–130). The practice of removing the fetus for baptism was not new, however. The Church had been performing postmortem cesareans for centuries. The law simply codified the practice and made punishable its obstruction.

Treatment of the Body among Hispanic Catholics

Once death occurred, the body was washed. Neighbor women who were present during the vigil were often hired for this task. Sometimes the body would be treated with perfumes. No efforts were taken toward preservation, and

burial was completed as soon as possible, usually the day following the death.

Few treatments were afforded the corpse. Rarely was the body dressed in secular street clothes but would be dressed in shrouds or garments resembling Franciscan robes (mortalhas). "The use of black mortalhas increased from the beginning of the nineteenth century, primarily among married women. When combined with the crucifix around the neck, these constituted the habit of Saint Rita, protector of sufferers" (Reis 1992:37). Children were dressed in white and a crown of natural, fabric, or paper flowers were placed upon their heads (Toor 1985:161).

Preparations for the wake, or velorio, began immediately following death. A hastily constructed altar decorated with images of the intercessor saints, candles, and a crucifix was erected in the home of the deceased. The priest began the rosary upon arrival of the mourners. Everyone in attendance participated, including children, a stark contrast to Protestant customs of the period (King 1954; Moore 1980). Like the vigil prior to death, the body, vulnerable to demons during the hours leading to burial, was never to be left unattended.

It was not until the mid-nineteenth century that requests for burial containers began to appear regularly in wills in New Mexico although they began appearing in Mexico many decades earlier. The rejection of burial containers during this time by those who could afford them represented pious virtue rather than frugality or lack of materials. Will de Chaparro (2007:121) and Voekel (2002:75), respectively, referred to such a refusal as an effort at "conspicuous humility" or "flamboyant modesty," which became more common during the nineteenth century as some Catholics came to reject external, sensualistic, baroque expressions of piety for a more internal, self-directed, and egalitarian expression of piety. Similarly, interment in a habit or shroud illustrated to all the devotion of the deceased. Burial without a container communicated this devotion further still.

Despite spiritual fidelity with the dead, language used to describe the deceased lacked any sentimentality or euphemistic indulgences common in Protestant ceremonies. The individual was dead, rather than "gone" or "passed." The body was a cadaver rather than "the dearly departed" (Will de Chaparro 2007:79). Once the body was interred, this pragmatism extended to the grave. For New Mexicans, little effort was made to protect the corpse from the natural process of decay, and lime may have even been used to accelerate decay (Will de Chaparro 2007:119). The reality of decay was made all the more apparent by the closeness of the dead to the living, often leaving a horrible stench in places of worship. In keeping with this close familiarity with the dead, the bones of the previously deceased were routinely disturbed and the stench of decomposition made all the more apparent as graves were opened to make way for new ones.

Space under church floors and in churchyards was limited, and therefore graves were prone to disturbance rendering these places of eternal repose impermanent at best. As Will de Chaparro (2007:127) noted, the "idea of occupying a grave exclusively and in perpetuity was most certainly foreign to New Mexicans." The same perspective probably applied to other Catholics in the American Southwest as well during the eighteenth and early nineteenth centuries. Remains unprotected by burial containers were easily displaced in order to make room for new burials, and mass graves were not uncommon, even for unrelated individuals who happened to die at or around the same time.

The opening and reopening of grave pits within church floors created irregularities in originally smooth church floors and led to the release of noxious gases and stench. In eighteenth-century France and Mexico, the accumulation of gases from decomposing bodies under church floors created strange, eerie sounds and in some cases became so intolerable as to deter people from attending church. Gases from decomposing bodies were also blamed for sickness and death (Ariès 1975; Voekel 2002). Famously, the underground ossuaries of the catacombs of Paris, where the bones of the deceased were conspicuously arrayed in intricate patterns, were a result of efforts to clean up the overflowing churchyards as they came to be deemed unsightly and unsanitary. Similarly, skulls and other bones in some New Mexican churches during the early to mid-nineteenth century were left laying about the church, possibly having been removed from burials disturbed during inhumations (Will de Chaparro 2007:127).

Processions and Graveside Rites

For Mexican American Catholics, the funeral was characterized by a spectacular procession of priests, friends, and family of the deceased, all carrying candles or flowers. In some cases, musicians would lead the group to the cemetery. As they were during the wake, children were an integral part of the funeral ceremony. Reis (1992:38) described similar Catholic practices in nineteenth-century Brazil: "Funeral corteges left the house at sunset, for the night shadows protected the living from the shadows of death. Funerals could be spectacular, imitating Corpus Christi processions or the Procession of Our Lady of Good Death, when music, fireworks and food and drink abounded."

The funerals of children were a cause for boisterous celebrations accompanied by fireworks and a band. For children, or *los angelitos*, the usual symbols of mourning were absent and replaced with joyous music, ringing bells, food, and flowers. Their bodies were transformed into angels through the use of floral crowns placed on their heads and burial clothes reminiscent of angelic forms. Children carried the coffin followed by women with jars of holy water. Once the coffin was in the grave, the child's relatives tossed

handfuls of earth onto the coffin's lid (Toor 1985:161–163; see also Bourke 1891:91; John Vance Lauderdale Papers, Reel 5, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut). Individuals were placed in a supine position.

Few records exist to describe Catholic funeral rites in nineteenth-century Tucson. John Vance Lauderdale, a surgeon who spent 30 years with the U.S. Army in various western outposts, was stationed at Camp Lowell from July 1869 to September 1870. Lauderdale had many opportunities to view funerals in Tucson, particularly those of children who died from disease during the devastating epidemics that occurred during his residence in the town. Shortly after his arrival in Tucson, he recorded in his diary the following entry:

> August 6, 1869—A funeral procession of a child passed this evening attended by a brass band of three instruments. I went to the grave and the coffin was a box of this shape [drawn by Lauderdale as a four-sided, trapezoidal coffin] which I find to be the one commonly used and it was covered with dark red cloth, and fringed about with white edging. When the coffin was laid in the grave, the children and all as if ambitious to throw their handful of earth, scarcely waited for the man who got into the grave to fix the coffin to get out again, before they shoveled with their hands the dirt from all sides, kicking up a great dust, and left but little for the grave digger to do to cover up and make the usual mound. But the most singular and interesting part of this ceremony is the fact that the earth takes the place of flowers which are usually thrown upon the graves of deceased friends, as with us at home where they are plenty [John Vance Lauderdale Papers, Reel 5, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut].

This description of a child's funeral is consistent with Mexican funerals described by Toor (1985). A month later, Lauderdale contrasted two funerals, the funeral of a presumably Euroamerican child with the funeral of a Hispanic child. Lauderdale described the Hispanic burial as follows:

> I saw a little Mexican baby's funeral pass this evening, towards the grave yard . . . I heard the ding dong of the bells at the church giving me a hint what I might expect to see as soon as the Priest had said his say over the child. So pretty soon after, a crowd of women came shuffling along the dusty street, each with a lighted candle in her hand, and one or two chanted a dirge. The central figure which all surrounded was a little girl say ten years of age, bearing upon her shoulder a very diminutive coffin of this shape [drawing of a trapezoidal coffin] without the cover. Another child carried that. There was some covering[,] a napkin perhaps[,] covering the corpse, this was all. They carry the dead to the grave in this manner and put the lid on after they get there. Why they should have the box open, I do not know unless they desire that the child shall hear the singing and perhaps give them a chance to have one last look at it. All who go to the grave throw in their handful of earth leaving the filling up to be done by the grave digger. What a strange people they are in some of their customs [John Vance Lauderdale Papers, Reel 5, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut].

From Lauderdale's perspective, the graveside activities of the local population appeared strange. Lauderdale hailed from New York and would have likely witnessed Catholic funerals prior to arriving in Arizona, although they would have been for people of other ethnic backgrounds, such as Irish or German Catholics. Still, Lauderdale seems to have been amused and intrigued by the strangeness of Mexican American Catholic funerals.

> January 13, 1870—There have been one or two funerals today. One was a child and you know when a child dies it is a subject to rejoice over for the Mexicans. The coffin was trimmed with festoons of artificial flowers and going to the grave it was followed by a band of music which consisted of one violin, a treble and a base [*sic*] drum. The tunes played if they can be called such were just such lively peices [*sic*] as they would play to dance by. Imagine such a crowd of men and women hustling along the street like a flock of sheep and think of it as a funeral [John Vance Lauderdale Papers, Reel 5, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut].

Even during times of devastating epidemics and elevated child mortality, the celebratory nature of child burials was maintained, although whether or not a band accompanied the procession may have been a matter of economics:

> March 1, 1870—There are a great many children dying in town of small pox. I have seen three or four funerals a day. If the friends can afford it they follow the coffin with a band of music—one passed this evening, the band was composed of the following peices [*sic*], one violin, a treble and

> a base [*sic*] drum, and playing the liveliest dancing music. Boys in the crowd would run along and be seen playing with two sticks imitating the man with the violin. When a child dies it seems to be a matter of rejoicing in the family [John Vance Lauderdale Papers, Reel 5, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut].

When burials were placed beneath church floors, grave markers were not used (Will de Chaparro 2007:123, 215). Grave markers in early-nineteenth-century Mexican cemeteries were fairly rare as well, as a local priest would record grave locations in his *libro de entierros*. Grave markers did not become popular until later in the nineteenth century. These included wooden and iron crosses, *cerquitas* (fences around graves), *relicaritos* (grave markers with deep recesses to hold items associated with the deceased), *nichos* (smaller versions of the *relicarito*), grave curbs (low enclosures, nearly flush with the ground), decorative piles of fieldstones placed on top of individual graves and, infrequently, engraved stone markers (Barber 1993; Brock and Schwartz 1991; Griffith 1992:119; Jordan 1990).

Potential Archaeological and Material Visibility of Catholic Practices in the Alameda-Stone Cemetery

Because space was limited in churchyards and under church floors, Hispanic Catholic burials would often disturb earlier graves in order to place new ones. Archaeological evidence from a variety of excavated sites in the American Southwest, including Tucson, demonstrate a tendency to move previously deposited remains aside in order to place new burials, with disturbed remains being returned to the grave in a disarticulated, bundled pile or a variety of other non-anatomical arrangements. In some cases, one or a few bones might be missing from the redeposited remains, which could represent the recovery of select bones as relics, or *memento mori*, or simply the loss or misplacement of bones during exhumation and reburial. In cases where a body already in the grave remained skeletally articulated, the remains were sometimes shifted to one side to accommodate a new interment. Despite this, little concern seems to have been placed in maintaining the original positioning or alignment of the body in earlier burials that had been disturbed, even though prior to disturbance many burials were first placed according to a fairly standard alignment and body position (Dayhuff 2002; Di Peso 1958; Hard and Doelle 1978; Tennis 2002; Thiel et al. 1995; Will de Chaparro 2007).

As a result of multiple episodes of burial in a single grave pit or in overlapping grave pits, grave pits were often modified or expanded to incorporate a new burial. Grave pits could thus be irregular in shape and large enough to accommodate multiple interments. On some occasions, multiple individuals were placed at the same time in a mass grave, but for other burials, grave pits were reopened or intruded into in order to place an additional interment. Because the rationale behind placing multiple individuals in the same grave could be based in practicality and expedience, it cannot be assumed that individuals buried in the same grave necessarily shared a familial or fraternal relationship; instead, their burial within the same grave could indicate that multiple individuals, related or not, died around the same time or that a burial space was reused simply to accommodate a new burial.

The church was the center of Catholic life in Tucson during the Alameda-Stone cemetery's period of use. By the time the Alameda-Stone cemetery was first opened, the presidio chapel, located a little over a city block west of the cemetery, had been abandoned, and a temporary two-room chapel provided by Francisco Leon, Our Lady of Guadalupe, was converted into a school and the slow process of building a new church southwest of the cemetery, San Agustín, was begun (Thiel 2005:31; see also Horgan 1975:268; Salpointe 1966:58–59). We might expect a large portion of the cemetery's earliest Catholic population to be oriented with their head to the east and feet to the west in order to face one of Tucson's Catholic places of worship. Possibly, later graves could have shifted to a more southwesterly alignment as the new San Agustín church came into use. Alternatively, some later burials might have been influenced by cemetery reformation and newly introduced Protestant traditions, in which case, burials may have been oriented with heads to the west and feet to the east in anticipation of the resurrection of Christ. The Church had no hard and fast rule about this, and burial orientation may have been driven less by Christian tradition and more by available space or geographical limitations. Generally, however, we would expect most burials to have been placed along an east-west alignment and oriented according to important religious landmarks. Religious artifacts could include rosary beads, medallions, the images of saints, crucifixes, and other offerings.

For those Catholics committed to achieving the baroque model of a good death, consecrated burial space would have been a necessity in the Alameda-Stone cemetery. In consecrated space, interments would have mirrored those practices already intrinsic to church burials. The reuse of graves, new interments intruding upon older interments, a mixture of coffined and shrouded burials, and a dense population of graves within the space in order to serve the many families wishing to bury their loved ones are common elements of church floor and churchyard burials and would be expected characteristics of consecrated space in the Alameda-Stone cemetery. Additionally, the space

may have been marked with a fence or wall to distinguish it from the rest of the cemetery.

Not all of Tucson's Catholic faithful would have been buried in consecrated ground, however. With the influence of Protestant settlers and the strengthening movement for cemetery reform, later generations may have viewed the entirety of the cemetery as sacred space and felt less determination to bury their loved ones in the already crowded space consecrated by the Church. Indeed, if they subscribed to reformist notions of enlightened piety, they may have viewed a simple burial within the egalitarian, undifferentiated space of the public cemetery as an expression of humility and pious virtue. Alternatively, individual plots may have been consecrated by a Catholic priest as needed.

Given that the baroque model of a good death represents an older tradition, we might expect burial in a circumscribed area characterized by frequent reuse of overlapping burial space to represent an older and more conservative tradition that was at odds with trends associated with the cemetery movement (i.e., to bury bodies individually in suburban plots that were left undisturbed for longer periods). We might expect such spaces to have first been used earlier than other areas of the cemetery and to have been used by a religiously conservative segment of the community whose members were more committed than other segments of the community to the baroque model of a good death.

As Will de Chaparro and Voekel each noted, the absence of material goods or coffins in a grave can be interpreted as a symbol of pious virtue, rather than an indicator of socioeconomic status or the availability of resources. Shrouded burials and burials in locally made vernacular coffins without mass-produced hardware may represent the rejection of flamboyant vanity or may simply be burials interred before the widespread availability of mass-produced goods. Because such acts of overt piety were associated with the Bourbon reforms as a means to move away from extravagant displays of wealth and hierarchical status, we might expect burials lacking in indicators of wealth to more often have occurred in areas of the cemetery where baroque practices were not commonly implemented.

As discussed above, the death of a child was regarded differently from the death of an adult. Ariès (1981) found the burial places of Catholic children in France weren't always near their adult relatives. Sometimes, the graves were not located in proximity to family plots or even located in the same cemetery. Likewise, Will de Chaparro (2007) found that infants and young children were sometimes buried in concentrated areas within New Mexican churches. It is possible that infants and small children may have had a defined section in the cemetery reserved specifically for *los angelitos*. Archaeological detection of such a space, however, is difficult, as the presence of large numbers of child burials could be an indication of other phenomena, such as high mortality from epidemic disease. There were multiple episodes of epidemic disease during the years the Alameda-Stone cemetery was in use, and a dense concentration of infant or child burials could indicate periods of high mortality. As such, spatial clustering of the very young should not be considered in isolation. Less ambiguous indicators of the burials of *los angelitos* include the remains of crowns represented by artificial flowers, wire, ribbon, beads, or other decorative objects found near the child's head. Other possible evidence for crowns found in other cemeteries include the discovery of pulverized mica (*talco*) or wildflower pollen found near the crania of infants and children (Will de Chaparro 2007:97, 209).

As noted above, the sacrament of baptism was essential to salvation, and this applied even to fetuses. Postmortem cesareans were performed by priests in order to perform baptism. Postmortem cesarean is difficult to infer unambiguously in an archaeological context. In some cases, the fetal remains may be interred with an adult female. Some archaeologists have interpreted the discovery of human fetal remains outside (or below) the abdominal area of an adult female skeleton as evidence of an obscure phenomenon referred to as "coffin birth" or the spontaneous ejection of fetal remains from a deceased pregnant female after death and burial. A more parsimonious explanation in this context, given the existence of a legally and religiously sanctioned practice, would be the practice of postmortem cesarean in order to baptize the unborn fetus. Evidence of holy water vessels placed with the fetus or the remains of a floral crown of *los angelitos* on or near the head of the fetus, as was seen at the Alameda-Stone cemetery, would provide further support that the fetus was baptized and that the presence of fetal remains outside the womb could best be explained by the practice of postmortem cesarean.

Protestant Burial Practices

After the Protestant Reformation in sixteenth-century Europe, the church's role in death and dying became less significant in parts of Europe, and Catholic rituals diminished in importance among Protestant deathways. The priest was replaced by family and neighbors, and the last rites were replaced by prayers. To the Protestant faithful, purgatory was no longer a destination. Rather, judgment was immediate and final and the soul went either to heaven or to hell. There was no intercession. In the absence of a spiritual second chance, Protestants developed an enhanced fear of judgment and eternal punishment. As a result, it became even more important to lead a virtuous life (Jalland 1996).

Bishop Jeremy Taylor's *The Rule and Exercises of Holy Dying (*1857 [1651]) became the Protestant guide to a good death and was based at least in part on the familiar conventions of the Catholic concept of a good death described in *ars moriendi*. Bishop Taylor emphasized lifelong spiritual

piety, courage, and submission to the will of God. Death anxiety was greatly reduced by the understanding that there was a purpose to death. Death was a trial of faith particularly when it involved the death of a child.

The Beautification of Death

The Protestant ideal of the good death recognized a need for comfort and affection rather than confession and contrition. The deathbed vigil was attended only by the immediate family. Jalland (1996) described numerous accounts of deathbed vigils in which the dying were stroked, caressed, and held. Companionship in the final days became more meaningful than words offered by the clergy. Family members kept written records of deathbed vigils in which private outpourings of grief and loss were expressed. The outward expression of emotion was encouraged by romantic literature and art of the period. By the end of the eighteenth century, expression of mourning and memorialization evolved into the Beautification of Death movement.

The Beautification of Death movement was characterized by elaborate mourning, rural garden and parklike cemeteries, extravagant funerary accoutrements, lavish grave markers, and an emphasis on memorialization. The movement was epitomized by Queen Victoria's extended period of mourning for her beloved Prince Albert.

During the second half of the nineteenth century, Protestant Americans treated death as a separate life process and segregated death from the living through language, ritual, material culture, and space. Steiner (2003:111) suggested four explanations for increasing alienation from death. First, the impact of overwhelming carnage during the Civil War altered perceptions of the disposition of the dead. Second, changing scientific insight changed perceptions of immortality while simultaneously institutionalizing the death experience. Third, American attitudes towards death and burial became increasingly secularized, which had the effect of decreasing concern over the afterlife. Finally, industrialization and urbanization commercialized the death ritual, shifting attention away from the family toward a professionally managed funeral. The result, as Steiner noted, was that death replaced sex as the taboo subject in American culture.

Treatment of the Body among Euroamerican Protestants

Until the early nineteenth century, the deceased's close circle of friends and family were responsible for treatment of the corpse and burial, and most people were buried in family cemeteries. Corpses were first prepared for burial in the home, transported to the grave site, and then buried. Close relatives, often women, prepared the corpse by laying out, washing, and sometimes shaving the body, and then dressing it, often with a winding sheet or shroud made of "muslin, wool, cashmere, or a cloth material treated with melted wax or gummy matter" (Laderman 1996:29). The prepared and dressed corpse was then placed within a coffin. Relatives and friends of the deceased held a vigil or wake from 1 to 3 days. In warmer weather, large blocks of ice would be used to cool the body and slow decomposition during the vigil period (Laderman 1996:29–31).

By the 1830s, with population growth and urbanization of cities in the northeastern United States, professional undertakers began to take over the role of treating the body. Laderman (1996) suggested most Americans increasingly found dealing with the corpse to be distasteful and repugnant. The harsh realities of decomposition and putrefaction interfered with sentimental memory. The language used to discuss the corpse reflected this sentimentality. The individual was not dead but "at rest" or "passed." Euphemisms for death abounded. Death was transformed from a biological fact into nebulous eternal slumber. As Henry Raymond observed in *Harper's New Monthly Magazine* (8 April 1854:690–691), the corpse retained "something of the former selfhood." This may explain the trend—allowed by the advent and subsequent popularity of photography—of documenting the deceased in postmortem photographs. When the deceased was a child, the corpse was positioned in a sleeping position, sometimes held by siblings or parents, and appeared peacefully "at rest." Adults were often photographed in their coffins or laid out for the wake. To many Americans of the nineteenth century, photography captured the very essence of its subject. Unlike paintings or drawings, photographic images were realism defined. Edgar Allan Poe, a writer who often explored themes of death and grief, argued, "the daguerreotype plate is infinitely more accurate than any painting by human hands" (Steiner 2003:61).

By the 1880s, the funeral industry—which had been previously limited to removal of the body, cabinetry, livery service, and grave digging—was now responsible for disinfection, shaving, dressing, cosmetics, and embalming. The Funeral Directors' National Association was formed in 1882. This organization of American death specialists emerged from the American Civil War. Prior to the war, little was done to preserve the corpse. After the war, embalming became the cornerstone of the funeral industry. Embalming allowed an extended viewing period, and Faust (2008) and Laderman (1996) posit that Americans, traumatized and overwhelmed by death during the Civil War, found an extended viewing period before interment to be therapeutic. The need to preserve the body in perpetuity is in stark contrast to the Spanish Baroque model of death in which the soul required mitigation and the body was left to the natural processes of decomposition.

Procession and Graveside Rites Practiced by Euroamerican Protestants

Before transporting the body to the grave site, prayers or a short service were given at the house or other familiar location associated with the deceased. For the procession, the coffin containing the corpse was covered with a pall and either carried on foot, sometimes by children if a small child had died, or in times of inclement weather, conveyed in a carriage specially outfitted as a hearse. On the way to the grave site, the procession would stop at a meetinghouse or church for a full sermon and a final opportunity for viewing the corpse. The final leg of the journey to the gravesite was a mournful affair accompanied by tolling bells, with mourners organized in the procession according to the closeness of the relation to the deceased (Laderman 1996:32–36). At the grave site, a "local religious representative gave another discourse or prayer," the pall was removed and the coffin lowered into the grave by family members, friends, or a sexton, if present (Laderman 1996:36). Graveside services often concluded with participants throwing dirt or other materials into the grave to signify the finality of the deceased's place on earth (Laderman 1996:37).

Lauderdale described the funeral of a child in Tucson, which was likely performed according to Protestant traditions:

> September 17, 1869—That little puny child of Col. Brown's died the other day, and we buried it in the neatest little coffin, covered with black cloth and spangled with silver headed screws. After the service was read at the house, the coffin was placed in the carriage, in which the ladies rode, the gentlemen going on foot, to the cemetery. Arriving there, the usual rough box was placed to receive the coffin [John Vance Lauderdale Papers, Reel 5, Yale Collection of Western Americana, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut].

The industrial revolution of the nineteenth century was largely responsible for a rise in the middle class, which sought to demonstrate its new wealth through display not only in life but in death. Grief was expressed openly through elaborate mourning and ephemera. Fashionable mourning dress constructed from black crape, a silk fabric that became synonymous with Victorian mourning attire, was in high demand by the middle and upper classes. In the 1870s, a less expensive version of cotton and silk blend called Albert crape was developed to meet the demands of the lower classes (Curl 2001:200). Other objects of adornment fashionable for mourning included capes, shawls, underclothes, caps and bonnets, fur boas, mittens, purses, umbrellas, handkerchiefs, and jewelry—all in traditional black. Commemorative jewelry made from the hair of the dead loved one was considered particularly poignant. Printed ephemera included memorial cards, notepaper and envelopes, postmortem photographs, and biblical verse. Funeral processions included a funeral coach led by a group of fashionably dressed mourners. The coffin was decorated for display, often covered in silk and outfitted with silver or silver-plated handles and decorative embellishments. Like Catholic burials, individuals were placed in a supine position.

Prior to closure of the coffin and burial, personal objects or mementos would often be placed with the deceased. These objects may have been a favorite toy, utensil, piece of jewelry, or vocational tool used by the deceased. Sometimes, a photograph of the family or letter from the parent or spouse was included.

In Prescott, Arizona, where the population was largely Euroamerican, Protestant funerals were more often described in the newspaper than they were in Tucson. As expected, Protestant funerals were typically solemn affairs in which the dead were extolled in their virtue and mourners were assured of the peace and rest that would be the heavenly reward of the deceased. When Margaret Griffiths Hunt, the wife of the Arizona governor died in April 1870, it was a cause for universal mourning:

> When the sad, startling news of her decease was made known, the town was hushed with sorrow, and her funeral at noon on the second instant, (the day preceding the 24th anniversary of her birthday) was attended by the entire population, the officers from Fort Whipple, and many persons from the adjacent country. Prescott was never before so still and melancholy, every store, saloon and shop was closed, and no one talked or thought of business. The Rev. Charles M. Blake, Chaplain at Fort Whipple, and the only clergyman here, delivered a touching discourse, full of beautiful allusions to the dead, at the Governor's house, and ceremonies were also had at the grave in the pine forest near by. When the remains (with those of the child), were deposited in the earth, many wild flowers were scattered upon them, and the weeping audience uttered a fervent amen to the earnest prayer of the Chaplain for the comfort and support of the stricken and disconsolate partner, and that the spotless and lovely example of the dear departed might be rightly improved by the whole community [*Arizona Miner,* 4 May 1867:3].

When the young merchant, Herbert Lord, died of consumption and was buried temporarily in the military cemetery in Tucson, the *Arizona Citizen* reported that:

> the impressive Episcopal burial service . . . called to mind this beautiful definition of man—A holy

> mystery, a part of earth, a part of heaven, a part, great God, of Thee. An intimate acquaintance made us love and respect our late neighbor as an unusually upright man, true to all his obligations; and notwithstanding it was evident he could recover or be free of pain while living, it was with profound sorrow, in common with all his neighbors, that we followed his remains to the tomb. In her bereavement, Mrs. Lord has the deep sympathy of the entire community [*Arizona Citizen,* 9 November 1872c:3].

There were no Protestant churches in Tucson until after the civilian section of the Alameda-Stone cemetery had closed (O'Mack 2006). Protestant ministers apparently came through town, preaching in gambling halls, saloons, and on the streets, although they may not have regularly been available to oversee funeral services (Correspondence of Jean Baptiste Salpointe, University of Arizona Special Collections, MS 276, Tucson, Arizona). Many people of Protestant backgrounds were recent migrants to the town and may not have had extended networks of friends or family to look after their death and burial. As had happened during the Civil War to address a similar void (see below), people may have stepped in as needed to ensure that a fellow American received a proper burial, having died far from home. Given the lack of a Protestant church and the recent arrival of Protestant Americans in Tucson, Protestant services may have been somewhat improvised affairs that depended in their particulars on the availability of friends, family, and religious officials. When described in newspaper accounts, friends or colleagues are typically listed as having read the burial service, and a Catholic priest may have offered prayers as well.

For instance, Daniel H. Stickney—a merchant, member of the territorial legislature, and former council president who died in Tucson in February 1871—appears to have been given a service at the council chamber in which Catholic "Father Jourvanceau recited a prayer, Dr. Phillips read the proceedings of the Council, and Judge Cartier and Col. Dobbins each made remarks." Stickney's corpse was then conveyed to the military cemetery where "Dr. John H. Phillips impressively read the funeral services at the grave" (*Arizona Citizen*, 25 February 1871:3).

Potential Archaeological and Material Visibility of Protestant Practices in the Cemetery

Many of the symbols of Protestant burial or the Beautification of Death may not be easily seen in the Alameda-Stone cemetery. Not only were most of the accoutrements previously mentioned used primarily away from the cemetery, but also the Alameda-Stone cemetery was in use prior to arrival of the railroad, and many material objects may not have been available to Tucsonans. That is not to say, however, that no evidence exists.

The designation of the Alameda-Stone cemetery as a public cemetery suggests a degree of cemetery reform and an increasingly diverse religious community in Tucson. Further, organization of the graves into linear rows, blocks, and groups by familial or fraternal affiliation may suggest American influence. The arid desert climate could not easily support the typical parklike cemetery seen in the eastern United States without more-modern irrigation techniques. Assistant Surgeon Durant described the military section in 1872 as "well kept, but the sandy nature of the soil prevents any attempt at beautifying by means of grass or trees" (National Archives and Records Administration, Washington, D.C., RG 94, Entry 547, Bk 13:73). The organization of the cemetery into large sectors with paths, walls, and fences may illustrate the attempt to mimic the public parks movement of the late nineteenth century.

Mass-produced decorative coffin hardware was becoming increasingly available by mid-century. Fashionable Tucsonans may have ordered hardware by catalog to outfit their locally manufactured coffins. Mass-produced coffins or caskets may have been available as well, but at great cost, and were less likely to have been widely available prior to arrival of the railroad in Tucson, which occurred after the Alameda-Stone cemetery closed. Goods imported from the eastern United States may indicate an American presence through family members or professional undertaking.

Additionally, inclusion of nonreligious objects in the grave may illustrate the importance of memorialization and the influence of increased sentimentality in Tucson funerals. Archaeological expression of sentimentality in isolation does not indicate a Protestant burial but does suggest the Beautification of Death trend may have been gaining a foothold in Tucson burial traditions.

Jewish Burial Practices

Jewish burial practices[1] have traditionally followed a strong set of customs and beliefs based on the Torah.[2] Although these traditions remain important in Orthodox and Conservative Jewish practices, some of the traditional customs have been modified under Reform Judaism.

[1] References incorporated into this summary of Jewish practices include Kolatch (1993), Klug (2010), and Lamm (1969).

[2] The word "Torah" means "to teach" in Hebrew. The Torah contains the basis and history of Judaism and all laws that Jews follow today are derived from it. The Torah consists of two parts: the Written Torah and the Oral Torah. The Written Torah includes the Five Books of Moses. The Oral Torah, which appears in modern times as the Mishna and Talmud, explains the Written Torah.

However, in the nineteenth century, traditional customs would have been prevalent. Although Judaism was not immune from the widespread impact of the Beautification of Death movement, its impact—beyond the movement of cemeteries to rural settings—did not come until later. Faust (2008) includes Jewish customs as among those affected by the impact of the mass deaths during the Civil War, but the basic customs have not significantly changed. Indeed, among some of the most interesting Jewish documents are the *responsas* written by rabbis to clarify what Jews should do in uncommon situations. These documents represent rabbis' responses to questions concerning procedure and custom in unusual or new situations. One *responsa* addressed questions about burial raised by the Civil War.

Judaism has had a strong belief that one should embrace life while accepting the inevitability of death. The emphasis was on how one's life should be lived and was lived and did not specifically define an afterlife. It is implied, however, that leading a praiseworthy life would prepare one for what comes after life.

The Jewish approach to death was part of a larger philosophy of life in which all persons were viewed with dignity and respect. Even after death, the body, which once held a holy human life, was said to retain its sanctity. Jewish law and tradition endowed funeral and mourning practices with great religious significance. To this end, Jewish funerals avoided ostentation; family and visitors reflected in dress and deportment the solemnity of the occasion; flowers and music were inappropriate; embalming, cremation, and viewing of the body were avoided; and interment took place as soon as possible after death.

The practice of autopsy was contrary to Jewish law because autopsies were seen as a desecration of the body. In most cases, when an autopsy was recommended, the family could refuse. However, in cases where the law required an autopsy, it was carried out under the supervision of a rabbi who was familiar with the procedures. Also, limited autopsies could be approved for instances in which learning something from the body might have helped the living. Similarly, organ donation could be seen as respect for the deceased, because it could bring healing to the living, and saving a life was more important than any rules and laws.

Jewish Approaches to Treatment of the Body

Although the custom was for Jewish burial to take place within 24 hours of death, exceptions could be made for legal reasons, to transport the deceased, for close relatives to travel long distances to be at the funeral or burial, or to avoid burial on the Sabbath or on a major Jewish holiday. Jewish funerals also emphasized simplicity to avoid embarrassment of the poor.

It was traditional Jewish practice to perform a ritual washing of the body (*tahara*) and then to dress the body in a plain white linen burial shroud. In every community there was a special volunteer group, called the Chevra Kadisha that prepared the body according to religious guidelines. Male members of the Chevra Kadisha prepared men, and female members of the Chevra Kadisha prepared women and children. Watchers (*shomrim*) remained with the body around-the-clock from death until the funeral. All of these tasks for the dead were considered the highest form of good deed (mitzvah) because they were deeds that the recipient (the deceased) could not repay; it was an act of kindness performed without ulterior motive. Family members usually did not know who served in the Chevra Kadisha for their loved one, but custom suggests that even though family members could be *shomrim*, or friends of the deceased, or members of the congregation, the family often did not know who served.

Jewish Funeral and Post-Funeral Rites

According to traditional practices, the funeral was held in a synagogue, graveside, or—in modern times—a funeral home. There was no visitation by friends in the presence of the body before the funeral. The body was placed in a simple wood coffin made with no nails so as not to disturb natural decomposition. An open casket, embalming, and cremation were not generally accepted in the Jewish tradition.

The service was conducted by the rabbi and began with the cutting of the mourners' clothing or a black ribbon to symbolize the individual breaking away from loved ones. A minyan (at least 10 Jewish adults, traditionally males) was required to recite prayers.

At the cemetery, more prayers were read, and family members usually participated in placing dirt directly on the coffin before it was buried. This symbolized the family's acceptance of the finality of death. After the burial, nonfamily members formed two lines and, as the mourners passed by them, they recited the traditional condolence: May God comfort you among all the mourners of Zion and Jerusalem. In traditional funerals, before leaving the cemetery, mourners washed their hands as a symbolic cleansing.

Instead of flowers, making a donation to a charity or Jewish organization was encouraged. For Jews, the initial mourning period, called shiva (Hebrew for seven), lasted 7 days. During this time, members of the community visited the home of the bereaved. There, family traditions may have included covering mirrors (the mourning should not be concerned with personal vanity); burning memorial candles; or wearing the black ribbon or item of clothing that was cut. Male mourners did not shave, women did not

wear makeup, and couples refrained from intimacy. This break from daily routine symbolized the disruption that death had brought to their lives and demonstrated grief through self-sacrifice.

Twice a day during the shiva period, the bereaved prayed for their loved one. They usually returned to work after the shiva period, but the mourning period may have lasted a year. This depended on the relationship of the mourner to the deceased. Parents, for example, were mourned for a year. On the first anniversary of the death, they attended a service and unveiled the tombstone at graveside. Although this was custom, one could have placed and unveiled the tombstone earlier in the year.

Candles were lit on the yearly anniversary of a death, and the mourner attended services to say the special mourners' prayer. This yearly recognition is known as Yahrzeit.

Potential Archaeological and Material Visibility of Jewish Practices in the Cemetery

The archaeological visibility of Jewish mortuary practices should be minimal. If there was a coffin, there should be no nails. The individual would not have been buried in clothing but in a plain white shroud. Men were sometimes buried with their prayer shawls, and occasionally religious jewelry or other religious items may have been buried with individuals.

An important question for the situation in nineteenth-century Tucson is how would these customs have been applied? Judaism has been a pragmatic religion and also a religion based on community. Most Jews die and are buried among other Jews. However, Jewish law and traditions take into account the fact that the deceased may have been in a situation in which customs and traditions were not possible.

When Jews are included in larger cemeteries, there is always a special Jewish section so that appropriate religious laws can be followed. We do not know if there was a Jewish section of the Alameda-Stone cemetery; it seems unlikely because none is mentioned anywhere in Jewish or other records. Jews in Tucson at the time of the cemetery were few, but they were primarily Euroamerican tradesmen and entrepreneurs (Sheridan 1986); if any had died during the period of the cemetery, it is likely that someone would have written about it.

Does this suggest that no Jews were buried within the cemetery? Not necessarily. It is possible that there was a small section set aside for Jews, but because of its size it was not publicly noted. More likely is the possibility that any Jews buried in the cemetery were either (1) so-called hidden Jews who were descendants from those who moved to Mexico from the Inquisition in Spain; or (2) Jewish peddlers or other visitors who were in the area for a limited time and died away from home, relatives, and friends. These individuals may appear as "unclaimed" or "isolated."

In the case of hidden Jews, these individuals would likely be biologically Hispanic and may have Jewish symbols or messages hidden among the common Catholic ones. In the case of short-term visitors away from home, the individual may have been buried as a Christian or Catholic by the Tucson community but would be biologically Euroamerican and may have Jewish items or symbols among his possessions. It seems likely that the Tucson community would not have made any special provisions for a stranger—they would probably have been buried in their clothes and may have been given a cross or other item that would normally accompany a burial. In sum, it is unlikely that the number of Jews in the cemetery would have been more than a few.

Military Funerals

As a result of the American Civil War, attitudes toward death and burial changed dramatically and in a way that crosscut religious and ethnic affiliation. Drew Gilpin Faust (2008) has argued that the Civil War, with its hundreds of thousands of casualties dying far from home and away from family and friends, resulted in the emergence of new attitudes towards death and burial. For Catholics and Protestants, there was an art to death, an *ars moriendi*, that dictated how the dying were to prepare for a good death. As discussed above, Catholics and Protestants held different assumptions about the passage of the soul beyond death and the relationship between mortal behaviors and final judgment. However, Faust (2008:7) argues that "by the 1860s many elements of the Good Death had been to a considerable degree separated from their explicitly theologized roots and had become as much a part of respectable middle-class behavior in North and South as they were the product or emblem of any particular religious affiliation." In this way, Americans began to develop universal attitudes about what constituted a proper death and burial.

Most Civil War soldiers were Protestant, but the "need for wartime unity and religious solidarity produced an unprecedented level of religious interaction and cooperation that not only brought Protestant denominations together but to a considerable degree incorporated Catholics and Jews as well" (Faust 2008:7). A central component of achieving a good death was the role of family, especially women, in preparing the dying for death and burial. Witnessing a death, in order to gauge the state of a person's soul, was important for kin to evaluate the potential for an immortal reunion in heaven. An individual's last words became

especially meaningful in these contexts in that they imparted spiritual meaning to an individual's life and were considered to be intrinsically truthful based on the proximity of their utterance to death and judgment.

Death on battlefields, in hospitals, and prisons far from home and family, disrupted the normal staging of a good death. In the place of family and friends, fellow soldiers, chaplains, military nurses, and doctors acted as surrogate family for the dying, reporting last words and attitudes to family members in letters, and sometimes filling in as kin when the dying, as they faded from the world, believed themselves to be in the company of close relatives. Pictures of family members were cherished items that soldiers kept on their persons. Soldiers would focus on these mementos during their last moments of life as a way to compensate for physical separation between themselves and their loving families. When a death could not be witnessed, soldiers would try to read the countenance of a deceased soldier for evidence of their spiritual state in death. A peaceful appearance was interpreted as evidence for a gentle and easy death, and an agonized appearance signified an individual who struggled spiritually in death and died in torment (Faust 2008).

Because of overwhelming numbers of deaths, many of which occurred on battlefields, a careful and respectful burial that met the expectations for a decent burial was often impossible. Sometimes, the dead were buried together in a shallow trench, or in hastily dug graves, near the place of death. Burial in an individual grave was generally reserved for comrades, and enemy soldiers were more likely to be buried in common pits. In the field, coffins could not generally be supplied. As coffins were considered by many Americans to be "the basic marker of 'decency' that distinguished human from animal interment," soldiers used blankets, sacks, or other found materials to cover the dead and prevent direct contact between a soldier and the earth that filled his grave (Faust 2008:73). Typically, officers received better treatment in death than the soldiers they commanded, and they were more likely provided coffins and their bodies more likely sent home. By contrast, most soldiers who died during the war were buried without coffins and away from home (Faust 2008:79).

Because many aspects of field burial were unplanned and improvised, there was little opportunity to prepare a corpse for burial. In some cases, fellow soldiers made an effort to clean up a deceased person's appearance, even to the point of washing blood from their clothes. Burials of comrades emphasized the personhood and individuality of the deceased, and efforts were made to provide a quiet and peaceful burial spot marked with a wooden marker bearing the deceased's name. In cases where large numbers of dead needed to be interred at the same time, however, expediency required that a common service be provided to all the dead.

In keeping with the principles of the good death, many families wanted their loved ones to be shipped home although this was rarely possible. The practices of refrigeration and embalming allowed families "to see their loved ones in as lifelike a state as possible, not just to be certain of identity but also to bid them farewell" (Faust 2008:93). These practices remained relatively rare during the war, particularly among Confederates, and were most often reserved for officers and the wealthy.

Military posts, like that in Tucson, typically had an established burial ground where the dead of the post, as well as civilians associated with the post, could be buried. In Tucson, around 100 people were buried in the military section of the Alameda-Stone cemetery. Around two-thirds of these were active military personnel at the time of their deaths, and the others were prominent citizens, retired personnel, and family members of military personnel. Unlike in the major battlegrounds, prisons, and hospitals of the Civil War, soldiers in Tucson did not die in great numbers at any one time, although there likely would have been a few occasions requiring the burial of multiple individuals as part of the same funeral. On a few occasions, they died during combat in dangerous territory outside of Tucson, and their bodies were eventually reburied in Tucson to obtain a more secure, if still temporary, resting place.

Thus, unlike many of burials conducted in the field of battle, there would have been adequate time to prepare for burials in the military section as well as greater access to materials for coffins and headboards. In addition, proximity to a populous town and military post meant that larger and more-elaborate funerals could be arranged. The relative rarity of military deaths allowed for an individual funeral that emphasized the selfhood, virtue, and service of the deceased to be provided. As with other kinds of burials placed in the cemetery, descriptions of military burials are relatively rare, but not surprisingly, they bear a number of similarities with Protestant burials of the time. The main differences appear to be the added pomp and circumstance of military ceremonies and preparations, which may have included a military escort for processions, mournful music played by the military band, and the dedication of military honors.

The following description of the burial of Lieutenant R. T. Stewart, who was buried in the military section, emphasized the sorrow and devotion soldiers had for an officer, along with the virtues of the deceased:

> All of the available men of companies D and E, Twenty-third Infantry, were detailed under command of Lieutenant Poillon to assist in burrying [sic] the late Lieutenant R. T. STEWART with military honors. The mournful duty was performed in a creditable manner, each sorrowful countenance gave unmistakable evidence of the love all, both enlisted men and officers, bore their late comrade in arms, and the large number of citizens who followed him to the grave

> did so with sad hearts, for in him they had ever found a friend who sympathized with them in their afflictions and did all he could to lighten their burthens. He was a true soldier, a generous friend and an honest man [*Arizona Citizen*, 31 August 1872d:2].

The funeral of Captain Phillip Dwyer at Camp Date Creek in August 1872 provides another example of a military funeral as may have occurred in the military section in Tucson:

> Many strange sights have I seen, but none that produced a stranger or more pathetic appeal to my emotions than the funeral of Phil Dwyer; we got together just as good an apology for a coffin as that timberless country would furnish, and then wrapped our dead friend in his regimentals, and all hands were then ready to start for the cemetery.
>
> At the head marched Mr. Hugus, Doctor Williams (the Indian agent), myself, and Lieutenant Hay, of the Twenty-third Infantry, who arrived at the post early in the morning; then came the troop of cavalry, dismounted, and all the civilians living in and around the camp; and lastly every Indian man, woman, or child able to walk or toddle, for all of them, young or old, good or bad, loved Phil Dwyer. The soldiers and civilians formed in one line at the head of the grave, and the Apache-Yumas in two long lines at right angles to them, and on each side. The few short, expressive, and tender sentences of the burial service were read, then the bugles sang taps, and three volleys were fired across the hills, the clods rattled down on the breast of the dead, and the ceremony was over [Bourke 1891:169].

The most complete description we have for a military burial placed in the military section of the Alameda-Stone cemetery was that of Corporal John Lyons. Importantly, this was the last recorded burial placed in the cemetery, and unlike nearly all other burials in the cemetery, was placed after the railroad had arrived in Tucson and a greater variety of goods was becoming available:

> The mortal remains of Corporal John Lyon[s], of Company M 6th Cavalry, were on Sunday last deposited in their final resting place in the military cemetery of the city . . . . He was buried with military honors, and all the ceremonies were of the most impressive of character. The order of the procession was as follows: Band of the Sixth Cavalry; Non-Commissioned Officers Acting as Pall Bearers [surrounding the Hearse]; Horse of Corporal Lyons; Detachment of Company M, Sixth Cavalry, dismounted, detailed as firing party, marching with reversed arms; Detachment of Company M, Sixth Cavalry, mounted; Captain Rafferty, Lieutenants Perine and Blake, of Company M, Sixth Cavalry, mounted.
>
> The horse of the deceased with its sable covering, vacant saddle, the arms of the dead soldier, and his boots reversed in the stirrups, was one of the most affecting portions of the sad ceremonies.
>
> The remains were taken to the Roman Catholic Church, where a portion of the services for the dead were performed. The column then reformed and proceeded to the cemetery. The troops formed in the enclosure; the coffin, wrapped in the American flag, was then taken from the hearse to the grave, and after being deposited therein, the final services of the church were performed by Father Antonio; then three volleys were fired; the band played a dirge, and the ceremonies were over [*Arizona Weekly Star,* 27 January 1881:3].

Most graves in the military cemetery were marked with painted wooden headboards. These headboards decomposed rapidly, however. Personal information on headboards soon became illegible through exposure to the elements, and many headboards did not survive to indicate the location of burial. By 1884, only a few headboards remained, and fewer still contained any legible information on their surfaces. There is also historical evidence for the use of an aboveground vault, a stone marker, and, possibly, two adobe grave curbs in the military section. On the undated plat map of the military section, Burial Number 34 in the northeastern quadrant of the military section is indicated as being marked by a "Cement Tomb, Arched." Also, on the 1873 burial list, the graves of Sergeant J. C. McQuade and Private J. L. Richards are indicated as marked with an "adobe mound." Apparently, at least one grave marker of marble slab remained in the cemetery after it was officially closed, but even it was largely destroyed before burials from the military cemetery were removed to Fort Lowell:

> At the head of one [grave] stood a marble slab (the only one in the cemetery) erected by his company to perpetuate the name of a comrade, a young Englishman, aged twenty three, but it is now broken in pieces and the grave is to be leveled off. In rows on either side, sleep scores of others, who perhaps were not less meritorious or brave but whose mounds, marked only by the regulation board, which time has seamed and worn till not a line remains to tell who they were, how they fought and where they fell [*Arizona Weekly Citizen*, 18 February 1883].

Potential Archaeological and Material Visibility of U.S. Military Burial Practices in the Cemetery

Because most of the burials originally placed in the military section of the Alameda-Stone cemetery were exhumed in 1884, the archaeological characteristics of many military burials were irrevocably altered. We would expect military burials to have shared characteristics with Protestant burials and, more generally, with pan-religious notions of a good death that emerged during the Civil War (Faust 2008). Soldiers would likely have been buried in military attire, with military buttons and military-issued footwear more likely to have been preserved in archaeological context. Spent ammunition resulting from volleys fired during the graveside service might also have been scattered within the grave fill or on the surface.

Exhumation resulted in the removal of most, if not all, remains from grave pits. However, given the incompleteness of exhumations and decomposition occurring since burial, remnants of clothing and some skeletal elements, particularly small appendicular elements and teeth, would have been left behind in grave pits. Because burials were removed during a single concentrated effort, artifacts from military burials may have been redeposited in adjacent grave pits or left at the surface. This would have mixed deposits between graves, complicating the effort to associate materials within grave pits with a specific burial event.

Apache Deathways

Curtis (1908:192) wrote that when an Apache died, the spirit followed the path of the Milky Way to an afterworld of "peace and plenty." The dead were dressed in fine clothes, ceremonially painted, and wrapped with blankets, animal hides, or mats. Burials were often placed by relatives in rock crevices or sometimes in the stumps of trees. Bodies were placed in a variety of positions, including face down. Along with the deceased were placed weapons, clothing, and other items. Apache graves were marked, or covered, with carefully placed layers or piles of stones and sometimes with layers of brush placed atop the stones. One or more horses may also have been killed to accompany the dead in their celestial journey. Infants were placed on cradleboards "on the upper branches of large cedar or pinon trees" because it was believed that the souls of infants were not strong enough to pass through the stones of an adult's burial (Curtis 1908:192). Wailing for the dead was performed by kin and friends, who would mourn for periods from a month to a year. Mourning sometimes included cutting of the hair and the practice of scarification.

Goodwin (1942:518–521) later reported a different but overlapping set of burial practices among the Western Apache. Goodwin's informant indicated that the dead were dressed in fine clothes and their hair washed and combed. Bodies of men were prepared by men and sometimes a man's wife or sister, and the bodies of women were prepared mostly by sisters. If an adult had died, a gun would be fired four times when the person died. The body would be left in the wickiup all night, where people would sit with the deceased and mourn the death. A horse or cow would sometimes be killed to feed the mourners and would be eaten around midnight. In the morning, the body would be prepared for burial, if not prepared the previous day, and a hole would be broken through the east wall of the wickiup through which the body would be removed from the wickiup for burial.

Four gunshots would be fired again when the process of burial was commenced. Kin would be buried close together, if possible, but in separate graves. Goodwin's (1942:519) informant stated that in the remembered past, the dead would be buried in extended position, rather than in flexed position, "with their head toward the sun," possibly so that when the dead rose they would go "off to the east, the land of the dead." Rather than being buried in a grave, elderly individuals who had died were sometimes left in the wickiup. In such cases, the wickiup would be collapsed over the body and the settlement moved to a new location. In order to prevent the dead from returning to the world of the living, prayers were offered at the grave and ashes were placed over the grave, first by close kin. Food was also placed on the grave for the dead. After burial, dirt from the grave was brushed off clothing and removed from moccasins; the hands of participants also needed to be washed with water before eating. Goodwin (1942:520) implies that earlier purification rituals may have been more intensive.

After burial, mourners would leave the grave site on separate paths, taking pains to not follow the path they took to arrive at the grave site. The wickiup of the deceased was burned, and close male relatives had to visit the grave on four separate occasions to ensure that it remained in good condition. If killed on the warpath, individuals were buried more expediently in rock crevices, without food or ashes, perhaps in a manner similar to that described by Curtis. Under these circumstances, close kin would cut their hair and wail upon learning of the death of their relative. Two or three horses or cattle would be killed for the deceased relative, the man's wickiup and property would be burned, and the deceased's wife and children would move to another settlement (Goodwin 1942:519–520).

The burial of one Apache in Tucson was described in the *Arizona Citizen*, although this individual may have been placed in the Court Street Cemetery. The civilian section of the Alameda-Stone cemetery had been closed

by this time, and this individual was not listed in military records as having been buried in the military section of the Alameda-Stone cemetery, which remained open until 1881 (O'Mack 2006, Appendix C). The account, however, illustrates the intense mourning practiced by Apache and the interest in burying or destroying all of the deceased's belongings. The account also suggests that Apaches were directly involved with the burial of a fellow Apache and influenced characteristics of the burial:

> The widow [of] "NARBONA," the late Apache interpreter of the Chiricahua reservation, left here for home by Tuesday's buckboard. Mr. Appel informs us that she was very pleased with her treatment in Tucson, and that she would so report to her people. When the body of her husband was put in the grave, she wanted to be buried with it, and exhibited much fear lest it would be taken up, but was finally made to understand that nothing of the kind would be done, and that it would be allowed to remain just where buried. She exhibited as great feeling for the loss of her husband as any woman could, and desired everything belonging to him buried or destroyed, according to the customs of her tribe. Apaches of her own tribe dug the grave, and she desired they should be paid for their service, and said that Capt. Jeffords their agent would see that all outlays were repaid. She exhibited great faith in Capt. Jeffords will to treat her people right and also to pay those who rendered them a service [*Arizona Citizen*, 4 December 1875:3].

Potential Archaeological and Material Visibility of Traditional Apache Burial Practices in the Cemetery

Most of the burial practices attributed to Apaches would not have been observed in the cemetery, which fundamentally represented a different location than was common for Apache burials. Such burials may have included burial in traditional clothing, the use of red ocher and other pigments to paint the body, and the inclusion of weapons and tools within the grave. Individuals may have been wrapped in blankets, hides, or mats, and covered with stones. Despite a lack of evidence of traditional Apache burial practices, at least several Apaches were buried in the Alameda-Stone cemetery (O'Mack 2006). Because these individuals typically had worked as scouts or interpreters, their burials may have accommodated burial practices common to Hispanics and Euroamericans, and they may have taken place in the military section.

O'odham Deathways

Catholicism first came to the Santa Cruz River valley in the late 1600s with Jesuit priest Father Eusebio Kino, beginning a program of missionization that continued for nearly two centuries. As the area was a remote frontier, the presence of Catholic priests was inconsistent at best. Their stays at missions, presidios, and *visitas* in the Santa Cruz River valley were typically brief and focused on performing priestly sacraments, such as baptism or marriage. Their infrequent presence may have meant that priests were not generally available to participate in the burial of Catholic O'odham.

Despite repeated efforts to convert the O'odham of the Santa Cruz River valley to Catholicism, missionaries complained into the late 1860s that the exercise of Christian traditions among the O'odham represented only a thin veneer over a fundamentally non-Christian religious perspective. Thus, we cannot expect O'odham Catholic deathways to have been identical to those of Hispanic Catholics in Tucson, although there could have been considerable overlap in basic practices. In addition to O'odham who adopted and accommodated aspects of Catholicism in their religious practice, other O'odham rejected Catholicism and practiced traditional, non-Christian deathways.

At San Xavier del Bac, a Christian cemetery was developed west of the church, where the Catholic faithful buried their dead. The O'odham who did not practice Christianity, however, buried their dead on a hill to the east of the church according to an entirely different set of burial practices (Lumholtz 1912). In Tucson, traditional O'odham burials may have been placed on the south side of Tumamoc Hill, along with the burials of Apaches (University of Arizona 2008:25).

Traditional O'odham Deathways

Historical and archaeological evidence indicates that O'odham traditionally placed the dead in flexed position within circular or subrectangular burial chambers. Burials were placed at a distance from the village, sometimes at the base or sides of a hill or in mesquite *bosques*. Burial chambers were partly excavated belowground and extended aboveground with a low rock wall that was tall enough to accommodate the body placed in a flexed, sitting position within the grave. Logs and timber were laid across the top of this structure to cover the grave. Graves were prepared when death was anticipated and were left unused if a person recovered from sickness.

Traditional O'odham burial ceremonies generally took place at night and were accompanied by chanting

or wailing. All of the belongings of the deceased were burned, including cattle and horses, and the meat was used to feed mourners, who would stay in the village for an extended period after burial. Both women and men cut their hair as a sign of mourning. Infanticide was reported to have been practiced in cases where a woman's husband died and the chances of caring for an infant were slim (Bandelier 1890:251–252; Gaillard 1894:294; Lumholtz 1912:11–12; Masich 2006:200; Russell 1908:193–195; ten Kate 2004:81; Yarrow 2006:19–20).

Clothing, ornaments, and tools were placed with remains both within and outside the grave. Lumholtz (1912:11) reported that at San Xavier del Bac

> Many such chambers are in time joined together and form singular looking structures, ugly and irregular in shape, being at the widest part from twenty to thirty feet across. After the lapse of some time the roof may fall in, allowing a peep down at the desiccated human remains, near which may have been placed objects such as arrow stretchers, plumes, ornaments, and trinkets. I often later saw pottery vessels that had contained food or drink standing near the newly erected chambers. Where there are trees near by, bundles of clothing for the use of the departed in the next life may be seen among the branches.

Burial in a suitable grave was apparently essential to keep the deceased spirit from wandering the earth and molesting the living. A California Volunteer who traveled with the California Column in 1862 reported, "The Pimos . . . believe, if a body is suitably buried, it will go to heaven; but if left disinterred, it will remain like the ghost of Hamlet's father, restless and unhappy until its crimes shall have been expiated" (reprinted in Masich 2006:200). The validity and accuracy of this statement is difficult to gauge, given the observer's likely unfamiliarity with O'odham language and customs. More than a century later, Bell et al. (1980:103) described the Hia C'ed O'odham death ceremony, which must occur immediately after death, as a series of preparations designed "to safeguard the deceased spirit in reaching its destination." If preparations are not done immediately, evil spirits could "enter the deceased's body, [and] After death, close relatives cut the hair of the deceased and immediate family, to prevent saying the deceased name and disturbing him or her. The deceased is fully dressed, including in shoes, and if a man, his horse is killed to accompany him" (Bell et al. 1980:103).

Burials interpreted to have been those of historical-period Tohono O'odham or Hia C'ed O'odham have been documented in archaeological investigations (Ayres 1970; Bell et al. 1980; Madsen 1993). For instance, Ayres (1970) documented the accidental discovery of a Tohono O'odham burial on the property of Jacinto Flores on the San Xavier Indian Reservation, approximately one-quarter mile south of the mission of San Xavier del Bac. The burial was covered by a layer of angular basalt rocks and contained a 40–50-year-old woman of probable Native American descent. The woman's body was flexed and lying on its right side, which could indicate either deliberate placement in that position or that the corpse had fallen to one side after burial. Interestingly, artifacts found with the burial included a necklace of 187 tubular shell beads (*Vermicularia* sp.), two bone awls, an unworked turtle plastron, an unworked pronghorn antelope tibia (*Antilocapra americana*), and a Hopi polychrome bowl dated to around A.D. 1700. Ayres (1970) suggested the bowl may have been obtained from Hopi traders or acquired initially by a Catholic priest as a gift and suggests the burial may have been placed in the late seventeenth or early eighteenth centuries. Pits dug within talus slopes and associated with Piman pottery have also been interpreted as the collapsed remnants of possible O'odham graves (Madsen 1993).

Variations on practices attributed to the Tohono O'odham may have been practiced by Hia C'ed O'odham. Thirty-four graves at the Hia C'ed O'odham cemetery at Quitobaquito Springs, in the southern part of Organ Pipe Cactus National Monument near the United States–Mexico border, were documented prior to stabilization (Bell et al. 1980:15). Artifacts found at the cemetery, as well as the death dates of people known to have been buried there, suggest the cemetery was used possibly between 1890 and 1945, and possibly earlier. Based on surface observations of grave features, rectangular to oval grave pits were dug through a thin soil to bedrock, and two or more layers of wood, usually mesquite, were placed over the deceased after they were placed in the grave pits. "[S]maller poles, branches, cactus, ribs, or milled lumber [were] laid at right angles to the primary roofing material" (Bell et al. 1980:17). The grave was then covered with rocks and probably dirt as well, although little dirt remained at the time of recording. Containers and utensils, possibly corresponding to the placement of food offerings, were scattered on the ground surface. A small suitcase discovered at the southern edge of the site was interpreted as a possible burial container for a child, and wood boards in another child's burial were interpreted as evidence of a possible burial container. Wooden crosses were used to mark grave pits. Grave orientation varied, but tended to be roughly east-southeast–west-northwest. Several graves were placed in clusters, were similarly constructed, and in some cases had shared walls or roofs, suggesting a close association between individuals in those graves. A living individual, Candalaria Orozco, was able to identify who was in each grave by reviewing a map in 1980, and indicated that many of the dead were closely related.

O'odham Catholic Practices

Much of what we know about O'odham Catholic burial practices comes from ethnographic work conducted during the twentieth century and thus may represent a departure or extension from O'odham practices that were in effect while the Alameda-Stone cemetery was in use. Nevertheless, they provide a glimpse into what O'odham funeral traditions may have been like. As discussed above, the O'odham practiced a syncretic form of Catholicism. Many death ceremonies performed by O'odham in the twentieth century were officiated by a tribal spiritualist rather than a Roman Catholic priest (Hanlon 1972:104; King 1954:2). Friends and family kept vigil over the dying person. Once death occurred, an announcement in the form of ritual wailing—resembling high-pitched singing in male and female voices—was begun and would continue until burial (Hanlon 1972:104). The body was washed and dressed, usually by close family members, and then was prepared for the wake, or *velorio* (King 1954:88). Modern O'odham funeral directors report that all O'odham request shoes placed on the deceased (Hanlon 1972:107).

A hastily constructed altar was decorated with flowers, candles, a crucifix, and the images of family's intercessor saint. When the mourners arrived, the ceremony of the rosary began followed by singing. The *velorio* continued this way until midnight when most of the mourners left for the night. Close friends and family stayed behind to continue the vigil over the body until the funeral, usually the next day (King 1954:88).

The funeral was arranged by friends and relatives of the deceased and when possible conducted the day following the death. These duties include making arrangements with a priest for the funeral service and digging the grave. It was particularly important for the grave preparation to include shelves to hold grave arches for vaulting. In some cases, a blanket may have been used in addition to timber to protect the coffin and its contents from falling soil from above.

At the graveside, the mourners were given a final chance to view the deceased before the coffin was lowered into the grave (King 1954:90–91). The next evening a series of nine nightly rosaries (novena) was begun in the home of the deceased. During these nights, the altar was redecorated, draped with dark fabric, black or purple, and sentimental objects belonging to the deceased were placed on display. Once the novena was over, the objects from the altar were buried in the grave mound and the funeral ceremonies were completed (King 1954:95).

Potential Archaeological and Material Visibility of O'odham Practices in the Cemetery

Evidence for traditional, non-Catholic O'odham burial practices was not discovered in the Alameda-Stone cemetery. The evidence for traditional practices would have included burial in a flexed position, rock-walled burial chambers covered with rocks and decomposed timbers, and the inclusion of tools, ornaments, and other cultural artifacts within and surrounding the grave feature. Traditional O'odham burials would have preferably been placed at the sides of hills or in mesquite *bosques* and not in more-open and relatively level locations like that of the Alameda-Stone cemetery.

As stated above, O'odham Catholic burials would likely contain archaeological characteristics similar to those of Hispanic Catholics. Catholic artifacts alone would not demonstrate O'odham burials. Rather, like O'odham expressions of Catholicism, funerary artifacts may be a combination of Catholic and O'odham objects.

Many of the burials listed as those of O'odham in the Tucson Diocese burial record were indicated as being placed at San Xavier del Bac, although it is certainly possible that O'odham living in Tucson were buried in the Alameda-Stone cemetery (O'Mack 2006). Today, the Tohono O'odham preference for burial in the church cemetery is demonstrated at the Catholic cemetery at San Xavier del Bac where hundreds of graves are diligently cared for and attended to by the community. All but the oldest graves are mounded, marked with a cross and decorated with candles and mementos. Many graves are not identified with the name of the deceased, a practice which may reflect the O'odham belief to refrain from mentioning the deceased's name after burial (Griffith 1992:123). Presumably, O'odham graves in the Alameda-Stone cemetery would have resembled the graves in the San Xavier church cemetery and would probably share many characteristics with Hispanic Catholic burials. Objects of significance to the deceased may have been placed in grave mounds or at the surface, but the surface of the cemetery had been graded historically, and such items would no longer be associated with grave pits.

Yaqui (Yoemem) Deathways

Like O'odham burial traditions, Yaqui (Yoemem) burial traditions represent a melding of Yaqui traditions and Hispanic Catholic traditions. Spicer (1980:62) postulated that Yaqui began to incorporate Christian concepts into their worldview with the arrival of the first missionaries in their territory in the early seventeenth century. However, assimilation of Christian concepts was a drawn-out, centuries-long process, and fundamental cosmological and eschatological concepts were retained by the Yaqui, even as they adopted Christian religious practices. The descriptions we have of Yaqui deathways come mostly from

ethnographic work beginning in the 1930s. But, as Shorter (2009:254) notes, "previous scholars of Yoeme history surprisingly have not detailed the full process of Yaqui death rites." More recent scholars, like Shorter, have endeavored to fill in the gaps, but their observations are even more distant from the times when Yaqui burials would have been placed in the Alameda-Stone cemetery.

The Yaqui believed that the spiritual dimension of the world, sometimes referred to as the *yo aniya*, was a dimension where ancient honorable ancestors lived. The *yo aniya* could be anywhere at any time, and power associated with *yo aniya* could be obtained from animals, spiritually endowed places, or transmitted through dreams (Spicer 1980:64–65). Other fundamental Yaqui concepts related to death were the concepts of *surem* and *aniimam*. *Surem* were ancestors who had lived before the Yaqui accepted Christianity or who chose not to be baptized when the Yaqui were first exposed to Christianity. *Aniimam* were baptized ancestors who had once lived in Yaqui land and who were thought of individually as relatives, such as a dead parent or child (Spicer 1954:121–125). The relationship between *aniimam* and living Yaqui was "warm and intimate, devoid of horror," but Yaqui were ever mindful of being respectful and proper in the presence *aniimam* (Spicer 1954:124). The *aniimam* came to the village for the month of October and joined families to partake in a meal prepared for the *aniimam* in the house yard on All Souls Day. Encounters with *aniimam* also occurred with regular visits to the cemetery where Yaqui would sit with the dead. To remember and honor the dead, the oldest women of each household kept a book with the names of dead ancestors. At every ceremonial opportunity, relatives sung over the names of the ancestors preserved in these books.

Treatment of the Body and Funeral Rites among the Yaqui

As with other Catholics, the sacrament of baptism for the Yaqui was fundamental to achieving salvation. At Pascua, a Yaqui settlement in Arizona, each Yaqui had three pairs of baptismal sponsors, or three *padrinos* and three *madrinas*. The three pairs of baptismal sponsors played crucial roles in funeral preparations and acted in concert to prepare the body for burial, each with specific tasks. The *padrinos* arranged and performed the funeral ceremony. If the deceased was unmarried, baptismal sponsors provided a feast in repayment of the feast they received in conjunction with previous baptismal ceremonies. Unmarried individuals were carried to the house of one of the baptismal sponsors, where the funeral ceremony was performed. If the person was married, baptismal sponsors contributed to the feast, but did not host it, and the funeral ceremony was performed at the house of the deceased's family (Spicer 1976).

Madrinas were responsible for removal of the clothing and dressing the body. The body was dressed in a blue gown with a white voile overdress. Similar to the Hispanic Catholic practice of burying children as *los angelitos*, children and unmarried Yaqui were decorated to resemble angels. Many-colored paper flowers were affixed to their hair, and wings were placed at their shoulders. Once the deceased individual was dressed for burial, the clothes that had been removed were folded and placed underneath the deceased's head in the coffin by the *padrinos* (Spicer 1976). Then the sponsors each placed a Yaqui rosary around the neck of the deceased and two *wikosam* at the waist to be used by angels to lead the deceased person "out of this world and into the other" (Spicer 1976:105). When all were placed, the deceased had six rosaries and 12 *wikosam.* If the deceased individual had been a ritual specialist, then ceremonial attire or ritual paraphernalia were also buried with the deceased, and the ritual society played a special role in the funeral. For instance, if the deceased was a *matachini*, a sacred ritual performer who owed allegiance to the Virgin Mary, "the *matachinis* dance again, place the *matachín* paraphernalia on the corpse, and finally break off in the midst of their dance and run away, not to return" (Spicer 1976:219). Parsons and Beals (1934:504) reported that members of the sacred clown society were "dressed in full regalia" and buried by members of their own society, with one of their ceremonial masks being burned after burial.

With the conclusion of funeral ceremonies, the *padrinos* carried the body to the cemetery and lowered it into the grave. Relatives of the deceased could not be involved in burial and remained "hidden, out of sight, until the body is safely in the grave" (Spicer 1976:105). There was a tendency to try to bury family members close to each other. Cemeteries were consecrated ground placed beside the church where closely packed blocks or rows of mounded graves were marked with wooden crosses (Spicer 1980:174–175). Frequent dances increased and maintained the sacredness of cemetery space. Family members frequently visited the graves of relatives in the cemetery, where they would sit with them.

Potential Archaeological and Material Visibility of Yaqui Practices in the Cemetery

Yaqui individuals had been filtering into the Santa Cruz River valley for decades by the time the Alameda-Stone cemetery was in use, but they did not establish a community in the area until the early nineteenth century, when larger waves of migration occurred. The few Yaqui living in Tucson while the Alameda-Stone cemetery was in use

may not have benefited from funeral rites normally performed by a network of family members, baptismal sponsors, and ceremonial specialists, as many such individuals may not have been available to participate in burials. As such, distinctively Yaqui characteristics of burial, such as the inclusion of specific ceremonial paraphernalia, may have been rare given the particular circumstances in Tucson at the time. In the burial agreement for this project, Yaqui representatives provided a number of characteristics they felt could be indicative of a Yaqui burial, including the wearing of sandals or a white robe; the inclusion of black, wooden rosary beads; cotton burial cords; or ceremonial objects such as cloth-covered crowns, flags, animal skins, blankets, and ceremonial belts. Other aspects of Yaqui burials may have been similar to the burials of other Catholics, such as extended supine inhumations or the use of floral crowns on children.

Conclusions

A variety of deathways would have been practiced by different groups living in Tucson while the Alameda-Stone cemetery was in use. Many individuals would have been buried according to broadly similar practices, with some variation in burial orientation, burial containers, inclusion of religious artifacts, offerings, and personal artifacts. In general, the main distinctions are between Catholic burials and burials representative of either broad Protestant traditions, or traditions associated with emerging pan-religious American notions of a good death. In other words, factors such as orientation, use of burial space, grave pit size and shape, use of floral crowns, and inclusion of Catholic religious artifacts can be used to infer Catholic practices in the Alameda-Stone cemetery, as opposed to non-Catholic ones. Other kinds of distinctions between Catholic practices could relate to differences between Catholics in attitudes about death and burial. Catholics subscribing to more-baroque notions of piety might have been more likely to use burial spaces in a manner consistent with earlier burial of Hispanic Catholics in church floors and churchyards, with frequent disturbance and reused of consecrated space, and Catholics subscribing to a more enlightened piety may have been more willing to use other areas of the public cemetery. In addition, lack of coffins or the use of simple shrouds and robes could in some cases suggest the expression of "flamboyant modesty" as came to be associated with reformist notions of an internal, egalitarian, and humble piety.

Military burials, which would likely have occurred mostly in the military section, would have involved the burial of individuals in uniform and military-issued clothing, the deposition of spent cartridges in grave fill and on the cemetery surface, and possibly inclusion of flags in the grave. Otherwise, military burials may have been generally similar to burials associated with Protestant practices or pan-religious notions of a good death. However, exhumation processes would have removed most remains, leaving behind portions of clothing, extremities and small bones, and possibly mixing these remains between graves. If there were Jewish graves in the cemetery, they would have been few in number and may or may not have been discernible.

Traditional, non-Christian Tohono O'odham and Apache burials would have normally taken place in entirely different kinds of environmental settings than the Alameda-Stone cemetery and would have consisted of grave features with shapes and other characteristics radically different from those observed in the Alameda-Stone cemetery. By contrast, Yaqui and O'odham Catholic burials would have been similar to other Catholic burials from an archaeological perspective. This may have particularly been the case for Yaqui burials because ceremonial societies and associated paraphernalia may have been difficult to sustain at the time with the few Yaqui living in Tucson.

In sum, the similarities between different groups' customs of cemetery burial during the cemetery's period of use mean that detailed analyses of many lines of evidence are necessary to begin to make religious and other cultural and ethnic distinctions.

CHAPTER 9

Mortuary Synthesis

Lynne Goldstein, Kristin J. Sewell, Michael Heilen, and Joseph T. Hefner

Introduction

The purpose of this chapter is to summarize and integrate the major findings about the cemetery and to identify overall patterns and their potential meaning. This chapter includes (1) a summary of findings by variable or topic, (2) multivariate analyses, and (3) discussion and interpretations. Most of the preliminary data descriptions and analyses used in this chapter are reported separately in Volume 2 and were conducted by Kristin Sewell, Michael Heilen, Joseph Hefner, and others. Chapters 4–6 in Volume 2 of this series present an outline and detailed descriptions of a number of the mortuary patterns in the cemetery, focusing on individual variables. This integrated chapter draws heavily upon these previous analyses and descriptions.

Strictly in terms of the time frame of cemetery use, one might associate the Alameda-Stone cemetery with the Victorian cemetery movement. The Beautification of Death movement, popularized during Queen Victoria's reign, spread rapidly from Britain to the United States during the second half of the nineteenth century (Bell 1987, 1990). This trend is marked by elaborate displays of grief and mourning and has been the focus of several studies of mortuary behavior (Ariés 1981; Bell 1987, 1990; Cannon 1989, 2005; Parker Pearson 1982). Archaeologically, parklike cemeteries are associated with this trend, as are ordered cemetery rows, elaborate headstone designs, the presence of mass-produced coffins, coffin hardware, and the remains of fine clothes included in burials. Most of these elements were not present in nineteenth-century Tucson as represented by this cemetery, where longstanding southwestern traditions were the dominant pattern and practice.

In Chapter 11, on reburial, we link some of the activity at the Alameda-Stone cemetery to Faust's (2008) analysis of death and the Civil War. Tucson was at the edge of the Civil War; although it was involved and impacted by the war, it was not as devastated or affected by it as the eastern United States. The shift in military and civilian culture can be seen in Tucson in the post–Civil War period and in its cemetery but not as dramatically or as clearly as other places in the United States. Importantly, this was a cemetery that was in use for a relatively short period of time (about 20 years), but it represents all of Tucson at that time.

The Spatial Organization of the Cemetery

The structure and plan of the Alameda-Stone cemetery is shown in Chapter 5 (see Figure 51). The cemetery was divided into five major cemetery areas, primarily based on spatial organization and separation, including distinct rows and groupings. The sections identified as Cemetery Areas 1–5 are referred to regularly in this chapter, but for the most part, these divisions have been imposed on the cemetery by the analysts based on distinctions noted, and may or may not be the same as any historical divisions.

We know from historical records that the cemetery was minimally divided into a civilian and a military section (see Figure 2). Practicing Catholics of the period expected loved ones to be buried in consecrated ground, often in proximity to other loved ones or in areas reserved for individuals of their particular status or genealogy. Young children were sometimes buried in an area reserved for *los angelitos*, or little angels, because their innocence placed them in a special status with regard to the afterlife. The demographic and religious diversity of Tucson during the cemetery period suggests

that, in addition to the division between civilian and military sections of the cemetery, divisions were also likely within the civilian section of the cemetery, based on religion, cultural affinity, and other factors.

Archaeologically, we were able to identify the military cemetery based on a variety of contextual clues, including the spatial location and positioning of graves in that section; artifact types (such as military buttons); osteological variables; and other factors that correlate with historical records. We were ultimately able to correlate archaeological grave pits with specific grave outlines recorded on a historical plat map of the military section of the cemetery made by the U.S. military in 1881 (see Figure 64). However, unlike other investigations where a few individuals could be positively identified through the combination of historical, biological, and contextual evidence, this was not possible here because the vast majority of remains had been exhumed historically from the military section and the osteological and artifactual materials left behind were not distinctive enough to be able to make strong inferences about personal identity.

Archaeological evidence suggested divisions within the civilian section of the cemetery. Variation in grave pit size, depth, spacing, and density; burial orientation; age; sex; biological affinity; and the presence of distinctive gaps between graves in different areas allowed us to recognize four distinct areas within the civilian section of the cemetery as well as a possible division between the western and eastern halves of Area 3. Osteological and archaeological analyses reported in Volume 2 have generally corroborated the validity of these divisions by repeatedly finding a number of important differences between cemetery areas in mortuary treatment, burial practices, demography, or evidence for health hazards or heritable conditions. However, the major differences divided the northern and southern portions of the cemetery.

Burials in the northern portion of the cemetery were more often those of Hispanic individuals but also included smaller numbers of non-Hispanic Euroamericans and Native Americans, and more than a third of all individuals were juveniles. Nearly all religious artifacts were found in the larger, northern portion of the cemetery. Many, but not all, of the burials in the northern portion of the cemetery were oriented with head to the east, perhaps in order to face the San Agustín chapel (located to the west of the cemetery) at resurrection. By contrast, grave pits in the southern portion of the cemetery generally contained the burials of non-Hispanic Euroamerican males or Hispanic males, with few women or children. Most of these burials were oriented with the head to the west and had different mortuary treatments than in the northern portion of the cemetery. Important variation existed within the northern areas as well. Nearly all burials in Cemetery Area 4 were oriented with head to the east, possibly to face San Agustín church, but many burials in the westernmost portion of Area 3 were oriented with head to the west, as were a few clusters of burials scattered throughout Area 3.

Other variables hint at differences between the northern and southern portions of the cemetery. For instance, more than two-thirds of the individuals with skeletal injuries were discovered in the southern portion of the cemetery, particularly in Area 2, even though almost 85 percent of all individuals were discovered in the northern areas. Caries frequencies were also highest in individuals from the southern portion of the cemetery, suggesting differential access to sugars in the diet, possibly from foods consumed outside of Tucson. Dental wear was also significantly more frequent in individuals buried in the northern portion of the cemetery, suggesting differences in diet. Nearly all evidence for dental work and dental appliances was found in the southern portion of the cemetery. Individuals in the southern portion of the cemetery more often had dental enamel hypoplasias than individuals in the northern portion, perhaps indicating greater exposure to childhood stress resulting from poor nutrition or exposure to infectious diseases. Spondylolytic vertebrae, which in this group could correspond to work-related or genetic causes, was found mostly among Hispanics in the northern portion of the cemetery, as were all cases of osteoporosis. In general, the differences observed indicate that the northern portion of the cemetery was used mostly by the local Hispanic community, and the southern portion was used mostly by more-recent migrants to Tucson, a larger percentage of whom were non-Hispanic Euroamerican adult males and at least a third of whom were associated with the U.S. military.

The few graves with evidence of professional undertaking services—apart from the presence of mass-produced coffin hardware—were located in the southern half of the cemetery in Cemetery Areas 1 and 2. In contrast, floral crowns—associated with Hispanic and Yaqui Catholics—were found in large numbers only in the northern portions of the cemetery. A similar division was found in the distribution of burial container shapes. Hexagonal coffins were more popular than any other shape in Cemetery Areas 1 and 2, whereas all three shapes tended to be more or less evenly divided in Cemetery Area 3.

Cemetery Area 4 was unusual in shape, distribution of graves, and orientations. The area was densely packed with grave pits, many of which intruded into earlier grave pits, and the area also contained the greatest number of graves with multiple burials. Burials in Cemetery Area 4 used cemetery space differently, in a manner more consistent with earlier Hispanic Catholic burials under church floors and in churchyards, but comparisons of demographic and other contextual variables suggest that there were not major differences in the identity of individuals between Cemetery Area 3 versus Cemetery Area 4. Cemetery Area 4 may have been the original location of consecrated ground used by the Catholic Church for burial, and Area 3 grew around it as Area 4 began to fill. Given knowledge of Hispanic

Catholic burial practices of the period, Cemetery Area 4 may have been reserved for individuals with a certain level of status or priority with regard to the church, or whose mourners subscribed to more conservative or traditional Catholic burial practices, but there is no clear indication that individuals in Cemetery Area 4 had substantially different life experiences or backgrounds than individuals in Cemetery Area 3. Differences were observed between Cemetery Areas 3 and 4 in the spatial distribution of burial containers according to shape, suggesting possible differences either in how these areas were used or who was using them.

Graves and Burials

Focusing first on the physical attributes of the graves, this section examines the shapes of the graves, coffin forms and construction, coffin hardware, burial orientation and positioning, grave goods, clothing and items of personal adornment, and mortuary practices at the cemetery and their relationship to longstanding southwestern traditions.

The Graves

All 1,083 grave shafts excavated were generally rectangular; these features held the remains of 1,386 individuals. There were no obvious or patterned differences in the grave shafts themselves in terms of shape and depth, although both varied across the cemetery. Much variation in grave pit shape and depth across the cemetery appears to have been random or related to the size of the individual buried or the number of burials placed within a grave pit. Grave pits were deepest and most irregular in shape in Cemetery Area 4, which was likely a practical result of the use of some grave pits to accommodate multiple burials. The major significant variable associated with grave shaft characteristics was orientation, which is discussed later in this chapter.

Most of the graves—914—held single inhumations. There were 58 instances of multiple burials in single grave features that ranged from a burial with two individuals to those with as many as five individuals. About half of the multiple burials represented individuals buried in separate events but in the same grave pit. The other half of the multiple burials were individuals that were buried together during the same burial event.

Vaulting and Niches

In most cases, graves were simple and rectangular, with a primary grave shaft into which a body in a coffin or a shrouded body had been placed. There were some variations on this pattern, with one set of variations focused on changes to the primary grave shaft for specific purposes. These variations included what we have termed vaulting and niches.

There were about 30 graves with evidence of vaulting (Figure 93). Vaulting was characterized by a primary grave shaft, in this case rectangular in plan view, with a secondary shaft excavated within the primary grave shaft to fit the shape of the coffin (Sprague 2005; Swauger 1959). The "shelves" created by the secondary shaft within the grave were covered by unattached planks perpendicular to the long axis of the shaft. Other terms used to describe this and other similar types of vaulting include "coffin board" (Plume ca. 1890 in Mainfort and Davidson 2006), "vaulted lid" (Mainfort and Davidson 2006), and "grave arches" (Bell 1987; Bybee 2002:7). The practice of reinforcing the grave shaft in this way dates to the colonial period in the United States and has been documented in historical-period cemeteries throughout the country (e.g., Bell 1987, 1990, 1994; Bybee 2002, 2003a, 2003b, 2004, 2007; Blakely and Beck 1982; Crissman 1994; Davidson 1999; Mainfort and Davidson 2006; Matternes 1998; Shogren et al. 1989; Swauger 1959). Somewhat different forms of vaulting have been used in Europe and Africa (Davidson 2004; Plume ca. 1890 in Mainfort and Davidson 2006).

Vaulting temporarily protected the coffin and its contents from collapse and helped prevent soil slumping within the grave. Perhaps more importantly, vaulting may have had psychological functions. The additional labor and time involved in excavating the secondary shaft and applying grave arches or vaults suggest additional care in grave preparation and could indicate greater respect for the individual (Mainfort and Davidson 2006:100). For mourners, an additional benefit may have been that the architectural reinforcement of the grave provided perceived protection for the body from collapse of grave walls and from soil being put directly on the coffin.

A total of 26 grave pits in the cemetery had shelves, or slightly more than 2 percent of the grave pit features. Of these 26, half had grave arches (Figure 94). Of the remaining grave pits with shelves, 70 percent held adult interments, almost 80 percent of which were male. Only Euroamerican and Hispanic individuals were interred with shelves, with slightly more grave pits containing Euroamericans than Hispanics.

A distinctive characteristic of the Alameda-Stone cemetery that may be linked to vaulting is what we have termed niches. Graves with niches were those in which a distinct space had been excavated into the short axis of the grave pit wall, only at the head end of the grave. The head of the individual to be buried was placed into the niche. Twenty-nine of the 1,083 grave pits at the cemetery had a head niche—less than 3 percent. Seventy percent of the individuals interred with head niches were adults, and most were identified as young adults. A slight majority of the adults

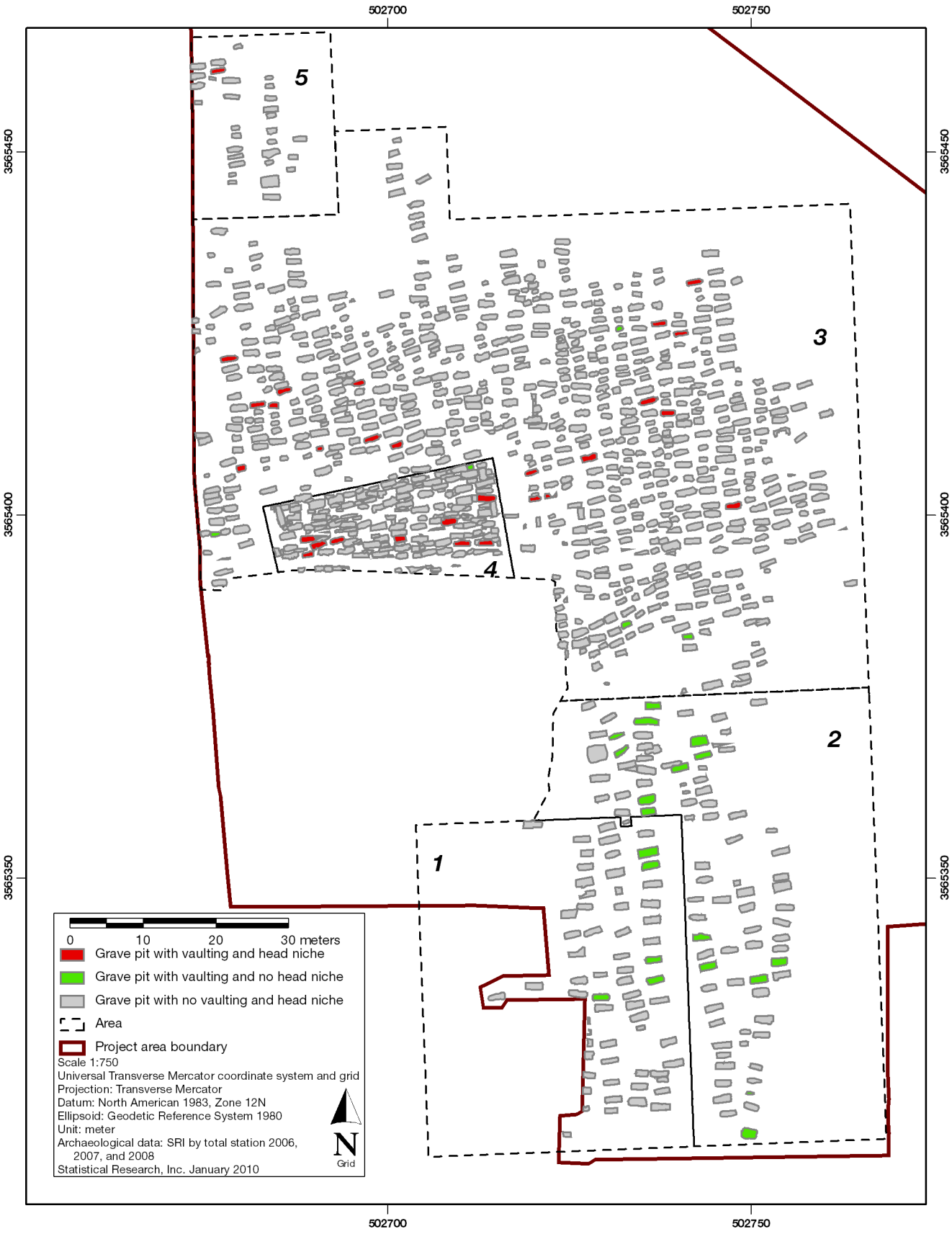


Figure 93. Distribution of graves with vaulting and/or head niches.

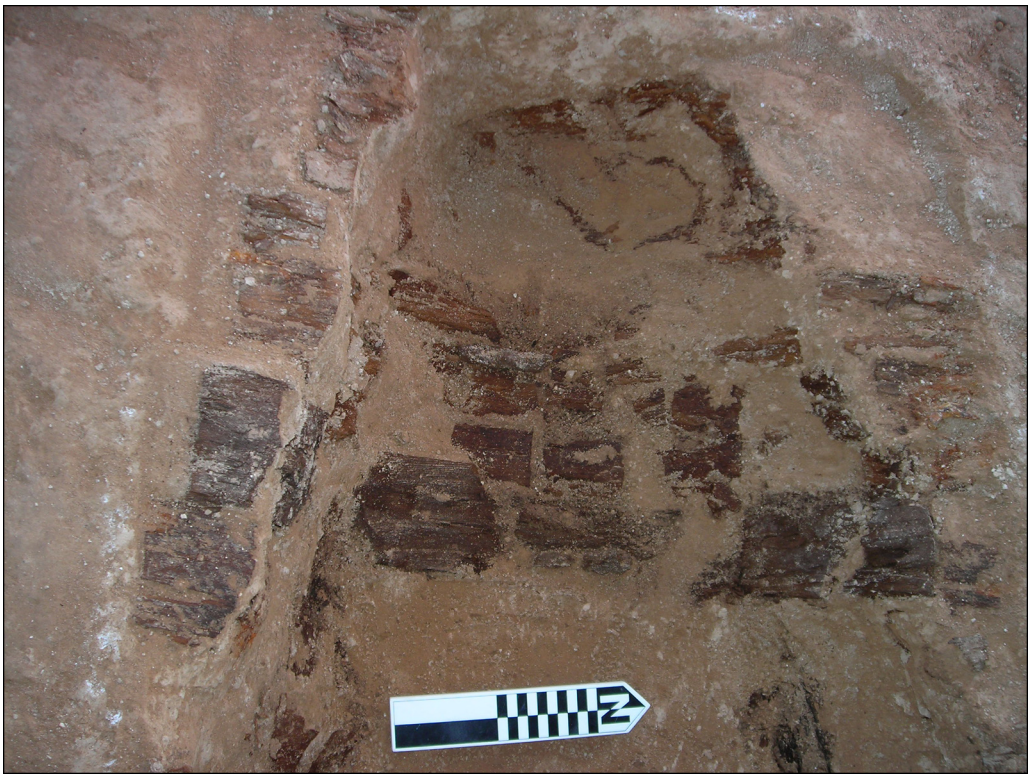


Figure 94. Grave Arches from Individual P, Grave Feature 3228, a middle adult male of Euroamerican cultural affinity.

was male. There were equal numbers of Euroamerican and Hispanic adults, along with two Native American adults.

None of the individuals in the grave pits with head niches was interred in a coffin, and they represented about 13 percent of the total number of burial features without coffins. One grave feature with a head niche held two burials, but only one of the individuals was in the head niche; both of these individuals were infants. The infant in the head niche was buried without a floral crown, but the other infant had a floral crown. The rest of the grave pits with head niches were single inhumations (see Figure 25). Because most of the grave pits with niches were large enough to accommodate the entire length of the individual (not counting the head niche), it is doubtful that the niches were created to accommodate an individual whose body length was greater than the length of the grave pit.

No ethnographic documentation has been discovered and no other archaeological evidence has been found describing a similar grave preparation. Head niches were only found in Cemetery Areas 3 and 4. Because of the small percentage of grave pits with head niches, and the fact that all of the grave pits with head niches held individuals buried without coffins, this type of grave preparation may have served a psychological function by limiting contact between the grave pit soil and the unprotected face of the individual. It is possible that, instead of reflecting something about the individual in the grave, the head niches may represent idiosyncratic behavior on the part of a grave digger. The presence of the niches only in Areas 3 and 4 could relate to the work of one or more grave diggers who could not tolerate putting dirt on the unprotected face of an individual, or who himself reflected a particular cultural tradition.

Beyond the above speculation, the precise function of these niches is unknown. The head niche likely represented a local extension or adaptation of vaulting—both protect the individual and contents, particularly the head of the individual. Unlike vaulting, however, niches used little to no wood in an environment in which wood was a scarce commodity. The spatial clustering suggests there may have been temporal relationships associated with the practice, perhaps tied to southwestern burial traditions in which the grave pit was undercut and the remains were placed within the resulting space (Loendorf 2001:128). Whatever the function or reason for head niches, these features at this time appear to be unique to the Alameda-Stone cemetery.

All grave pits with possible niches were examined according to a set of defining criteria that included physical characteristics of the niche, such as size, shape, and location. Conservatively, only graves with niches that met all criteria were labeled as having niches. Grave pit preparations, vaulting, and head niches differed between the northern and southern halves of the cemetery. Vaulting

with grave arches and shelves appeared more often in the southern half of the cemetery in Cemetery Areas 1 and 2. Head niches were found exclusively in the northern half of the cemetery in Cemetery Areas 3 and 4.

Burial Containers

Despite the relatively short period of time the cemetery was used, around two decades, a variety of idiosyncratic techniques were used in the construction of burial containers. Most coffins were probably made by carpenters or laymen and were not the product of professional cabinetmakers or casket makers. The construction of burial containers in the Alameda-Stone cemetery used a variety of board lengths and widths as well as a variety of construction hardware, suggesting local manufacture and occasionally scarce construction materials. However, the presence of at least some burial containers that also required specialized tools, knowledge, and complex carpentry techniques suggests that, in a few cases, professional coffin makers or furniture makers may have constructed some containers.

Coffin Shape and Construction

Some researchers have tried to temporally differentiate nineteenth-century burials by the use of rectangular or hexagonal burial containers. Such a typology is problematic because the introduction of the rectangular casket occurred at different times in different regions of the country and with different cultural groups or communities (Mainfort and Davidson 2006). Although use of hexagonal coffins waned in the late nineteenth century, these forms were advertised in period catalogs into the 1920s (Mainfort and Davidson (2006:109–110) and were in use in some areas into the 1930s. Rectangular burial containers were already in use prior to the nineteenth century (Koch 1983) and were used primarily for the interment of infants and young children in the early nineteenth century (Bybee 2002; Davidson 1999). The Alameda-Stone cemetery had roughly equal representations of hexagonal and rectangular coffins.

Over 80 percent of graves held coffins with at least one individual. Of the coffins that could be identified, shapes were limited to hexagonal, rectangular, and trapezoidal, with hexagonal the most common (Figure 95). Coffins were constructed of local pine and juniper or cypress wood, with butt end joints, in a vernacular style. None of the coffins in the cemetery appeared to have been mass-produced.

In terms of coffin construction, coffins were put together with cut-iron nails. Over 50 percent of the coffins were lined, indicated by the presence of coffin-lining tacks and, in some cases, remnants of dark-colored silk or light-colored cotton fabrics (Figure 96). Upon viewing an

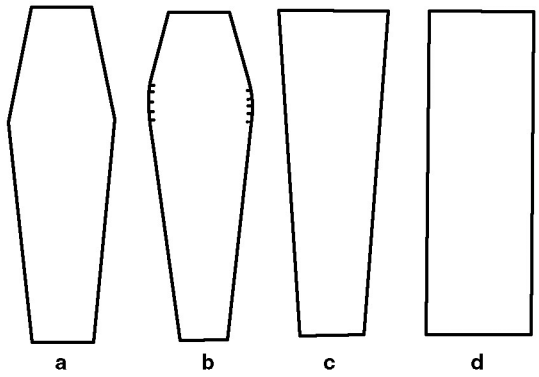


Figure 95. Coffin Shapes from the Alameda-Stone cemetery: (*a*) mitered hexagonal; (*b*) bent-shoulder hexagonal; (*c*) trapezoidal; (*d*) rectangular.

1875 Tucson funeral procession, one individual observed that the coffins of children were covered with pink and blue cloth, and those of adults were covered with black cloth (Cosulich 1953). Additionally, many coffins at the cemetery were painted bright shades of green, blue, red, or white. Paint did not preserve well at the site, so it is unclear how many coffins were originally painted. A small historical-period California cemetery also reportedly held individuals in brightly painted coffins. Those individuals were identified as "Californio," or having Mexican ancestry (Brock and Schwartz 1991:82).

Relatively few coffins used formal coffin hardware. There were fewer than 100 coffins that had any type of mass-produced decorative element. Of those, there were five types of coffin screws, and eight types of ornamental tacks. Coffin handles were found with only 17 graves, including a number of different, unique types of handles. Coffin handles ranged from furniture pulls to plain, white-metal simple swing-bail handles to ornate silver-plated swing-bail handles.

Other analysts have noted the importance of coffin hardware. Burgess et al. (2007) argue that ornate and expensive coffin hardware marked social status for some affluent members of society, but Little et al. (1992) have suggested that some used coffin furniture to mask social realities and present the illusion of wealth. In the nineteenth and early twentieth century, many viewed ornamentation of the funeral and the coffin or casket as important parts in the expression of sentiment and community restructuring (Bell 1987, 1990). These were not major sentiments in Tucson at the time of the Alameda-Stone cemetery.

Of the three main coffin shapes, hexagonal coffins were most common in all cemetery areas. Most of the coffins in Areas 1 and 2 were hexagonal, followed by rectangular coffins. Slightly more than half of coffins in Area 5 with determinable shapes were also hexagonal, and most of the rest of coffins in Area 5 were rectangular. Trapezoidal coffins were exceptionally rare in Areas 1, 2, and 5. By

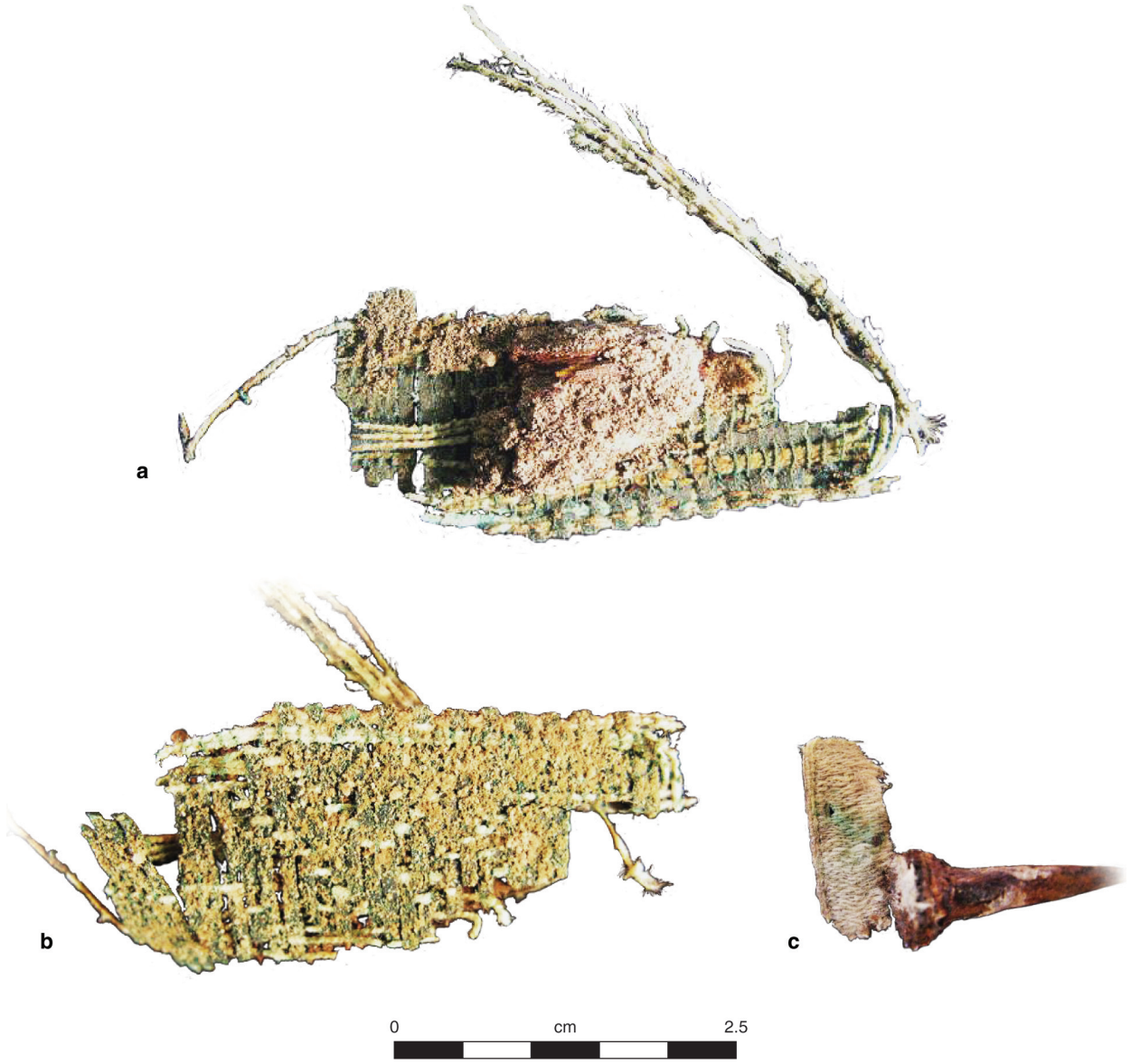


Figure 96. Fragments of fabric from Individual P, Grave Feature 7802, an adult of indeterminate sex and cultural affinity.

contrast, in Cemetery Areas 3 and 4, hexagonal coffins were only slightly more common than rectangular or trapezoidal shapes—the three types were relatively evenly distributed in number. Some of this variation is associated with age of the individual because hexagonal containers were most common among adults. For juveniles, rectangular containers were most common, although hexagonal and trapezoidal containers were also used.

There was variation in container shape by age between cemetery areas as well. In Cemetery Areas 1 and 2, most adults were buried in hexagonal containers, whereas juveniles were buried in either hexagonal or rectangular containers. In Cemetery Area 5, the pattern of burial container shapes for adults closely followed the pattern in Cemetery Areas 1 and 2, but all three shapes were used for juveniles, with most juveniles in rectangular containers. In Cemetery Areas 3 and 4, approximately one-half of the adults were buried in hexagonal burial containers, as were about a third of juveniles, but both rectangular and trapezoidal containers were used for adults and juveniles to varying degrees.

For the cemetery as a whole, males were more often buried in hexagonal containers, but this pattern was associated with the apparent preference for hexagonal burial containers in Areas 1 and 2, and the proportionately large number of males in those two cemetery areas. Otherwise, there appears to have been no difference in burial container shape between sexes, with one possible exception. Males in Area 4 were most often buried in a hexagonal or

a rectangular container, whereas females in Area 4 were most often buried in hexagonal containers. Given the relatively small sample size of burial containers in Cemetery Area 4 with both recognizable shapes and individuals who could be identified as male or female (n = 40), this pattern may or may not be significant.

Within cemetery areas, there was also variation. In Cemetery Area 2, most of the burials with rectangular containers were in the northern portion of the area. In Area 3, the three basic burial container shapes were found throughout the area, but tended to be clustered by shape within rows. Often, two or more adjacent grave pits in Area 3 held burial containers of the same shape. The significance of this pattern is unclear, but the clustering of shapes within rows suggests that similar coffin styles may have been used for burials that either occurred closely in time or for family members who were buried in close proximity to each other. In Area 4, trapezoidal containers were found throughout the excavated area, but rectangular containers clustered in the western half of the area and hexagonal containers clustered in the eastern half. The significance of this pattern is also unknown, but it could reflect time, social, or familial groupings.

Both adult males and adult females were three times more likely to have been buried in a hexagonal coffin as a trapezoidal or a rectangular one. Juveniles were slightly more likely to have been buried in a rectangular coffin; but if not in a rectangular coffin, the juveniles were almost equally likely to have been buried in a hexagonal or a trapezoidal coffin. Roughly equal numbers of hexagonal and trapezoidal burial containers appeared with infant and fetal remains. However, infants were 36 percent more likely to have been buried in a rectangular casket, and fetuses were 50 percent more likely to have been buried in rectangular burial containers. This trend is supported by patterns in other historical-period cemetery settings (i.e., Ferguson et al. 1993:V-8–V-9).

Plank Burials

At least three individuals from the Alameda-Stone cemetery were buried on single boards, planks, or platforms. In one instance, both the infant and plank were wrapped with fabric and the fabric was tacked down on the underside and painted before being placed in the grave pit. The other two plank burials did not appear to be decorated or painted. Two of the plank burials were infants, and one was that of a young child. All were located in Cemetery Area 3.

Although not common, plank burials have been noted in at least one other archaeological context. The Seven Rivers Cemetery, a late-nineteenth-century pioneer cemetery in New Mexico, contained both Euroamerican and Hispanic interments. Two plank burials were recorded here: one in association with a 7-year-old female and the other with a 24–30-year-old male (Ferguson et al. 1993:IV-22, IV-36).

Coffin Hardware

All burial containers recovered from the cemetery were constructed using common cut nails, so no demographic conclusions can be drawn from an investigation of nails. Similarly, the use of utilitarian screws followed a seemingly normal demographic distribution. Less common in burial excavations was the presence of coffin hardware; there were only nine types of handles, five types of coffin screws, and eight types of ornamental tacks (Figures 97 and 98).

Ornamental tacks often have floral or geometric motifs, but they can also be representational (such as a cross-shaped stud). These tacks are usually placed along the perimeter of the coffin lid or on the sides of the coffin itself. If inclusion of decorative hardware reflects on the wealth or standing of the families of the individuals interred, then members of the same family may have been buried with similar embellishment. Because family members were often buried near one another in historical-period cemeteries, examination of the geographic distribution of decorative hardware should prove useful. In most cases in the Alameda-Stone cemetery, decorative hardware was found on the burial containers of adults and was not associated with a particular cultural, religious or biological affinity.

No pieces of decorative hardware were recorded in Cemetery Area 4. In Areas 1 and 2, two graves with decorative hardware were adjacent to one another, and although both contained decorative hardware, the types of hardware style were not the same. In another instance, two graves shared proximity as well as several decorative hardware types. These latter two graves may have held more recent interments, were contemporaneous, and/or were the burial locations for two prominent citizens. Although there is not sufficient evidence to positively identify these remains, Heilen and Hall (see Chapter 4, Volume 2 of this series) suggest the two latter grave pits spatially correlated to the graves of Hospital Steward Charles Knaeble and Corporal John Lyons, both of whom died after the arrival of the transcontinental railroad in Tucson. A wider range of goods and services would have been available by this date and may explain the evidence of professional undertaking and ornate coffin treatments.

Exterior Burial-Container Treatments

At least 165 burial containers were painted on their exterior surfaces. Colors included green, blue, white, black, yellow, pink, red, and gray. Decorative paint patterns were found on one burial container that was painted green, and then embellished with yellow swirl patterns. On the lid of another container was a painted green floral/leaf pattern. Finally, one burial container had a footboard with a painted

Figure 97. Coffin handle types from the Alameda-Stone cemetery.

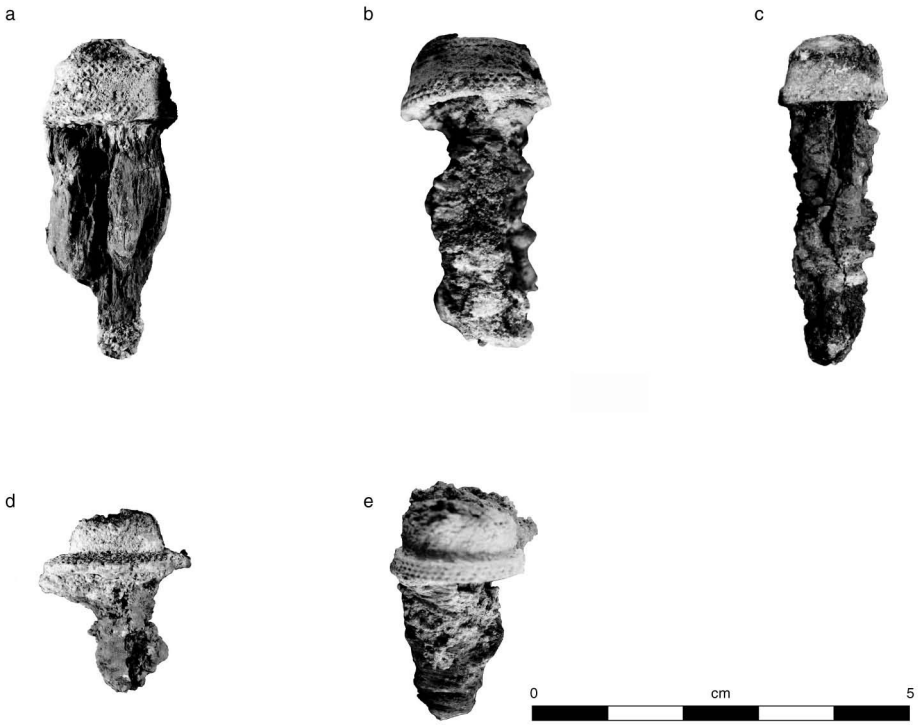


Figure 98. Coffin screw types from the Alameda-Stone cemetery.

green cross. All three of these decorated coffins contained fetal or infant remains.

There were approximately 219 burial containers in the cemetery that showed evidence of having been covered with cloth. Usually, the evidence consisted of fabric impressions on the heads of nails or on the surfaces of other metal hardware. In 60 cases, both paint and fabric were present. Green was the most common paint, appearing with fabric in 39 cases. There were also 4 blue, 5 white, 2 black, 5 blue/green combinations, 1 green/yellow combination, 1 green/pink/blue combination, and 2 green/blue/yellow combinations. In all instances, the paint was likely applied to the outer surface of the fabric.

Interior Burial-Container Treatments

Interior burial-container treatments included evidence of pillows, linings, and painting. Some form of lining tacks was recovered from approximately 510 burials. Five types of tacks were found within the cemetery: silk-head lining tacks, appearing in 28 burials; domed-head ferrous tacks, found in 21 burials; flat-head ferrous tacks, recovered in 456 burials; flat-head brass tacks, included in 7 burials; and decorative, French nails/upholstery tacks found in 1 burial.

The presence but relative paucity of decorative coffin hardware and treatments likely represents two separate things: (1) limited access to manufactured goods throughout most of the use of the cemetery, and (2) the beginnings of Euroamerican influence toward the end of the cemetery's period of use.

Clothing and Adornment

Viewing the Alameda-Stone cemetery strictly through the lens of the Victorian Beautification of Death movement is not sufficient. Such a lens does not incorporate the deeply rooted traditions of the Mexican community and Native American tribes that have been in the Southwest for millennia. The cemetery in Tucson represents a transition and a place of cultural intersection—from long-held traditions to a European-influenced practice of death and burial. There were a few examples of this influence in the cemetery: monuments erected in the southern half of the cemetery near the military section, several burials with mass-produced coffin hardware, and the dead buried in street clothes more often than burial shrouds. Despite this, the cemetery largely exhibited traditions in keeping with traditional Hispanic death practices. With the arrival of the railroad in 1880, the population reflected an increased

Euroamerican influence and they had access to a wider range of goods and services,—an economic diversity that arrived too late to have much impact on the predominantly Hispanic cemetery.

Because they are objects of personal adornment, buttons, buckles, hooks and eyes help to inform the archaeologist (Beaudry 2006). These items provide an opportunity to examine—among other topics—mortuary practices, eschatology, folklore, kinship groups, and socioeconomics. These objects also correlate strongly with sex and inform on gender roles.

In general, artifacts of personal adornment—apart from clothing fasteners—were more likely to be located in Cemetery Areas 3 and 4 than in any other area of the cemetery. These items were more often associated with the many women and children interred in the northern half of the cemetery (i.e., Cemetery Areas 3, 4, and 5), than compared to the southern half that consisted primarily of adult males. Clothing fasteners were distributed throughout the cemetery, although there were noteworthy differences between types of clothing fasteners and age and sex. Decorated Prosser buttons (e.g., painted, transfer-printed, or molded) and engraved shell buttons were more frequent in Cemetery Areas 3 and 4. Molded Prosser buttons and engraved shell buttons were more common among adult males than adult females. Transfer-printed buttons, glass-shank buttons, and hook-and-eye fasteners were more popular among adult females. Military buttons, riveted studs, coat buttons, and cinch buckles were more commonly recovered with adult males. As a group, juveniles were interred with more painted Prosser buttons, gaiters, and hook-and-eye fasteners than adults. Footwear was also more common among juveniles. Among adults, females were more likely to be interred with shoes. Footwear was most common in Cemetery Area 3.

Clothing Fasteners

Clothing fasteners are often, with a few exceptions, gender-specific. As expected, clothing fasteners were the most commonly found artifact type in the cemetery. There were 6,000 buttons, by far the most popular form of fastener.

Straight Pins and Burial Shrouds

For the 20 percent of the graves that held individuals interred without a coffin, straight pins may indicate burial shrouding (Figure 99). Shrouding was a practice in which the deceased was washed and bound in cloth. The individual was bound tightly in a winding sheet, loosely in a burial robe, or simply covered with a sheet. Apart from the presence of straight pins, there was little evidence to confirm that burial shrouding was used in the Alameda-Stone cemetery. Nonetheless, the practice of using shrouds was fairly common in contemporary funeral ceremonies (Bell 1987; Coffin 1976; Crissman 1994; Litten 1991; Puckle 1926; Richardson 2000; Will de Chaparro 2007).

Buttons

Prosser porcelain sew-through buttons were the most common form of button recovered. Most of the Prosser buttons in the cemetery were an undecorated, white, dish-shaped, sew-through variety. In addition to undecorated Prosser buttons, there were many printed calico Prosser styles. These buttons were usually associated with the torso of individuals and were likely used for fastening underwear, shirts, or dresses.

Although less common than Prosser buttons, shell sew-through buttons were another common button type in the cemetery. Shell buttons, or "pearl" as they are sometimes called, were not mass produced domestically until late in the nineteenth century, and they were relatively expensive compared to Prossers (Claassen 1994:6–7, 66–69). The shell buttons recovered were usually not decorated and were associated with the upper torso and pelvic region of individuals. These plain buttons were used to fasten underwear, shirts, or dresses. In addition to the plain, undecorated shell variety, there were 120 engraved shell buttons (Figure 100). These buttons were unique and appear to have been carved by hand, often with stylized idiosyncratic patterns such as sunbursts, loops, circles, and, in one case, the Star of David (see Figure 57). Engraved shell buttons were associated with adult males and children. Of the males in the cemetery, 10 percent had these individualized or personalized buttons.

Undecorated Prosser porcelain and shell buttons were ubiquitous and gender-neutral in their cemetery distribution. However, decorated buttons, designed to complement calico-print dress fabrics, were associated with both sexes. These buttons were present with 5 percent of the cemetery population. There were 39 children associated with calicos or otherwise decorated buttons. Of the adult males, 6 percent had decorated Prossers. Of the adult females, decorated Prossers were with 5 percent of the individuals.

Bone buttons were also recovered in significant numbers. Bone buttons were usually large, sew-through, irregularly shaped, concave discs found in the pelvic region of the individual (Figure 101). These buttons were generally used to fasten underwear or trousers. Bone buttons for underwear and pants were associated with children and adults. About 15 percent of the cemetery population was associated with bone buttons, but of the males in the cemetery, over 30 percent used this fastener type. Fewer than 5 percent of the females used them.

Metal sew-through buttons were also recovered. These small metal discs were usually made from brass, iron, or both. Pants buttons were often recovered from near the waist or pelvic region and were used for fastening trouser

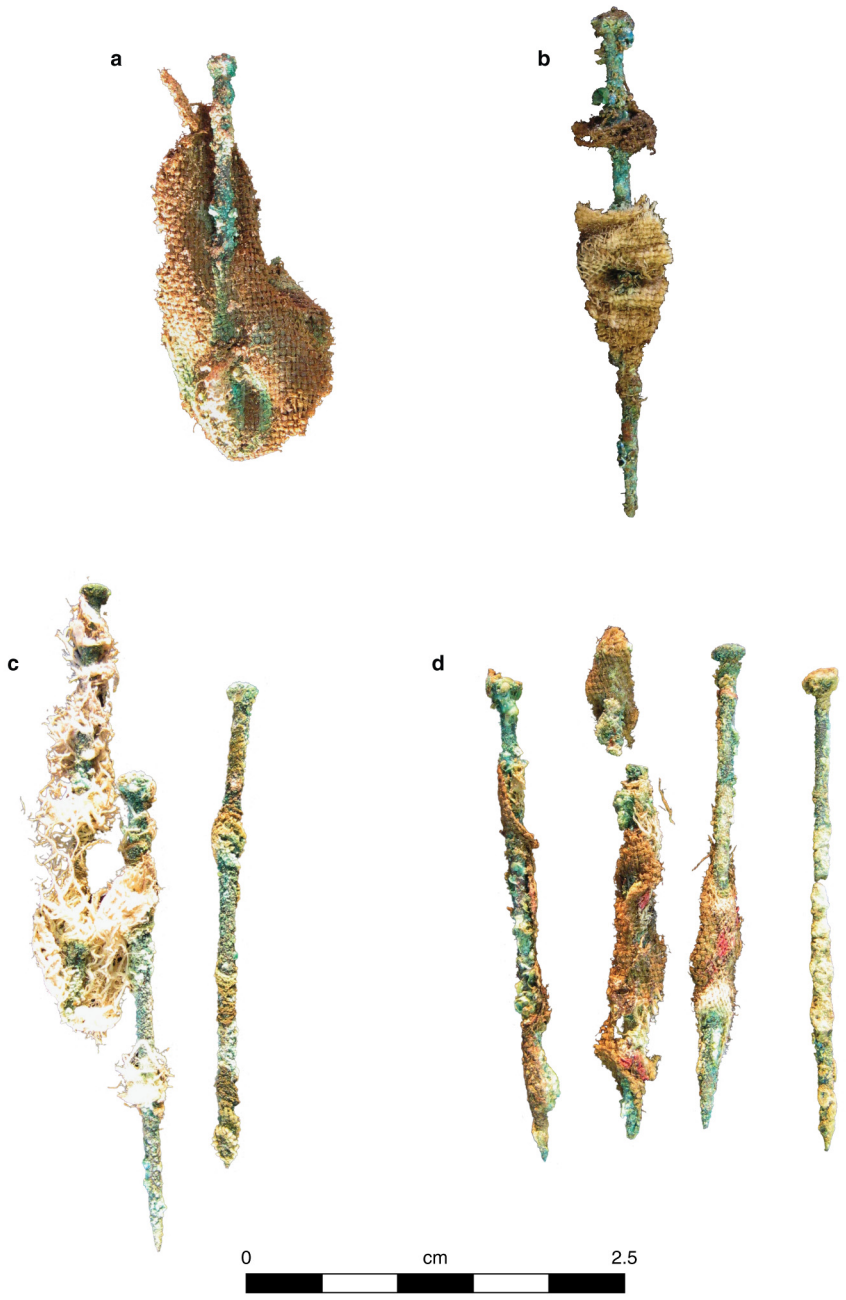


Figure 99. Straight pins with small fragments of fabric from burials with possible shrouding from the Alameda-Stone cemetery.

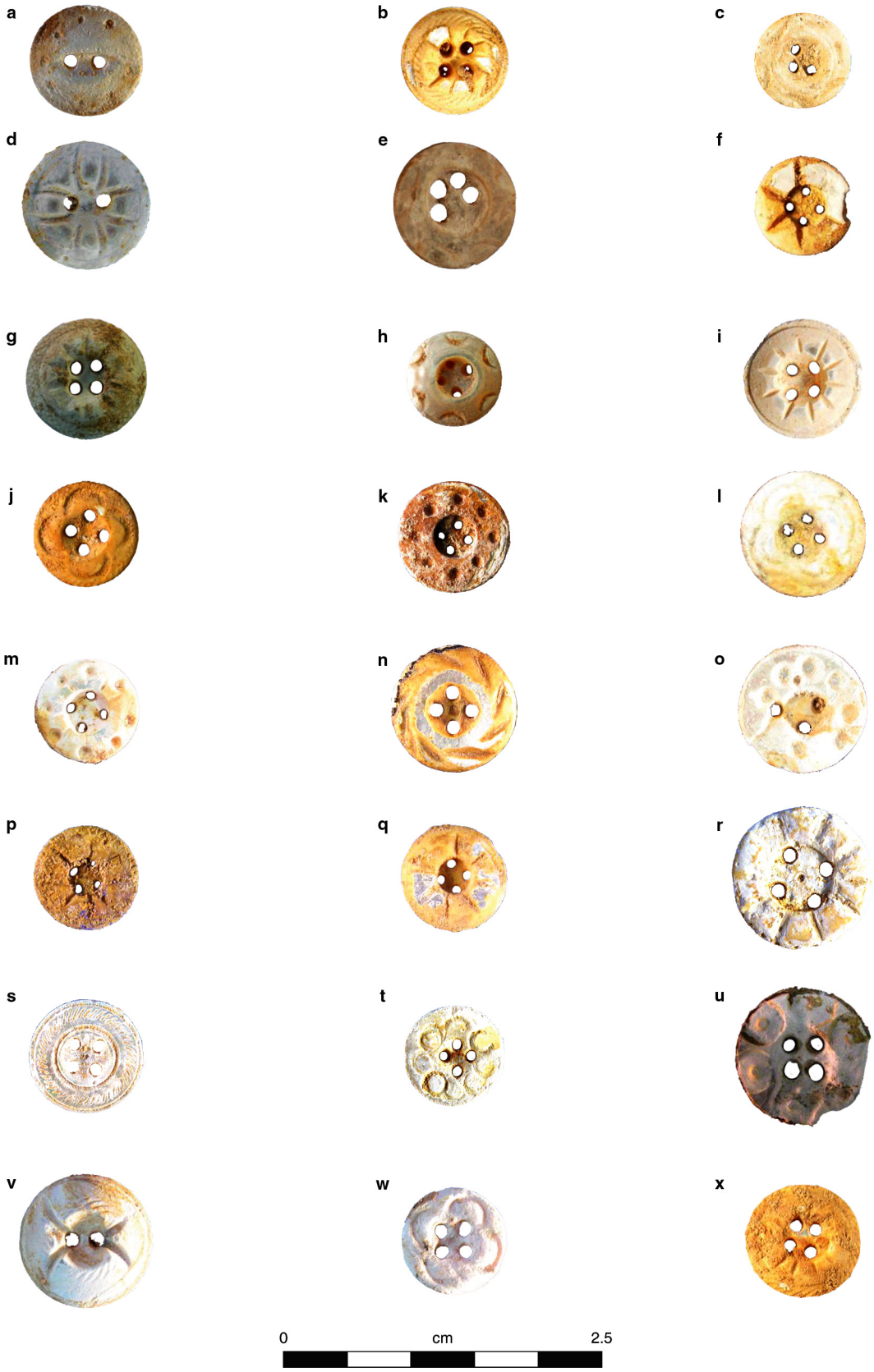


Figure 100. Examples of engraved shell buttons from the Alameda-Stone cemetery.

Figure 101. Bone buttons from the Alameda-Stone cemetery.

fly-closures or suspenders. Metal-riveted studs were another type of pants fastener recovered from the cemetery. These fasteners consisted of a button and post that snapped together through cloth. Around 30 percent of the cemetery population used pants buttons, including over half of the males and about 5 percent of the females.

Cloth buttons were relatively rare; they were usually made of a central core of iron or composite material covered by an outer fabric fastened with a shank at the back. These buttons were most often found in the cemetery at mid-torso and used for fastening coats or jackets.

Like cloth buttons, uniform coat buttons were usually recovered near the torso, although in some cases, smaller versions were associated with the wrists of the individual, presumably at the cuff of the jacket. Uniform buttons at the cemetery were brass with a large federal eagle bearing a shield, arrows, and olive branches. The shields were often obscured by corrosion but when observable, the shields bore the letters I, C, D, or A for officers in the Infantry, Cavalry, Dragoon, or Artillery Corps, respectively. Most common, however, was the striped federal shield for general servicemen. Military uniform buttons were only found with males, although, surprisingly, two infants were also buried with military buttons (see Figure 12).

Used primarily by men, about 5 percent of the cemetery population had coat buttons. Of those, fewer than 1 percent were associated with females.

Other Fasteners

Cinch buckles were among the two most common nonbutton types of clothing fasteners (Figure 102). These simple devices were designed to slide along a strap of fabric such that the teeth on the fastener would catch on the fabric to hold it in place. Buckles, usually recovered beneath the remains at the lower back, are associated with vests and pants. Cinch buckles were associated with just under 15 percent of the adults in the cemetery. Of the males, 25 percent had cinch buckles. Of the females, 10 percent had this type of pants or vest buckle.

Hook-and-eye fasteners represent the other common type of nonbutton clothing fastener. Hooks and eyes at the cemetery were constructed of brass wire looped around to form an eyelet and a hook that could be sewn into opposite sides of a garment and hooked together for closure. These were often recovered as a single fastener at the throat of the individual or in a line of multiple hooks and eyes down the front of the chest or down the back. Hook-and-eye fasteners are associated with dresses or blouses, and they were the only clothing fastener that had a clear association with females. Around 15 percent of the cemetery population had these fasteners, but over 30 percent of the females in the cemetery were associated with hooks and eyes. Less than 5 percent of the male population had such fasteners.

Many clothing fasteners and their associations were likely a result of conservative reuse in an isolated community where such items were hard to come by and highly valued.

Clothing Fasteners and Gender Roles

Women of the Southwest, despite otherwise strict traditional dress codes, had some flexibility in their choice of clothing. There were two adult females buried with numerous pants buttons and cinch buckles. In addition to these

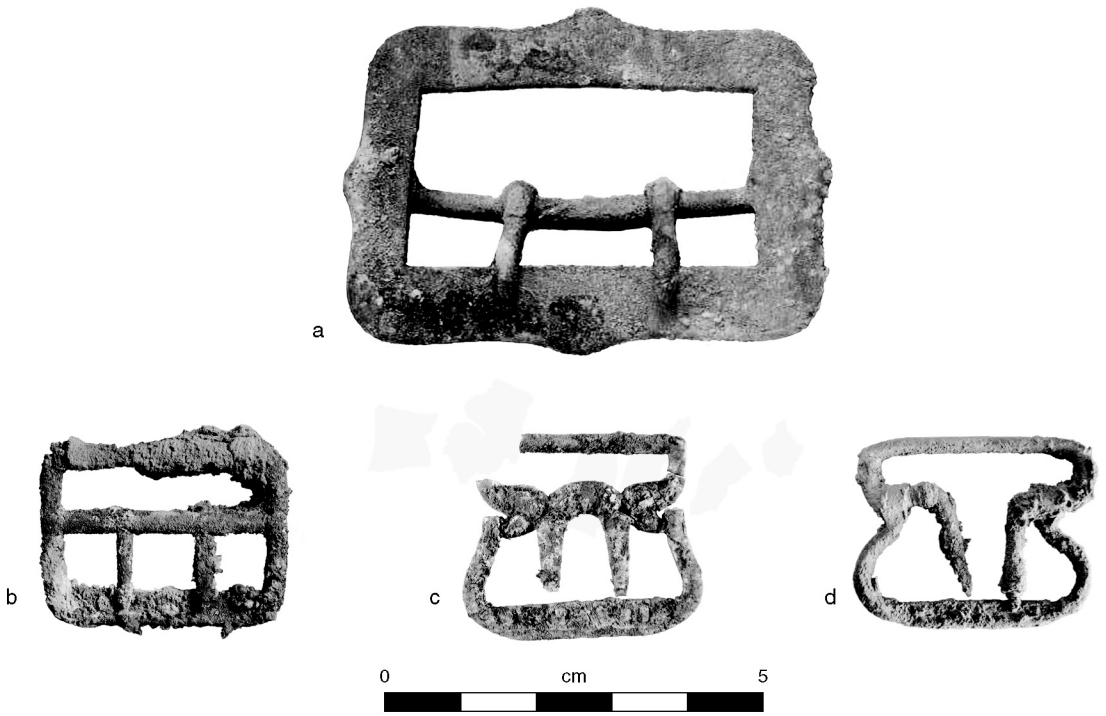


Figure 102. Examples of cinch buckles from the Alameda-Stone cemetery.

two females, one older adult female was buried wearing work boots typically marketed to men (see Figure 5). There are well-documented cases of pioneer women living their lives as men.

Identifying gender-specific uses of clothing fasteners can lend insight into women's changing social roles and the demands of the frontier Southwest. Many of the older children were buried with gender-specific clothing fasteners. However, because they had not yet reached puberty and did not display sexual dimorphism, we were unable to establish sex for these individuals. By using just two different gender-specific fasteners—hook-and-eye fasteners and pant buttons—we established gender for many of the individuals of indeterminate sex (Figures 103 and 104). If we use gender as a placeholder for sex for this group in the cemetery, we can compare age and gender to reported demographics in historical mortality records and osteological congenital trait analysis to better identify site chronology and establish family groups. The next step in analysis is to use what is known about these objects of personal adornment to predict gender for some of the indeterminate individuals in the cemetery.

European women did not accompany Spanish conquistadores on their early forays into the region; European women came to the area but in relatively small numbers and later in time (although certainly within the time of the cemetery use). The role of these women in the region was significant even if their numbers were not great. As Guy and Sheridan (1998:13–14) note, many European women helped mark Spanish families as elites; they transmitted European culture (especially to native women who served as domestics in their houses); and they introduced European grains, fruits, and vegetables (Martín 1983). Spanish women also occasionally married native men—some because they were taken prisoner and chose to live with the Indians. Even though the frontier has been seen as being predominantly "male," wealth transmission required females. "[M]ale relationships with women became important indicators of both class power and racial formation because they affected the class status and racial identity of their children" (Guy and Sheridan 1998:14).

Shoes

Shoes in cemetery contexts may have multiple meanings. Economics is the obvious explanation for the overwhelming absence of shoes in the cemetery, but the exclusion of shoes with burials may have eschatological meanings as well. In his discussions of the Eddy and Becky Wright cemeteries in Arkansas and the interments at Freedman's Cemetery in Dallas, Davidson (2004) suggested that shoes may have been included in those burials because shoes may have provided a magical element to the wearer as he or she began a new journey. A similar custom has been observed in Oaxacan funeral rites. Men were shod in sandals made

Figure 103. Examples of hook-and-eye fasteners from the Alameda-Stone cemetery.

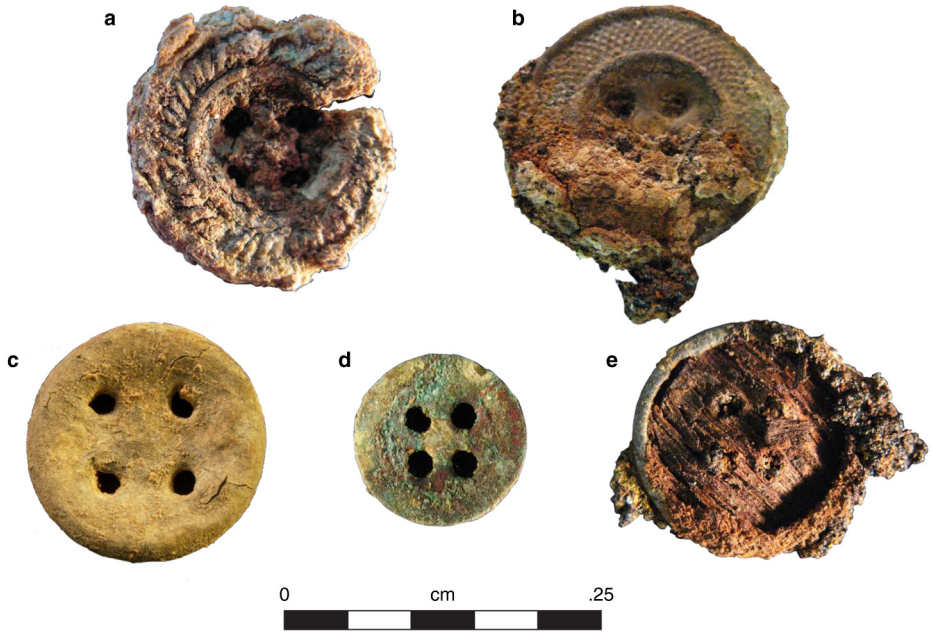


Figure 104. Examples of metal sew-through pants buttons from the Alameda-Stone cemetery.

especially for the journey of the dead on the rocky road to paradise (Toor 1985).

Evidence for shoes was relatively rare among the Tucson interments, with about 5 percent of the cemetery population buried with artifacts associated with some kind of footwear (see Appendix G) (Figure 105). There were 58 individuals buried with footwear. These graves were located in all five areas of the cemetery, but evidence for shoes was most common in Cemetery Area 3, where over 6 percent of individuals were interred with shoes. By contrast, around 3.5–4 percent of individuals in Areas 1, 2, and 4 were buried with shoes, and only 1 percent of individuals in Area 5 were interred with shoes.

Footwear at the cemetery was categorized into nine different types. Juveniles were buried in lace-up booties, lace-up ankle boots, or lace-up ankle boots with brass toe covers (Figure 106). There were 9 infants or children aged from 6 months to 2.6 years presumably buried in booties constructed of an indeterminate textile material. These booties were represented by small amounts of textile, aglets, and a few eyelets near the feet of each individual. All of these individuals were located in Cemetery Areas 3 or 4. In Cemetery Areas 2 and 3, there were 18 infants or children aged from 6 months to 7 years buried in lace-up leather boots. The third type of children's shoe was a lace-up ankle boot with brass toe covers. There were 8 infants or children aged from 6 months to 7 years buried in this type of shoe; these individuals were buried in Cemetery Areas 3, 4, and 5.

Adults were buried in six different types of footwear: lace-up booties, lace-up ankle boots, ladies' boots, pull-up work boots, riding boots, and men's buckle shoes. There were 2 adults buried in lace-up booties, both in Cemetery Area 3. Like the booties recovered with children, these booties may have been a simple foot covering used for sleeping, or made specifically for burial. There were 14 adults buried with lace-up ankle boots. These individuals were buried in all cemetery areas except Area 2. Three adults were buried in ladies' boots. These boots had adornments such as decorative buckles, buttons, or silk lining. These 3 individuals were located in Cemetery Areas 3 and 4. In 1 adult burial in Cemetery Area 1, the individual was buried in pull-on work boots. One adult buried in Cemetery Area 2 was in riding boots. The final type of adult footwear was a single shoe or bootie with a buckle fastener. This shoe was found with an adult male in Cemetery Area 1 (the military section), recovered from a grave that had been partially exhumed, presumably during the 1884 removals conducted by the U.S. Army.

There were 13 females and 8 males buried with footwear. The remaining 36 individuals with footwear were juveniles of indeterminate sex. Footwear distribution by sex suggests that proportionally, adult females were buried with footwear more often than adult males, but interpretation of this apparent pattern is complicated by the small sample of sexed adults with footwear. Six percent of the adult female population was buried with footwear compared to 2.5 percent of the adult male population. Four percent of all adults were buried in shoes. Despite their seemingly high numbers, only 5.4 percent of juveniles were buried with footwear.

Five Euroamerican individuals were buried with footwear. Footwear types buried with Euroamericans included riding boots, ladies' boots, and children's lace-up boots with copper toe covers. Thirteen Hispanic individuals were buried with footwear that included lace-up booties, ladies' boots, pull-up work boots, and lace-up boots for adults and children. One adult male of Native American ancestry was identified with lace-up boots.

Not all footwear was located on individuals' feet. There were three burials in which the footwear was loose at the foot end of the coffin. In one case, the grave held a small child whose shoes were not fitted to its feet; the boots were placed between the legs in the lower half of the coffin. In another burial, the footwear was also placed between the legs of the individual, in this case, a young adult male. One shoe was placed between the legs and the other shoe was placed over the right leg. A final grave held a small child with the left boot near the left foot and the right boot positioned under the left knee. These examples may have simply reflected difficulty in preparing the deceased.

Religious and Ceremonial Artifacts

Religious or ceremonial artifacts recovered from graves in the Tucson cemetery clearly signify some of the influence that Catholicism had on the population. Items such as jewelry included crosses, crucifixes, medallions, beads, and other elements of fragmented rosaries, as well as wire from floral funerary crowns. More than 225 graves held at least one religious object.

There were 42 crosses, 21 crucifixes, and approximately 70 medallions and other religious objects located in 112 graves; this represents approximately 10 percent of all graves. The most common cross was a simple style, of which there were 31 variations, averaging 1.1 inch in length by 0.7 inches in width. There were also three wooden crosses with a stamped-metal Christ figure attached (Figure 107).

Nine medallions had discernable motifs depicting saints, including five variations of the Virgin Mary, one St. Catherine Laboure, one Virgin of Guadalupe, and two French Catholic Sacred Heart medallions (see Figure 9). The discovery of French motifs is consistent with the cultural backgrounds of religious specialists working for the Tucson Diocese during the period the cemetery was in use (O'Mack 2005, 2006). Rosary beads were constructed of a variety of materials and shapes.

Figure 105. Shoe parts from the Alameda-Stone cemetery.

Figure 106. Child's copper-toe-covered boot from Individual P, Grave Pit 7698, a child of indeterminate sex and Euroamerican cultural affinity.

One brass reliquary pendant holding a distal finger bone was recovered (Figure 108). The inside cover of the reliquary had a cross engraved on it. There was a small amount of fine fabric impressed on the front, a bail for the chain, and a hinge on the right side of the pendant. One small, solitary shell button engraved with a Star of David was located at the collar area of an older adult male with multiple cultural affinities buried in Cemetery Area 3. Along with the button was a rosary at the feet. The engraved button may have been a gesture of clandestine faith, a cryptic symbol of kinship, or even a coincidence. However, the individual was buried alone and separated from others in Cemetery Area 3; one possible scenario is that he was Jewish, but died alone while traveling/working in the area and the church buried him as a kindness. The engraved button was not notable unless examined closely, and the individuals burying him may not have seen any particular relevance to the star. Although there is no question that a rosary was in the grave, unlike a number of the other rosaries, it appears to have been tossed at the feet, not placed on the individual. Sheridan (1995:106–107) discusses early Jewish entrepreneurs who came to the area from German-speaking Europe.

Religious objects were found in Cemetery Areas 2, 3, 4, and 5 but more than 95 percent of such items were located in Cemetery Areas 3 and 4. There were only two religious artifacts recovered in Cemetery Area 2—one was a cross found with an adult female in a grave just south of Cemetery Area 3, and the other was an adult male buried in a coffin decorated with cruciform coffin hardware. Catholicism was more frequently represented in the cemetery than any other religious affinity. Adults were more likely to be buried with rosaries, whereas children were more likely to be buried with traditionally Catholic floral crowns. Additionally, all of the funerary-related bottles were located in Cemetery Area 3. These may have held holy water and been used in the funeral ceremonies for each of the three infants with which they were found. Frames, which in some cases may have held religious images, were also confined to the northern portion of the cemetery.

Figure 107. Examples of crosses from the Alameda-Stone cemetery.

Figure 108. The reliquary locket from Individual P, Grave Pit 7528, a subadult of indeterminate sex and Euroamerican cultural affinity.

Floral Crowns

Half of the artifacts that can be associated with a religious affinity consisted of wire fragments, likely associated with floral crowns. Floral crowns, made of wire wrapped with paper or ribbon and adorned with paper or fabric flowers, were recovered with 104 of the cemetery's juveniles.

Straight pins were a common artifact recovered from the cemetery, and in many cases they likely secured floral crowns to the hair of the deceased. As a part of this tradition, coffins were elaborately decorated with flowers. More than half of all straight pins were recovered with infants and were often found around the perimeter of the coffin and in the coffin fill. These pins likely represented the remnants of funeral decorations. The decorations were often used as an expression of celebration for the passage of an innocent child to heaven. The tradition is still integral to Mexican celebrations of death today (Marino 1997:37–38).

Five adult females were buried with fetuses. In each of these cases, the burial contains an adult female of childbearing age and a fetus positioned between the female's legs. All but one fetus had associated artifacts, including straight pins and fragments of wire from floral arrangements. Will de Chaparro (2007) examines this practice in *Death and Dying in New Mexico* and notes that the burial of a fetus with its mother represents a Spanish tradition dating to the late 1700s in North America, in which a postmortem caesarean was performed on the mother so that the fetus could be baptized to secure it a place in heaven (Will De Chaparro 2007).

The wire fragments at the heads of fetuses were most likely the remnants of floral crowns, which usually consisted of a wire frame adorned with paper or fabric flowers. Such crowns were recovered from 25 percent of the cemetery's children. A Catholic tradition practiced by Hispanics and some Native American tribes, the bodies of children were dressed in clothes to resemble angels with wreaths of real or imitation flowers; they were referred to as *los angelitos* (Marino 1997; Toor 1985; Will de Chaparro 2007). Spicer (1976:255) described a similar practice for Yaqui-Catholic burials in which the "child is decked with many-colored paper-flowers . . . a crown is made of them and placed on the head." In the case of the Yaquis, the tradition also included unmarried adults.

Jewelry

Twenty-nine individuals were interred with jewelry. For the purposes of this report, jewelry includes earrings, lockets, pendants, necklace fragments, pins, brooches, and rings (Figure 109). All of the jewelry was unique; no identical items of jewelry were found in more than one burial or grave feature. Jewelry was found in all five cemetery areas with 2–4 percent of the burials in any area. More types of jewelry and a larger proportion of jewelry artifacts were found in Areas 3 and 4, but this is likely because of the larger sample of burials in these two cemetery areas. Only rings and a locket were found in Areas 1 and 2, whereas, in addition to rings, jewelry in Areas 3 and 4 included earrings, necklaces, pins, a buckle, a pendant, and a jewelry setting. Only a necklace and a ring were found in Area 5 burials. Females were interred with jewelry more often than males, and juveniles were interred with jewelry slightly more often than adults. Jewelry seems to have been reserved for females and juveniles. Rings were the only jewelry type recovered only with adults. Earrings were more prevalent among children; only one adult individual was interred with an earring.

Other Items

Coins and tokens—those that were unambiguously included in burials—were found in Cemetery Area 2 (see

Figure 109. Examples of the jewelry from the Alameda-Stone cemetery.

Figure 2). Two individuals were interred with coins over their eyes, and one individual was buried with a poker chip in what was presumably his back pocket. Other individuals with coins were located in Cemetery Area 3, but the coins recovered from these burials cannot be directly associated with funerary activities. Ammunition was located in adult male or juvenile graves exclusively, and ammunition was located in all areas but Area 5. The three males with bullets recovered from their remains were found in Areas 2 and 3—two of them in Cemetery Area 3. This is consistent with osteological analyses showing that most of the 18 trauma cases involving weapons were recovered from the northern half of the cemetery, but it barely supports romantic tales of the wild west or Tucson's legendary violent past.

The distribution of ammunition in the cemetery was interesting (Figure 110). Only a few burials had an ammunition artifact likely associated with a gunshot wound (see Chapter 7). In a large proportion of cases, ammunition artifacts were intrusive and not likely associated with any trauma to an interred individual. The few associations of individuals with fired ammunition artifacts seems to contradict historical descriptions of Tucson as a town overwhelmed with gun violence, although it is possible that projectiles were removed from affected individuals prior to death or burial as a result of medical procedures.

In conclusion, artifacts associated with personal adornment, apparel, religious objects, and other personal artifacts found in burial contexts were relatively abundant and diverse. The specific meaning or function of many artifacts was often difficult to determine, but variation in multiple artifact types according to demography and spatial location suggest that further analyses of artifact distributions—including analysis of covariation in multiple artifact types and feature characteristics—could contribute to a deeper understanding of cemetery organization. Burial-associated artifacts found with individuals, in combination with other evidence, should also provide a basis for understanding social and religious variation in mortuary practices as implemented in this and other cemeteries of the period, particularly those associated with Hispanic Catholic religious traditions.

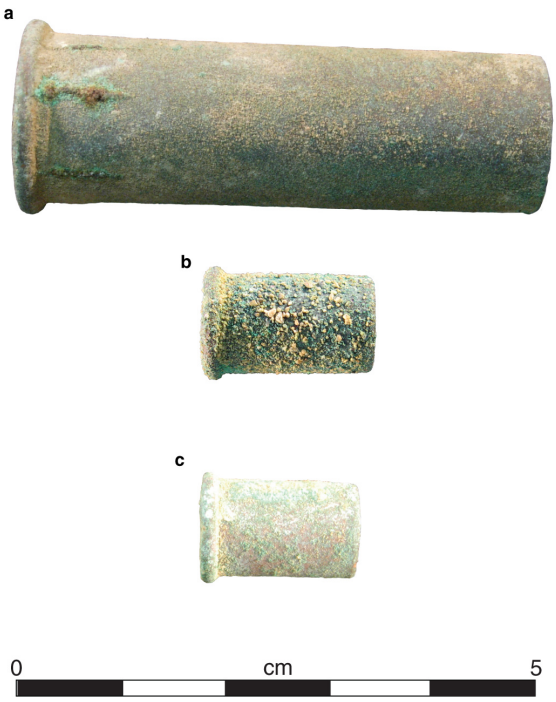


Figure 110. Examples of shell casings from the Alameda-Stone cemetery.

The Military Section of the Cemetery

On July 17, 1862, President Lincoln signed the National Cemetery Act, which established 14 national cemeteries to be used ". . . for the soldiers who shall die in the service of the country." Among these was Arlington National Cemetery, on the grounds of the confiscated estate of Confederate General Robert E. Lee. After the war, additional cemeteries were added to the national system and the military spent considerable money and effort to relocate soldiers from battlefield graves to national cemeteries (Steere 1953).

Efforts to consolidate deceased soldiers occurred in the West during the late nineteenth century. Small frontier military posts established cemeteries as needed, and when posts were decommissioned, the burials were typically exhumed and moved to an established national cemetery.

The U.S. Army formally established Camp Lowell a few blocks southeast of the old Tucson presidio in 1866, although there had been a permanent U.S. Army presence in Tucson since 1862. In 1873, Camp Lowell was moved 7 miles northeast, well beyond settled Tucson, and the post was expanded and renamed Fort Lowell in 1876.

The earliest documented use of the military portion of the Alameda-Stone cemetery was in 1862. The military cemetery was located in an area already used for burials by Tucson residents (O'Mack 2006:25). A wall was built around the military plot in 1868 or 1869, and a small segment of this wall may have been identified during Statistical Research's excavations (Hall et al. 2008). The cemetery continued to be used after Camp Lowell moved out of town, and the final military interment took place in January 1881. By that time, the city already had plans to move the cemetery, so the Army established a new cemetery at Fort Lowell later that year.

By 1884, the city of Tucson planned to subdivide and sell lots in the cemetery parcel, and in June of that year

the Army relocated the military graves. The exhumation of 74 individuals took place under the direction of a Tucson physician contracted by the U.S. Army (O'Mack 2005:37). According to official records, there were 93 graves in the military cemetery, and 65 burials were reinterred at Fort Lowell. The discrepancy between these numbers may be explained by the exhumation of some burials by friends and family prior to the Army's effort (see Chapter 4, Volume 2 of this series; O'Mack 2006:23).

Excavations in the project area revealed that most of the graves in the military section had been exhumed. Of the 64 graves identified in the project area, only 4 contained intact burials, and 2 of these were subadults. Such cemeteries often included nonmilitary personnel, children, and honored citizens. Seven graves produced no human remains. The other 53 graves contained a smattering of skeletal elements. Those graves showed a range of characteristics similar to that in other parts of the cemetery in terms of coffin shape and hardware, as well as mortuary treatment and the relative lack of personal items. Twenty-one of the burials produced buttons from military uniforms (including General Service, Cavalry, and Dragoon), and over half contained other types of buttons or clothing fasteners. Two individuals wore finger rings, and one man was buried with a heart-shaped locket pendant. Other recovered items included a brass coin, a pipe fragment, and wire that likely secured floral arrangements.

A map of the Camp Lowell plot drawn in 1881 closely matches the archaeological map of this portion of the cemetery (see Figure 64). Discrepancies in the maps may have resulted from the fact that the military map was hand drawn based on surface manifestations at the time, some graves were likely not distinct or well marked, and some graves were found in disturbed areas. There were a few grave pits excavated in the military section that do not appear on the historical map; these could postdate the 1881 map or perhaps were not observable on the surface in 1881 (see Chapter 4, Volume 2 of this series).

There were problems in a few instances in the lack of concordance between biological profiles of skeletal remains from some of the graves and the historical record of the individual supposedly interred there (Heilen et al. 2008). These discrepancies were not surprising in a cemetery from which people had been moved or reburied; someone excavating one individual could easily commingle remains and artifacts from another that was also being excavated. Overall, however, there were few discrepancies and these were not wildly inaccurate, but it was decided not to establish or argue for positive identifications for any of the military graves, even though in many cases the archaeological, historical, and biological data were concordant. The level of proof for the military is different and sometimes exceeds the level required for an archaeological interpretation. As discussed in Chapter 11, all remains were reburied in 2009 in a special section of the current military cemetery in Sierra Vista, Arizona.

Fort Craig near Socorro, New Mexico, serves as a useful comparison. The fort was established on the west side of the Rio Grande in 1854. Troops from Fort Craig took part in the Battle of Valverde, the first of two Civil War skirmishes that occurred in New Mexico. A total of 111 soldiers was killed during the battle or died in the ensuing days (Taylor 1995), and these casualties represent almost half of the burials in the Fort Craig cemetery. Like the cemetery at Camp Lowell, the cemetery at Fort Craig was delimited with a wall in 1868. Troops from Fort Craig were involved in a number of battles with Apache groups, resulting in further additions to the cemetery.

One pattern at both Fort Craig and the military portion of the Alameda-Stone cemetery was the presence of skeletal elements left behind in graves that had been exhumed by the military. Nearly all graves contained at least a few elements, and some produced significant portions of an individual. The most common elements were small bones of the hands and feet, along with bones such as the hyoid, patella, coccygeal vertebra, and the twelfth rib. These particular elements are ones that might not be recognized by someone unfamiliar with human anatomy, and they could be overlooked during the task of disinterment. More surprising was the not-infrequent presence of larger bones such as scapulae, central ribs, portions of the pelvis, and even long bones, usually the fibula or lower arm bones (Spurr et al. 2009).

How much of a human skeleton is needed to certify that a burial was properly exhumed? In no cases were there crania in the exhumed graves, and only one femur was found. Those bones are universally recognized and identified as human and unlikely to be left behind. The Camp Lowell exhumations were contracted to a local physician, who undoubtedly hired laborers to assist him. In the case of both cemeteries, low-level military personnel and/or local contractors likely carried out most of the removals, and in neither case would the individuals have a personal or vested interest in the burials. This surely contributed to recovery rates. A total of seven graves in the military section of the Alameda-Stone cemetery contained no skeletal remains, perhaps suggesting exhumation by family or friends, who may have been more careful and thorough (Spurr et al. 2009).

It is clear that many graves of soldiers have been moved, often more than once. This pattern of several moves began with the effort to recover Union soldiers killed in the Civil War, so that they could eventually be relocated to the new national cemeteries. Later, the Army developed a mandate to rebury every Union soldier in a permanent resting place, which was often a newly established national cemetery in another location. This policy of providing a proper, permanent resting place to all soldiers continues today (Faust 2008).

Children in the Cemetery: Special Areas and Specific Artifacts?

It is not uncommon for cemetery populations, dating to any era, to include nearly 50 percent children, and this cemetery

was no exception. However, there was one area of the cemetery where children were far more prevalent than adults. At the southernmost portion of what has been designated Cemetery Area 3, there was a large area with many children and few to no adults. This pattern continued in fairly straight rows towards the northern portion of Cemetery Area 3.

In reviewing the final demographics for the site, approximately 52 percent of the total cemetery population could be identified as belonging to fetal, infant, child, and subadult age groups, with infant and child age groups representing the largest numbers. Within the five cemetery areas, the largest numbers of individuals were located in Cemetery Areas 3 and 4. Even though Cemetery Area 4 held a dense concentration of individuals, 54 percent were juveniles, and this is generally consistent with the overall site demographics. Cemetery Area 3, however, included 59 percent juveniles with a significantly higher number of infant and child burials. Moreover, 63 percent of individuals buried in the eastern half of Cemetery Area 3 were juvenile, and only 52 percent in the western half of Cemetery Area 3 were juvenile.

As discussed in Chapter 7, multiple epidemics occurred in Tucson while the cemetery was open, including a small pox epidemic in 1870 that killed more than 100 Tucson residents, most of them Mexican American children. The victims of this and other epidemics may have been buried in the eastern half of Area 3. In addition to having the largest percentage of juvenile burials, more than half of the juveniles exhibited some form of pathology, including developmental defect, trauma, or unknown etiology.

Most of the deaths listed in the 1870 Federal Mortality Schedule took place during the months of February, March, and April. This is supported by the Catholic Diocese records, which show a spike in numbers for these months in 1870. Aside from smallpox, winter has traditionally been a time of year when people are susceptible to colds and flu, and those with immature or compromised immune systems are at even greater risk. This usually means infants, young children, and older adults are most likely to succumb to illness.

Although it is impossible to prove that the children listed in the 1870 Federal Mortality Schedule were buried in the eastern portion of Area 3, the evidence is suggestive. Most of these juveniles were concentrated within four consecutive rows that began with the western boundary of the eastern portion of Area 3 (see Chapter 4, Volume 2 of this series). The multiple rows of juveniles, with few to no adults, had a greater standardization in the spacing and alignment of graves suggesting that these individuals may have been interred at the same general time, and the numerous incidences of proliferative and periosteal reactions among the juveniles in this area suggest a high incidence of metabolic stress.

Identities

Human remains and their mortuary contexts provide clues to interpreting aspects of identity that can be associated with a specific individual or groups of individuals. However, inferring identity from available mortuary data can be both difficult and tenuous, relying on assumptions about the social construction of identity and the ways in which identity is manifest in a mortuary context.

Early studies of identity in archaeology relied on the concept of essentialized and fixed identities, and posited direct correspondence between identity and sets of diagnostic artifacts and features. Recurring sets of artifact and feature types were often interpreted as markers for a particular ethnic or cultural group. More recently, archaeologists have begun to examine identity from an instrumental or constructivist perspective and have investigated the intersections and tensions among different components of identity, such as gender, status, age, religion, occupation, or family roles. These approaches stress that identities are never fixed or immutable, but are instead hybridized, multivalent, porous, and situationally contingent. Identities are formed in relation to other identities and vary according to social context.

Especially in historical contexts, the attributes of a burial may have as much or more to do with the aspirations and identity of mourners than they have to do with the identities of the deceased. Because identity is socially contingent and relational, the identities or roles a person plays in death are formed with respect to their role as a deceased individual and don't necessarily reflect the roles a person played in life. In this sense, identity in a mortuary context is often less constructed or negotiated by the individual than by the community; their identity in death is, at least in part, constructed for them and with respect to new social roles played in death.

Another issue that affects interpretation of identity from cemetery contexts is the relationship between identity expressed in a cemetery versus identity expressed in a living community. As seen from an archaeologist's perspective, identities such as age, occupation, or gender become static or fixed at the point of death, although identity among the living is fluid and can and will change over the course of a lifetime. This situation, along with a host of other factors, complicates the extrapolation of identity from the burial population to a once-living community.

While the cemetery was in use, Tucson was a multiethnic and diverse community, and the cemetery itself appears to have been used by the entire community. No other cemetery in Tucson was in operation at the same time, and our models of historical and archaeological data suggest that the vast majority of the 1,800–2,100 individuals who died in Tucson while the cemetery was in use would have been buried there. The project uncovered the remains or partial remains of nearly 1,400 of those individuals; the burials of the remaining individuals were likely destroyed or removed during construction of the Tucson Newspapers Building basement in the 1940s and 1950s. Preservation in the cemetery was relatively good, to the extent that infants and young children were well represented.

We used a variety of primary and secondary historical sources to model the demography of the burial population according to age, sex, place of birth, family roles, and cultural affinity. These sources, although not without biases, allowed us to determine that around 75–80 percent of burials would likely have been those of Hispanic individuals, many of them Catholic, and around 10–15 percent would have been non-Hispanic Euroamerican individuals. The remainder would have been O'odham, Apache, Yaqui, and possibly Opata, as well as a few African Americans.

Our assessment of historical records indicated that the Hispanic segment of the community was evenly distributed according to age and sex, and was likely to be organized around extended families. Native Americans were slightly more likely to be adult individuals than children and had slightly higher sex ratios in comparison to Hispanics. Non-Hispanic Euroamerican migrants were most often adult males; sex ratios were quite high, as expected of migrating, frontier populations. For some individuals, additional details about a person's occupation or community roles could be gleaned from enlistment records, newspaper articles, or other documents. Although not comprehensive, this information underscores the idea that the population in Tucson consisted of individuals with diverse and eclectic backgrounds.

Osteological analyses of skeletal materials allowed us to infer the age, sex, and biological affinity of individuals, as well as possible occupations or domestic activities based on degenerative changes and musculoskeletal evidence for work. When combined with contextual and historical data, these fundamental demographic variables allowed us to distinguish different segments of the burial population, and to search for patterning in their spatial distribution. Analysis was hampered to some degree by the inability to assess the sex or biological affinity of most juvenile individuals, forcing us to rely on the assessments for adults in order to assess some spatial patterning according to demography. Based on what we know of Tucson's historical demography for the period, however, the vast majority of children would have been Hispanic, and rarely, of Native American or non-Hispanic Euroamerican affinities. We can safely assume that most juveniles had Hispanic cultural affinities and a slight majority of them would have been boys (see Chapter 6 on cultural affinity and also Chapter 5 for a detailed discussion of the historical context).

Many different artifact types and feature characteristics discovered in burial contexts have the potential to inform on identity, some of which can be associated with the mortuary programs of specific religious or fraternal organizations. For example, evidence for rosaries, floral crowns, and religious medallions was likely associated with Catholic practices, and in some instances, with finer religious distinctions. In one instance, coffin hardware displaying Masonic symbols, along with the use of bricks to support the coffin in the grave, could indicate a Masonic burial. The discovery of military buttons, along with other contextual clues, could be used to support the inference that an individual had served in the military. Expensive dental work, and in one case, the recovery of a valuable poker chip, may indicate a high economic status, or at least temporary access to substantial financial resources. These kinds of clues proved an important source of information that counterbalanced and enriched historical and osteological information.

The data as a whole suggest that the cemetery was organized according to a number of demographic variables, the most obvious of which appears to have been a division between the local Hispanic community and outsiders, most of whom were probably not active in the Catholic Church and who likely affiliated themselves with outside populations. In some ways, this division may correspond to what Sheridan refers to as a "demographic duality" among Tucson residents—a growing political, economic, and social division between Mexican Americans and Anglo Americans in Tucson that became wider after the cemetery closed. Sheridan (1986:38) wrote, "in a sense Tucson in 1860 [around the time the cemetery opened] was a dual, almost schizophrenic, settlement, one divided between Mexican families rooted in the land and male Anglo immigrants seeking fame and fortune on the Apache frontier. This demographic duality in large measure determined Tucson's destiny for the next 20 years," in other words, the same period in which the cemetery was used. This duality may explain the differences seen between the northern and southern portions of the cemetery.

There were other intriguing differences in the use of cemetery space and in apparent layers of identity and life experience which we have only begun to examine. Although there was a concentration of juveniles in the eastern half of Cemetery Area 3 (which may correspond to a smallpox epidemic in 1870 that claimed a large number of Mexican American children), we never found a clear and discrete area for the burial of children and infants. The lack of such a clear area may have been the result of a prior disturbance in one area of the cemetery, but this is not certain. Further, we have not found clear historical, osteological, or contextual justifications for why Area 4 was spatially different from the other areas of the cemetery, although the difference likely had some correspondence to differences (or changes) in identity relating to the Catholic Church. Once we sort out the differences between identity and mortuary practice in the northern portion of the cemetery, we will be better able to understand how the local Hispanic community was organized and the factors that influenced their lives and deaths.

Examining the cemetery in terms of overall patterns, it is clear that certain variables are useful in identifying and separating portions of the population: spatial distinctions are very important (especially the large division of north versus south, although the cemetery areas also appear to be important); as are age and sex of individuals; orientation; coffin shape; coffin wood type; grave preparation;

presence of religious artifacts; and the type of buttons or fasteners recovered. Other patterns were also present, but the variables represented appeared so infrequently that it was difficult to use them to make a strong case or interpretation.

Multivariate Analysis of Mortuary Artifacts Recovered from the Alameda-Stone Cemetery

Thus far, this chapter has outlined several distinctive patterns in the cemetery through examination of one or more contextual, historical, or osteological variables. However, although the analysis to this point has provided several views of the cemetery and has increased our understanding of what was found and possible meanings, we have not comprehensively combined sets of variables in an attempt to determine more-complex patterning and meaning. On one hand, some may argue that it may not be necessary to go further because the simpler patterns are generally clear, but it is useful to apply several multivariate techniques to the data because there is no other way to effectively and independently examine and assess groups of variables in an unbiased manner.

Methods

There are many ways to analyze and understand mortuary data recovered from a cemetery context. Such variables can be used to understand spatial patterns in cemetery use by various groups and to understand how these groups treated their dead. The following methodologies are not new to anthropological research and each has been thoroughly outlined in various books and research articles (Legendre and Legendre 1998). The purpose of this section is not to completely explain each method, but rather to provide the reader with an introduction to the method as well as a foundation on which the results of the current analysis are interpreted.

Polychoric and Tetrachoric Correlations

The polychoric correlation coefficient measures the association between ordinal variables (0, 1, 2, 3, 4), and is appropriate here because variable correlations are not affected when the latent, continuous variable underlying the trait is compressed into an ordinal response (Coenders and Saris 1995). Tetrachoric correlation coefficients are the recommended measures of association for binary (0, 1) variables. SYSTAT 12.0 was used to estimate polychoric and tetrachoric correlation coefficients. SYSTAT uses Limited Information Maximum Likelihood analysis following a two-step procedure (Joreskorg and Sorbom 2001). First, thresholds are estimated from the raw frequency distribution for y_i and y_j, the two variables of interest. Correlations are then estimated using a restricted maximum likelihood method conditional on each of these threshold values calculated during the first step of analysis (Coenders and Saris 1995:132). These methods are appropriate for use when the states of the underlying characters that form the fundamental scoring methodology can be viewed as continuous, a condition met with the large sample size and the quasi-continuous nature of the mortuary artifact data. For instance, we can view the mortuary variable "orientation" as a quasi-continuous variable because each ordinal response represents the number of degrees, or declination, from north (0°) that the head of the interred individual is positioned.

Cluster Analysis

Cluster analysis (also known as segmentation or taxonomy analysis) is a technique for partitioning individuals into homogenous subsets using similarities. Cluster analysis requires no a priori group label, but the method identifies subsets of the data by determining which individuals (objects) are more similar to each other than they are to individuals in other subsets (Krzanowski 2000). In this way, each cluster represents conceptually meaningful groups sharing some suite of common characteristics.

There are many clustering techniques, and each will inevitably lead to different "solutions" of clusters, so selecting an appropriate clustering method necessitates an understanding of the nature of the data set and the anticipated clustering of the individuals within the population.

Agglomerative hierarchical clustering analysis was used to find clusters using mortuary data. This method is one of the most common clustering techniques, in part because of the ease of the calculations, but also because the algorithm used to define the clusters is intuitively simple and the resulting relationships can be easily interpreted. In short, the cluster process begins with all data points as individual clusters, and at each step of the algorithm, merges the closest two data points (clusters) until only one cluster remains. The "closeness" of the individual clusters is determined using a distance measure (e.g., single linkage, complete linkage, group mean, Ward's), generating a proximity matrix for all subsequent calculations. Generally, the results of a hierarchical clustering analysis are presented graphically as a dendrogram, which displays the cluster relationships (i.e., the order the clusters are

merged and the relatedness between the various clusters) in two dimensions. These clusters can then be compared to known group membership labels and spatial positioning to determine what, if anything, was being considered during inhumation and how those considerations were distributed throughout the cemetery.

Canonical Discriminant Function Analysis

Discriminant function analysis is a suite of statistical procedures (including linear discriminant function analysis and canonical analysis) used to separate groups, classify unknown individuals into one of several reference populations, and measure the level of similarity between groups using variables shared by these groups.

In short, a discriminant function works by transforming the original variables into a discriminant analysis score in a way that maximizes differences between each group (or cemetery area). Discriminant function scores are then calculated and compared to the mean discriminant score of each group, and are classified into the group with the mean score closest to the unknown individual's score.

Certain assumptions about the data set must be met to optimize the discriminant function, including large and representative samples, multivariate normality, and equality of variance (homoscedasticity) among groups. If any one of these assumptions is not met, the results of the discriminant function analysis may not be reliable.

The purpose of the discriminant function analysis was to classify individuals into cemetery areas (Cemetery Areas 1, 2, 3, 4, and 5) or into large cemetery organizational structures (northern cemetery area versus southern cemetery area) using only mortuary variables in an effort to understand the patterns of cemetery use within the Alameda-Stone cemetery.

Factor Analysis

Factor analysis is a statistical method used to describe variability within a data set using a potentially lower number of unobserved variables called factors. In other words, it is possible that variations in three or four observed mortuary variables mainly reflect the variation in a single unobserved variable or in a reduced number of unobserved variables. Factor analysis searches for these unobserved variables by modeling the original variables as linear combinations of the potential factors, plus error. The information obtained about the interdependencies between observed variables can be used later to reduce the set of variables in a data set. Factor analysis is related to principal component analysis (PCA) but is not identical. Because PCA performs a variance-maximizing rotation of the variable space, it takes into account all variability. In contrast, factor analysis estimates how much of the variability is because of communality. Factor analysis can also be used to understand how the original variables interplay to form the derived factors. These "unobservable" factors become combinations of the original variables and can guide questions about the importance of each variable in forming the distribution of the original variables between groups, or as used in this analysis, the distribution of the mortuary data throughout the cemetery.

Results

Table 21 presents the tetrachoric and polychoric correlation coefficients of the various mortuary variables collected from the Alameda-Stone cemetery (see the earlier sections of this chapter for a discussion and explanation of these variables). Most of these variables were not correlated, suggesting their distribution within and between individuals was relatively unrelated, or the sample sizes were so small that no definitive statement could be made. Biological and spatial variables were correlated with some of the mortuary observations, however, suggesting some patterning in variable distribution.

Table 22 presents the correlation coefficients of the mortuary observations to four overriding variables: cemetery area, age-at-death, cultural affinity, and sex. These four variables fairly succinctly capture the biological and spatial qualities of the individuals interred in the Alameda-Stone cemetery, providing a proxy for the comparison of these data to the mortuary observations.

Sex

Sex (coded for these purposes as male, female, indeterminate) was significantly correlated to the type of wood used in the construction of the burial container and the presence of a crucifix. Each of these will be explored separately. Coffin shape, military buttons, orientation, and vaulting were significantly negatively correlated with cemetery area because of ordination (see below) (see Table 22). For coffin shape, this suggests that hexagonal coffins (shape = 3) were most common in Cemetery Areas 1 and 2, whereas other coffin shapes (shape = 1, 2) were more prevalent in Areas 3–5. The type of wood used in the construction of the container was significantly correlated with sex. Three patterns of wood were used in coffin construction in the Alameda-Stone cemetery: juniper, pine, and a combination of the two. Children (0–12 years) represented a large majority of the indeterminate individuals (Table 23). In fact, of the 511 individuals identified as sex "indeterminate," nearly 86 percent were juveniles. Therefore, we can safely assume that most individuals identified as sex "indeterminate" were likely juveniles, so any associations

Table 21. Tetrachoric and Polychoric Correlation Coefficients between Mortuary Data Collected at the Alameda-Stone Cemetery

	Coffin Shape	Military Button	Orientation	Painted Prosser Buttons	Plain Prosser	Plain Shell	Engraved Shell
Military button	**0.150**	1					
Orientation	**0.137**	**0.125**	1				
Painted Prosser buttons	-0.005	0.001	0.027	1			
Plain Prosser	-0.005	0.001	0.027	0.002	1		
Plain shell	0.089	-0.020	0.093	0.004	0.004	1	
Engraved shell	0.075	-0.004	-0.019	0.020	0.020	**0.193**	1
Sex	**0.258**	0.100	**0.183**	0.022	0.022	**0.189**	0.086
Age	**0.335**	**0.178**	**0.239**	-0.009	-0.009	**0.119**	0.065
Cemetery area	**-0.230**	**-0.306**	**-0.379**	0.038	0.038	-0.096	0.019

Note: Bold font= significant at α = 0.05 level or lower.

Table 22. Polychoric and Tetrachoric Correlation Coefficients between Mortuary Observations and Biological and Spatial Variables

Mortuary Observation	Age	Cemetery Area	Cultural Affinity	Sex
Christian cross	0.070	0.035	-0.043	-0.144
Coffin (presence)	-0.063	0.051	0.042	0.050
Coffin shape	**0.308**	**-0.245**	**-0.236**	**-0.191**
Crucifix	0.086	0.022	-0.088	**-0.157**
Engraved shell	0.059	0.054	-0.073	-0.002
Jewelry	-0.027	0.022	-0.057	-0.029
Medallion	0.012	**0.176**	-0.016	-0.068
Military button	**0.187**	**-0.399**	-0.040	0.014
Orientation	**0.241**	**-0.358**	-0.118	-0.092
Painted Prosser	-0.017	0.047	0.019	-0.025
Plain Prosser	0.127	0.010	**-0.206**	-0.076
Plain shell	0.115	-0.049	**-0.156**	0.010
Shoes	-0.099	0.074	0.050	0.047
Transfer-print Prosser	-0.069	0.046	0.042	0.059
Vaulting	0.065	**-0.200**	-0.111	-0.002
Wood type	**-0.188**	0.038	0.116	**0.194**

Note: Bold font = significant at α = 0.05 level or lower.

Table 23. Age and Sex Distribution of Mortuary Observation Sample

Age Group	Female	Indeterminate	Male	Total
Fetal	—	42	—	42
Infant	—	270	—	270
Child	—	114	—	114
Subadult	7	13	4	24
Subtotal (children)	7	439	4	450
Young adult	76	38	88	202
Middle adult	57	7	99	163
Old adult	25	2	40	67

continued on next page

Age Group	Female	Indeterminate	Male	Total
Adult	5	24	13	42
Indeterminate	—	1	—	1
Subtotal (adults)	163	72	240	475
Total	170	511	244	925

Note: Multiple burials removed for ease of calculations.

between variables for that group was most likely an association with juveniles.

Figure 111 is a correspondence map showing the relationship of the type of wood used for coffin construction and the sex of the individual. Correspondence analysis is a graphical tool to view contingency table data in two dimensions and extricate associative information between variables. There was a very clear association between the type of wood selected for the coffin and sex (and, apparently age, but we will address that shortly). In the Alameda-Stone cemetery, males were more likely to be interred in a coffin made of both pine and juniper; in contrast, females were more likely to be interred in a coffin made of pine. Juniper coffins were associated with juveniles.

The sex of the individuals buried in the Alameda-Stone cemetery also seems to have been a determining factor in whether a cross or crucifix was associated with the remains, although we must also consider the distribution of the sample. If most crosses and crucifixes were found in Cemetery Areas 3 and 4, and those areas had many more females than Cemetery Areas 1 and 2, this may reflect a tendency towards inclusion with females. Nevertheless, nearly 13 percent of the identified females were buried with either a cross or a crucifix, compared to only 4.5 percent of the males and 3.1 percent of the indeterminates (mostly children). Table 24 presents the frequency of a cross or crucifix, by sex. Figure 112 illustrates the associations of these data in two dimensions, showing clearly the strong relationship between the two variables.

As discussed in an earlier section of this chapter, it is important to realize that sex includes a hidden age variable because "indeterminate" individuals are primarily children. Examining sex subsequently includes a factor for age by default. The differences within the cemetery by sex were not surprising. We expected different treatment by sex, as well as differences in treatment of children. On initial examination, however, what was surprising was that the two main distinguishing variables associated with sex were type of coffin wood and the distribution of a religious object.

Coffin wood was a variable for a large number of burials, and its differential distribution by sex may have had as much to do with size of the individual that was buried than other factors, although it is clear that other factors also came into play. Sewell et al. suggest in Chapter 5, Volume 2 of this series, that differences in the wood used could be associated with the size of the tree. This is especially true because none of the coffins were mass-produced; all were locally made. Typically, single wood boards that were wide enough to perform the function would have been used in construction. Narrow boards were cheaper and often more accessible, as long as there was a way to join the boards together. Litten (1991:103) has noted that often coffin makers could not obtain 2-foot widths of wood, which would have been the suitable size for coffin construction; in these cases, 12-inch or 6-inch planks were used, and the poor craftsmanship was masked by cloth covering.

In the Alameda-Stone cemetery, both wide-board and pieced-board construction was used in coffin manufacture. Juveniles, particularly infants, were most strongly associated with juniper wood coffins, and they were also commonly associated with cloth-covered burial containers. Juniper does not grow rapidly and tends to have smaller, narrower trunks; this would make it useful for juvenile coffins in terms of size, but more problematic for adult coffins, especially for larger males. It is cheaper to use softwoods for the construction of unseen parts of cabinets or furniture, and this could have been an underlying reason for many of the cloth-covered burial containers. In sum, it is likely that juniper was used for children because it was readily available locally, and its width was better suited to children than adults. Softwoods, which were easily and routinely covered with cloth, were often associated with juveniles. This does not mean that there was not also another more emotional or cultural meaning attached to the association of juniper and juveniles.

Females were more often buried in pine coffins, and pine is a softwood that would have been cheaper and could be covered. It may not have been quite as easily obtainable as juniper but would certainly not have been difficult for a local craftsman to obtain. Juniper is more difficult to work than pine because of the many knots in the wood, but it can be quite beautiful. Historically, the bases or bodies of burial containers were sometimes constructed of less expensive materials, and more-visible parts, such as the lid, were constructed of darker hardwood. Perhaps this is the reason that males were associated with coffins that were a mixture of woods. It should be noted that although juniper is not very hard or wide, the heartwood of juniper is more stable and resistant to rot; it would have been useful to know if any of the adult coffins made of juniper were made from juniper heartwood, or if the combination wood coffins included juniper heartwood

Table 24. Frequency Distribution of Crosses and Crucifixes, by Sex

Mortuary Observation	Female		Indeterminate		Male		Total
	n	%	n	%	n	%	n
Cross or crucifix	21	12.4	22	3.1	11	4.5	54
None	149	87.6	681	96.9	233	95.5	1,063
Total	170	100.0	703	100.0	244	100.0	1,117

Note: $\chi^2 = 25.386$, $df = 2$, $p < .001$.

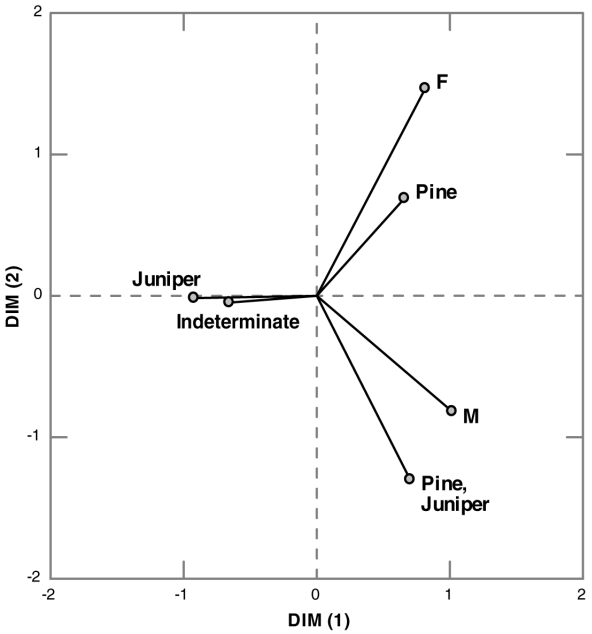


Figure 111. Correspondence plot of wood type and sex (M = male; F = female).

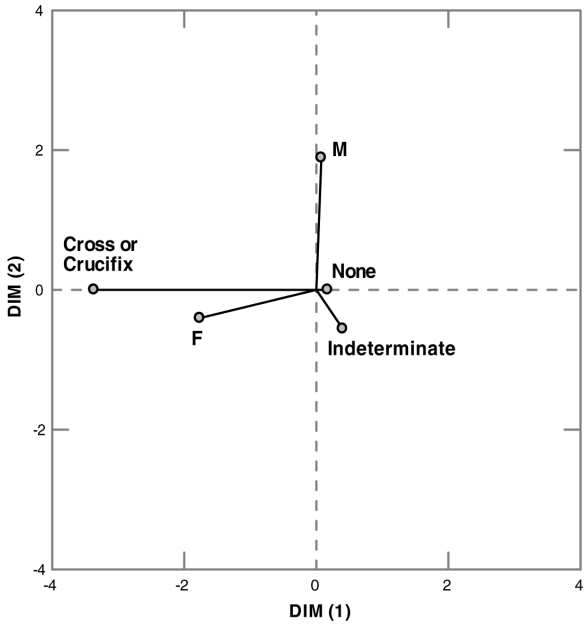


Figure 112. Correspondence plot of presence of cross or crucifix and sex (M = male; F = female).

as opposed to regular juniper wood. Unfortunately, such a detailed analysis was not possible for the wood collected. Later, more detailed analysis of the correlations between wood type, age and sex, and location of the wood types within combination wood coffins may yield more conclusive results.

Finally, Tarlow (1999) discusses the importance of the development of an "emotional" archaeology that may override instinctive behavior. In the case of coffin wood, it is possible that when women made choices of coffin wood, they selected more emotionally and chose the potentially more attractive juniper—or a combination of woods—over the pine that may have been easiest to work. Whether or not this was the case, the inclusion of an emotional factor may account for some of the differences; women would likely have had more say in the selection of coffins for their children and husbands, and males may have made the selections for their wives' coffins. This kind of differential selection could account for much of the patterning seen.

One of the other strong associations was that between sex and presence of crosses or crucifixes. The higher degree of association between the presence of a cross or crucifix and females may reflect the more common display of religious affinity by women. Although none of the numbers was proportionately high, females were three to four times as likely to have a cross or a crucifix as males or children. This may also link to the emotional factors discussed above.

Age

As mentioned previously, age is a hidden variable when analyzing sex data because individuals indeterminate for sex were predominantly juveniles. It should come as no surprise, therefore, that age was also significantly correlated with the type of wood used in coffin construction. This association will not be discussed further, except to

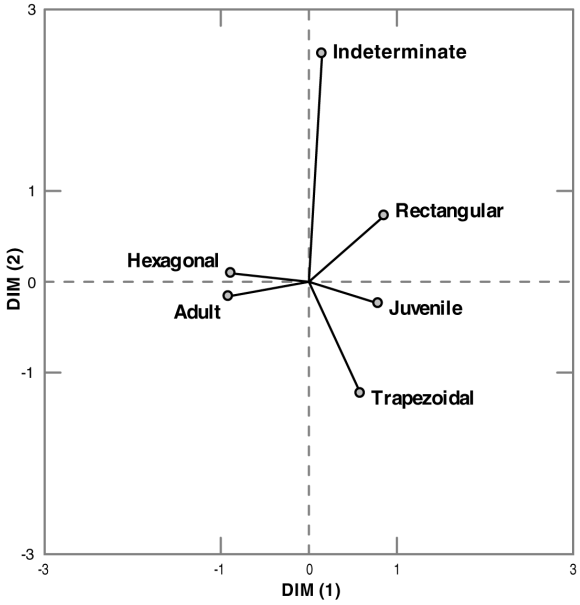


Figure 113. Correspondence plot of coffin shape and age.

Table 25. Frequency Distribution of Coffin Shapes, by Age

Coffin Shape	Adult		Indeterminate		Juvenile		Total
	n	%	n	%	n	%	n
Hexagonal	218	64.3	25	43.1	113	29.7	356
Rectangular	65	19.2	21	36.2	162	42.5	248
Trapezoidal	56	16.5	12	20.7	106	27.8	174
Total	339	100.0	58	100.0	381	100.0	778

Note: $\chi^2 = 88.254$, $df = 4$, $p < .001$.

note that there was also a strong association between age and the shape of the coffin (Figure 113 and Table 25). Here, it is interesting that the proportion of shapes associated with individuals of indeterminate age closely mirrored the proportion that each coffin shape was represented in the cemetery as a whole, suggesting that the indeterminates did not differ from what one would expect. Adults were much more likely to be in hexagonal coffins, and juveniles were most closely associated with rectangular coffins but had equal proportions of rectangular and trapezoidal coffins. Once again, the link here could be size of the individual, but it could also reflect choice based on other factors. The presence of military buttons, although correlated with age, will not be discussed because that correlation is neither surprising nor unexpected.

The orientation of a body within a grave has many implications, including religious, spatial, temporal, and social. Orientation was significantly correlated with age, but again, this has much to do with the distribution of age groups according to cemetery area. Many of the burials in Cemetery Areas 1 and 2 (which were mostly adults) had their heads oriented to the west, whereas most in Areas 3 and 4 (which included many juveniles) were oriented with head to the east, with some very notable exceptions. The cultural significance of orientation has been discussed elsewhere (see Chapter 5, Volume 2 of this series) and earlier in this chapter). Among Alameda-Stone adults, orientation was fairly evenly divided between eastward- and westward-facing inhumations (Table 26). Among juveniles, however, more than two-thirds were oriented to the east, suggesting this direction was favored for younger individuals or that their placement was determined by other factors. The correspondence map in Figure 114 illustrates this relationship.

Cultural Affinity

Cultural affinity was correlated with coffin shape and button type (plain Prosser buttons and shell buttons). Coffin

Table 26. Frequency Distribution of Various Inhumation Orientations, by Age

Orientation	Adult		Indeterminate		Juvenile		Total
	n	%	n	%	n	%	n
East	250	52.7	61	31.6	307	68.2	618
North	2	0.4	1	0.5	—	0.0	3
South	2	0.4	—	0.0	2	0.4	4
Unknown	9	1.9	115	59.6	15	3.3	139
West	211	44.5	16	8.3	126	28.0	353
Total	474	100.0	193	100.0	450	100.0	1,117

Note: $\chi^2 = 513.723$, $df = 8$, $p < .001$.

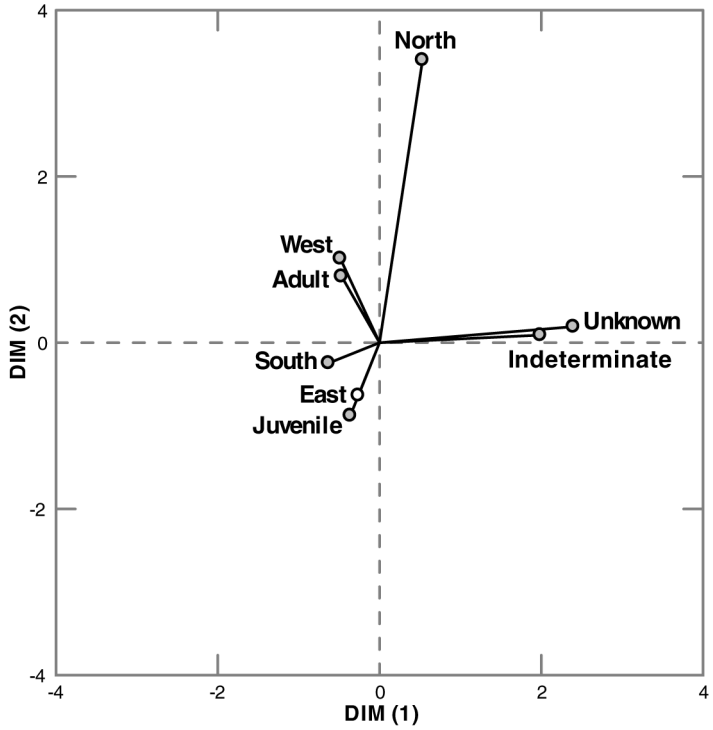
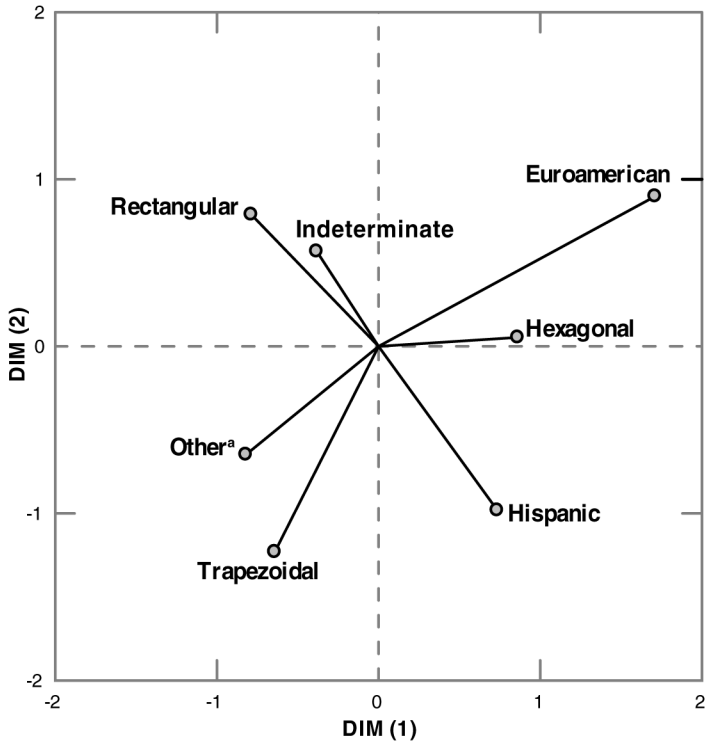


Figure 114. Correspondence plot of orientation and age.

shape was fairly evenly distributed among the various cultural groups, although Euroamericans and Hispanics were more likely to have been buried in hexagonal containers (Figure 115 and Table 27). Of course, much like sex-determination methods, which are not suitable for younger individuals (see above), assessing cultural affinity for young individuals is often difficult. Recall the correspondence map of age and coffin shape (see Figure 113): juveniles tended to be buried in trapezoidal or rectangular coffins, so the results of the cultural affinity analysis likely also represent age effects on coffin selection. That said, there are two things about the shape and cultural affinity analysis that are worthy of further comment. Euroamericans had a much lower proportion of individuals in trapezoidal coffins, and this may reflect time (many may have been buried more recently, for example) or choice. The other interesting aspect of the analysis is that the Other category (which included Native Americans and those with multiple cultural affinities) and the Indeterminate category reflected a much more even distribution of coffin shapes than Euroamericans or Hispanics, both of which had a strong association with hexagonal coffins.

As we have already seen, most variables were directly affected by age (see Factor Analyses below). This may also be true for buttons, although some interesting patterns were observed. Recall that buttons and other clothing fasteners



[a]Other includes all Native Americans, all multiple affinities, one African American.

Figure 115. Correspondence plot of coffin shape and cultural affinity.

Table 27. Frequency Distribution of Coffin Shape, by Cultural Affinity

Coffin Shape	Euroamerican		Hispanic		Indeterminate		Other[a]		Total
	n	%	n	%	n	%	n	%	n
Hexagonal	59	73.8	102	57.3	144	39.8	51	32.3	356
Rectangular	14	17.5	37	20.8	137	37.8	60	38.0	248
Trapezoidal	7	8.8	39	21.9	81	22.4	47	29.7	174
Total	80	100.0	178	100.0	362	100.0	158	100.0	778

Note: $\chi^2 = 56.427$, $df = 6$, $p < .001$.
[a] "Other" includes all Native Americans, all multiple affinities, and one African American.

are likely to be both age and gender specific. However, in order to properly use the buttons in analysis, not all button types could be included. The most useful categories for analysis were presence or absence of plain Prosser buttons and the presence or absence of shell buttons. Hispanics and Euroamericans were both interred with plain Prosser buttons and plain shell buttons more often than the Other group, which included Native Americans but also a large proportion of children (Table 28). Figure 116 illustrates this relationship. Hispanics and Euroamericans, however, did not differ significantly in which type of button was found in the grave (Fisher's exact, $p = .4088$), suggesting fairly equal access to these button types. The same is true of all adults with plain shell and Prosser buttons, without respect to affinity.

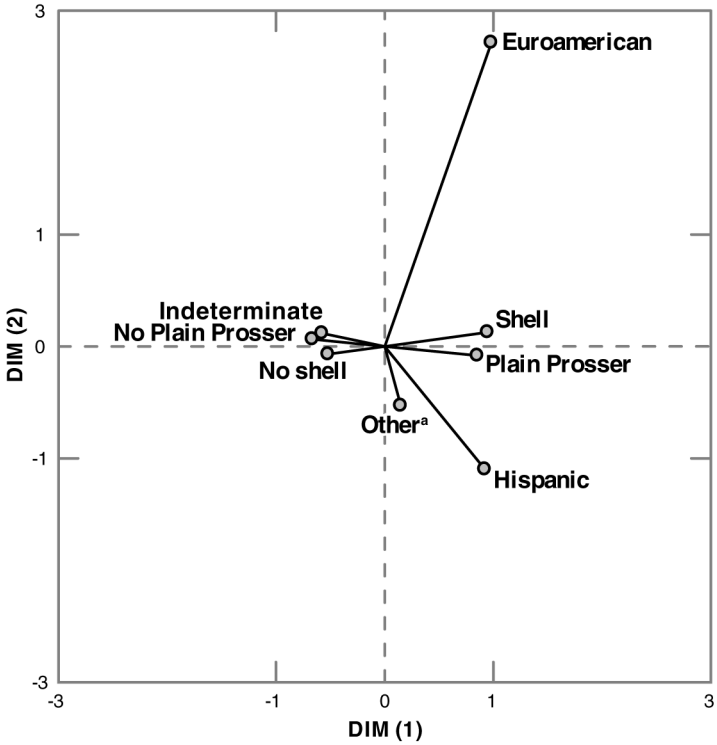
Factor Analyses

As seen above, there were a variety of factors influencing the distribution of mortuary artifacts and the mortuary observations made on the Alameda-Stone cemetery. For example, age seems to have been an important contributing factor in nearly every cultural, spatial, or biological variable. However, this does not mean these other variables were not also important. Factor analysis permits us to explore the relationship of a number of variables in terms of factors or unobserved variables as combinations of the original variables. Combining a large number of variables in a meaningful way is not always easy; however, with factor analysis we can explore how the biological, cultural, and spatial variables interplay with the mortuary

Table 28. Frequency Distribution of Buttons by Cultural Affinity, per Burial Feature

Mortuary	Euroamerican		Hispanic		Indeterminate		Other[a]		Total
Observation	n	%	n	%	n	%	n	%	n
No plain Prosser	42	40.4	86	37.1	403	67.5	97	52.7	628
Plain Prosser	62	59.6	146	62.9	194	32.5	87	47.3	489
Total	10	100.0	232	100.0	597	100.0	184	100.0	1,117
No shell	49	47.1	122	52.6	434	72.7	116	63.0	721
Shell	55	52.9	110	47.4	163	27.3	68	37.0	396
Total	104	100.0	232	100.0	597	100.0	184	100.0	1,117

Note: Prosser, $\chi^2 = 76.969$, $df = 3$, $p < 0.001$; shell, $\chi^2 = 45.823$, $df = 3$, $p < .001$.
[a] "Other" includes all Native Americans, all multiple affinities, and one African American.



[a]Other includes all Native Americans, all multiple affinities, one African American.

Figure 116. Correspondence plot of button types and cultural affinity.

observations. The purpose of factor analysis is to "explore the underlying variance structure of a set of correlation coefficients. Thus, factor analysis is useful for exploring and verifying patterns in a set of correlation coefficients" (Brown 2001: 184).

Figure 117 illustrates the factor loadings of the first three factors in two dimensions and the scree plot of the eigenvalues from the factor analysis. The first three factors explain roughly half of the total variation (Table 29). The first factor is most correlated to age (0.875) and sex (-0.739), the two variables that explain the greatest amount of variation in mortuary observations (see above). However, this factor is also significantly correlated with cultural affinity (-0.672) and coffin shape (0.487). This combination of variables (age, sex, cultural affinity, and coffin shape) alone captures over 25 percent of the variation in mortuary observations. The first three are not surprising, but the weight given to coffin shape (which is slightly higher than cemetery area) is at first surprising. However, recall the correspondence maps and frequency distribution tables presented above outlining the association between coffin shape and age, sex, and cultural affinity, and the result is less than expected because each of the factors influenced the shape of the coffin. Finally, the second factor is

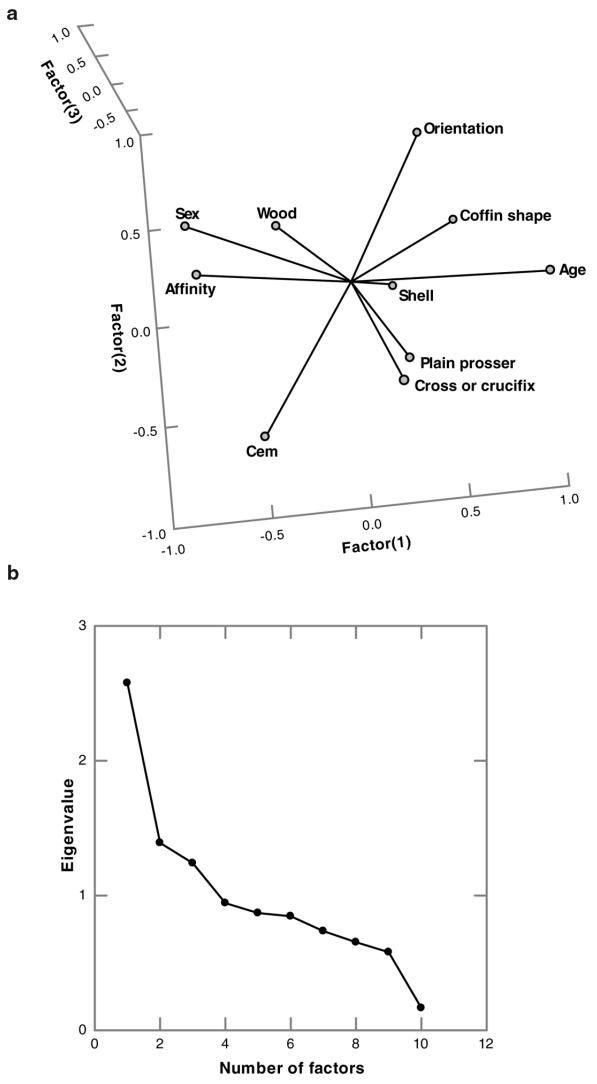


Figure 117. Factor loading and scree plot of mortuary variables.

Table 29. Component Loading Extracted during Factor Analysis

Variable	Factor 1	Factor 2	Factor 3
Age	0.875	-0.064	0.161
Cemetery area	-0.449	-0.637	-0.03
Coffin shape	0.487	0.224	0.009
Cross/crucifix	0.181	-0.48	0.278
Cultural affinity	-0.672	0.079	0.153
Orientation	0.366	0.618	0.071
Plain Prosser	0.258	-0.308	-0.675
Plain shell	0.217	0.063	-0.743
Sex	-0.739	0.375	-0.305
Wood type	-0.306	0.269	0.072
Total communality	25.764	13.903	12.399

most correlated to cemetery area (-0.637) and orientation (0.618), and the third factor is correlated to button type (plain Prosser = -0.675; plain shell = -0.743).

The results of the factor analysis suggest some interesting patterns. First, age was by far the most important determining factor in the distribution of most of the mortuary observations. Many of these are unsurprising, such as the lack of military buttons with young children. However, the exact reason for the differences observed in some factors requires further exploration. Take for instance the association of juniper wood in the construction of child coffins or the differences in coffin shapes between adults (hexagonal) and juveniles (trapezoidal or rectangular). Are these differences linked to the decision to use juniper (a relatively smaller lumber compared to the larger planks obtained from most pine), the small size of juveniles relative to adults, or was there also a specific cultural significance to these decisions? We can only speculate about these questions; however, it is clear from the above analyses that adults and children, more so than Hispanics and Euroamericans or males and females, were treated differently at death. All of the mortuary observations were influenced, to varying degrees, by the age of the individual at death.

Even with the understanding that age was the major factor influencing the distribution of these variables, other factors played a role in how mortuary treatment was dispersed throughout the cemetery and between and among groups. One of the clearest examples of this was burial orientation, which was very much influenced by which area within the cemetery the individual was interred. Again, age was the overarching, or meta-factor, influencing the cemetery areas. However, differences in orientation between cemetery areas remained when we looked at the adult-only sample. Cemetery Areas 1, 2, and 5 contained predominantly west-facing burials, whereas burials in Cemetery Areas 3 and 4 predominantly faced east. There are several possible explanations for these differences, including religious, cultural, and functional. However, the most parsimonious explanation was the presence of a Catholic church (San Agustín) west of the cemetery; individuals buried in Cemetery Areas 3 and 4 were placed to sit up facing the church at resurrection.

Cluster Analysis

Another multivariate exploratory method used in the analysis of the mortuary observations was cluster analysis. The following variables were used: coffin shape, military buttons, orientation, painted Prosser buttons, cross or crucifix, plain shell buttons, and engraved shell buttons. These variables were selected using a multivariate exploratory method known as random forests, a nonparametric clustering algorithm useful for identifying important variables in a large data set (Siroky 2009). Figure 118 presents the

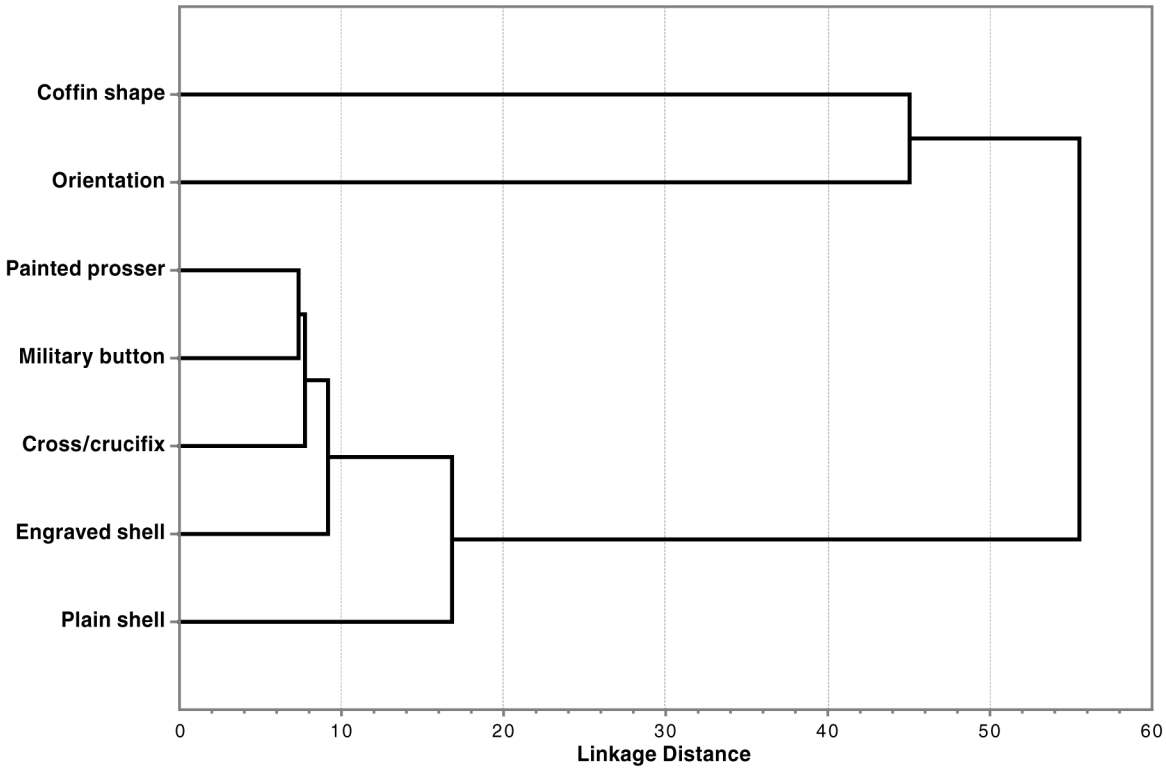


Figure 118. Ranking of importance of mortuary variables for cluster analysis.

rank and importance of each of these variables. We considered these results as well as the results of the factor analysis (see above) to determine which variables were selected for the final cluster model. The pattern of variable clustering (Figure 119) reveals that coffin shape and orientation were most distinctive (judged by the length of each branch). Buttons and other mortuary artifacts were less distinctive in the cemetery population and did not seem to influence the final clusters at the same level as either coffin shape or orientation. Several iterations were tested, but a two-cluster solution to look for broad classes within the cemetery was the final model presented herein. Interestingly, using only these variables led to fairly discrete clusters roughly depicting the northern (Cemetery Areas 3, 4, and 5) and the southern (Cemetery Areas 1 and 2) portions of the Alameda-Stone cemetery (Figure 120 and Table 30). The separation of these clusters into relatively consistent patterns with the spatial organization of the cemetery suggests differential treatment according to cemetery area (Table 31). Hefner (see Chapter 8, Volume 2 of this series) demonstrated that biological groups were likewise distributed between the northern and southern portions of the cemetery. At a minimum, the mortuary context variables seem consistent with this pattern and lend further credence to the observation that the divisions within Alameda-Stone cemetery followed a north-south distribution of Euroamericans (in the south) and Hispanics (in the north).

Conclusions and Discussion of Multivariate Analyses

The multivariate analyses were extremely helpful for the interpretation of the cemetery, as well as outlining potential areas of future work. All of the multivariate approaches applied to the cemetery data indicated that age and sex were of primary significance, along with cemetery area. For the mortuary observations themselves, several variables were found to be significant in each of the analyses conducted. These variables included type of coffin wood, shape of coffin, orientation of body, presence of a cross or crucifix, and presence of certain button types. These variables may themselves represent proxies for Catholic religion, temporal differences, differences between cultural affinities, locally available resources, gender, and interaction with groups outside the Tucson area.

We selected the variables for some of the multivariate analyses by using a multivariate exploratory method known as random forests, a nonparametric clustering algorithm useful for identifying important variables in large data sets. The following variables were included: coffin shape, military buttons, orientation, plain Prosser buttons, painted Prosser buttons, cross or crucifix, plain shell buttons, and engraved shell buttons.

Children represented most of the individuals in the category "indeterminate sex," so there was a strong relationship

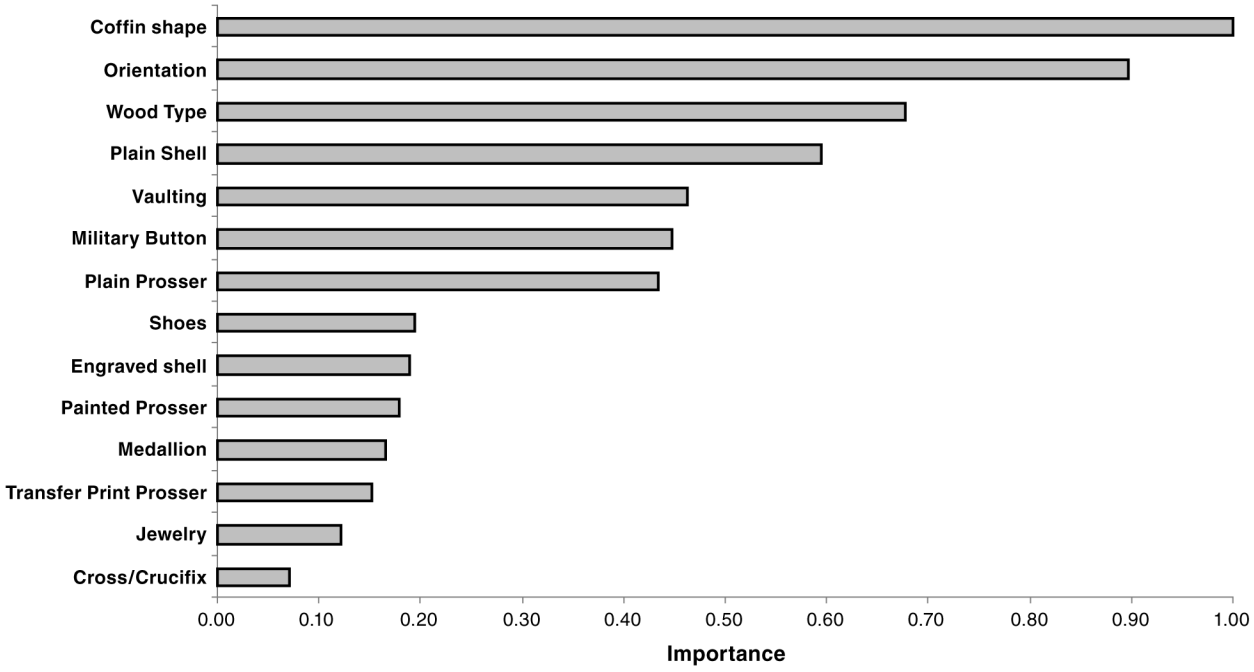


Figure 119. Tree diagram of seven mortuary variables.

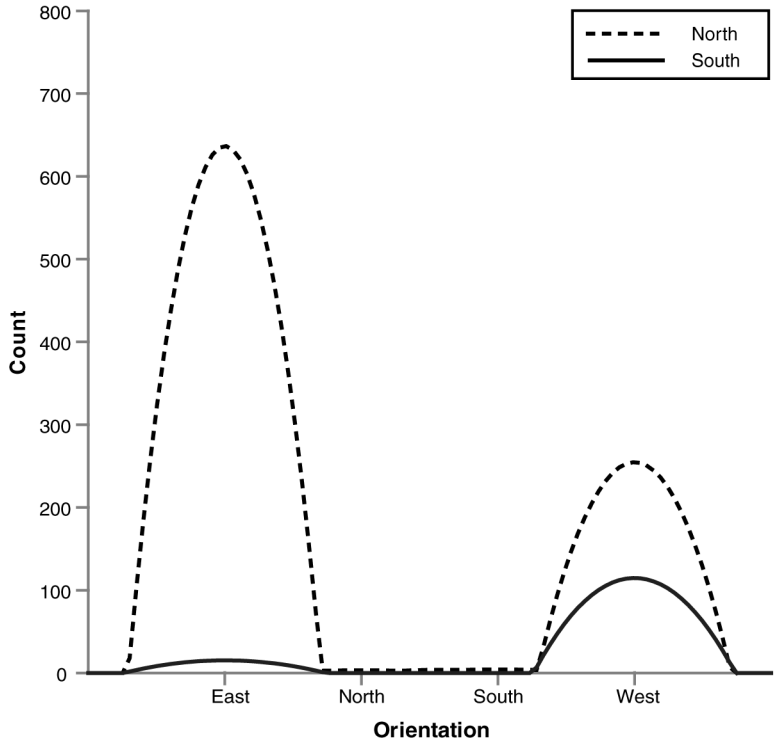


Figure 120. Grave orientation by northern and southern areas of cemetery.

Table 30. Distribution of Clusters, by Cemetery Area

Area	Cluster A	Cluster B
South (Cemeteries 1 and 2)	84.314	15.687
North (Cemeteries 3, 4, and 5)	32.883	67.116

Table 31. Frequency Distribution of Mortuary Variables by Cemetery Area, per Burial Feature

Mortuary Observation	Cemetery Area			
	Northern		Southern	
	n	%	n	%
Coffin shape				
Hexagonal	251	35.96	104	78.20
Multiple	5	0.72	—	0.00
Not observed	44	6.30	6	4.51
Rectangular	226	32.38	21	15.79
Trapezoidal	172	24.64	2	1.50
Orientation				
East	600	62.44	15	9.80
North	3	0.31	—	
South	4	0.42	—	
Unknown	114	11.86	25	16.34
West	240	24.97	113	73.86
Painted Prosser buttons				
Absent	930	96.77	151	98.69
Present	31	3.23	2	1.31
Plain shell buttons				
Absent	624	64.93	94	61.44
Present	337	35.07	59	38.56
Engraved shell buttons				
Absent	871	90.64	148	96.73
Present	90	9.37	5	3.27
Military buttons				
Absent	956	99.48	128	83.66
Present	5	0.52	25	16.34
Cross or crucifix				
Absent	909	94.59	152	99.35
Present	52	5.41	1	0.65

between the age and sex variables. Indeed, sex de facto includes a hidden age variable because most "indeterminate" individuals were children. Examining sex includes a factor for age by default.

Sex and age appear to have been determining factors in whether or not a cross or crucifix was associated with a burial, and examining this relationship more carefully, there was a strong association between the presence of a cross or crucifix and females. As suggested earlier, this pattern could reflect that women more commonly displayed their religious affinity by regularly wearing crosses. Recall as well that the distribution of paper and wire crowns was almost exclusively associated with children; indeed, the variable was not included in the multivariate analysis because the association was so absolute. The difference in associations of religious symbols may have been the result of personal practice on the part of adult women (and some men), but in the case of children, it was more likely a cultural association imposed by parents and family and (directly or indirectly) the Catholic Church.

Button types provided another set of interesting spatial and perhaps gender-related distinctions. As noted earlier in this chapter, a wide variety of button types were recovered, but for the multivariate analyses, the large classes of Prosser buttons and shell buttons were used. The button styles had slightly different distributions, and the analyses found that the presence of engraved shell buttons was significant for at least a portion of the cemetery. Almost all engraved buttons were located in the northern portion of the cemetery and found with adult males.

Cemetery Area 4 contained a dense concentration of graves, many of which intruded into earlier grave pits; this area also contained the greatest number of graves with multiple burials. Burials in Cemetery Area 4 made different use of cemetery space, even though as a group there were no clear differences in the identity of individuals using either Cemetery Areas 3 or 4. The suggestion that Cemetery Area 4 may have been the original area of consecrated ground used by the Catholic Church for the cemetery is stronger after the multivariate analysis, as is the idea that Cemetery Area 3 grew around Cemetery Area 4 as Area 4 began to fill with burials. As noted above, given knowledge of Hispanic Catholic burial practices of the period, Cemetery Area 4 may have been reserved for individuals with a certain level of status or priority with regard to the church, but these were not individuals with substantially different life experiences or backgrounds than those in Area 3.

The multivariate analyses provide further evidence that adults and children, even more than Hispanics and Euroamericans or males and females, were treated differently at death in this Tucson cemetery. All of the mortuary observations were influenced, to varying degrees, by the age of the individual at death. Most significantly, the cemetery reflected somewhat different practices between its northern and southern portions. The divisions within Alameda-Stone cemetery follow a north-south distribution of Hispanics (in the north) and Euroamericans (in the south). Using only the two-cluster solution led to fairly discrete clusters roughly depicting the northern (Cemetery Areas 3, 4, and 5) and the southern (Cemetery Areas 1 and 2) portions of the Alameda-Stone cemetery (see Table 31).

Discussion and Interpretations

As mortuary analysis matured, people came to understand that identities were not fixed, and that different people and groups communicate different messages from a cemetery site. Acknowledgement of this fact has resulted in more analysts agreeing with Parker Pearson (1982) that mortuary behavior represents ritual communication, and what it is communicating is not necessarily "reality," but an idealized conception of the social order. More recently, Tarlow (1999) has argued that archaeologists should include emotion as an important variable in mortuary analysis. Although Tarlow's idea has not been overwhelmingly accepted or implemented, it is true that emotion, although culturally constructed and influenced, can modify and affect other behaviors, including biologically based ones. These ideas are more evident (or more easily interpretable) in a historical-period cemetery site than in a prehistoric one.

The people of Tucson, who used this cemetery for a period of about 20 years between 1862 and 1881, represent a way of life that was influenced more by its southwestern traditional past than by its acceptance of what has been termed the Beautification of Death. The shift to the more Victorian pattern did eventually come to Tucson as the railroad made more manufactured items easily and cheaply available. Nonetheless, the historical Hispanic and Catholic nature of the town did not disappear. Most of the people buried here were primarily local and poor, with little differentiation between folks.

Even though social differences were not great, the Tucson cemetery was divided into two major parts—a northern cemetery that was predominantly Catholic and Hispanic and a southern cemetery that included a military section, more Euroamericans, and many fewer children. In both portions of the cemetery there was considerable cultural diversity as well as considerable similarities. Within the northern section, in Cemetery Area 3, we did not find a clear, discrete area for the burial of infants and children, but we did find a concentration of juveniles in the eastern half of Area 3. This concentration of juveniles may represent the burial place for those who died during the smallpox epidemic in 1870. The epidemic claimed a large number of Mexican American children. The distinctions between north and south can be seen as a division between the local Hispanic community and more recent outsiders, most of whom were probably not active in the Catholic Church and who likely affiliated themselves with other outside populations.

If Cemetery Area 4 represents an older graveyard established in spatial relation to the San Agustín church, it is interesting that most crosses or crucifixes were located in Areas 3 and 4, regardless of sex, and there were more rosaries with adult males than females in Area 4. In Area 3, three times as many adult females as adult males had rosaries. If one combines all religious objects together as one variable, religious objects were found in Cemetery Areas 2, 3, 4, and 5, but more than 95 percent of them were located in Cemetery Areas 3 and 4. There was also spatial differentiation in coffin shape within Cemetery Area 4, with a distinction between the east and west halves; trapezoidal containers were found throughout the area, but rectangular shapes clustered in the west half of the area and trapezoidal shapes—more often associated with adults—clustered in the east half. The males in Area 4 may have represented important or notable religiously observant church-related figures.

Many of the mortuary observations have the potential to inform us about identity. For example, religious objects suggest a particular kind of religious practice, and objects such as buttons may inform on the use of manufactured items or the reuse of one type of object in another way. One of the potentially interesting analyses to be conducted

in the future will focus on the engraved shell buttons, a category that was also identified as significant in the random forests analysis. During the cemetery period, shell buttons were manufactured and distributed widely, but we have found no documentation of engraved shell buttons similar to those from the Alameda-Stone cemetery. The button engraving was done individually and idiosyncratically, but on buttons so small and placed so discretely that it is unlikely that anyone but the wearer and his/her family would have ever noticed them. Did these buttons represent an identity display? Did they allow one to transform a mass-manufactured clothing item that may have been inherited, or reused, into an item that was more personal and individual? We hope that more intensive analysis of this particular artifact type will begin to address these and other questions. Thomas and Thomas (2004) examined how gender and social identity were intertwined and expressed in African American dress in the antebellum South. They made a distinction between clothing designating a member of a community and clothing or clothing decoration that was intended for individual expression and differentiation. The buttons, which composed our third factor in the factor analysis, may reflect such similar distinctions in the Alameda-Stone cemetery.

In the introduction to his book *Arizona: A History*, Sheridan (1995) noted that Arizona has changed as the world system changed. He pointed out that others have always had a part in shaping the way people here lived. Importantly, he notes that as these changes occurred, race relations, class, gender, and ethnic identity in Arizona changed too. Discussing the specific period coinciding with the Alameda-Stone cemetery, Sheridan (1995) noted that no one established control over the whole area until the U.S. military won the Indian wars in the 1880s, and it was at this point that the "frontier" ended. In particular, and observed distinctly in this cemetery:

> Until the late nineteenth century, Arizona was a frontier in the most basic sense of the term. It was not a border between civilization and wilderness, or civilization and savagery. . . . Instead, it was contested ground, a place where no one group . . . held uncontested sway. . . . [T]hree major cultures—Athapaskans, Hispanics, and Anglo Americans—converged upon the region. They and the people who were already living here—Hopis, River Yumans, Upland Pais, and O'odham—fought, slept, and traded with one another, exchanging ideas, rituals, seeds, and genes [Sheridan 1995:xv].

The data and analyses from the Alameda-Stone cemetery represent a rare and unique view into this transition period. The relative egalitarianism present in the cemetery structure, and the apparent fluidity of roles and identities, represent clear examples of these important exchanges and of this unusual time that was about to change dramatically.

CHAPTER 10

Summary, Comparisons, and Broader Implications of the Cemetery

Lynne Goldstein

> Memories of the dead and the past in many cultures define the present. The present in turn defines the future. . . . To remember is more than to recall events and places: memory operates in a social context and therefore can be regarded, in part at least, as a collective cultural and social phenomenon.
>
> Williams, *Death & Memory in Early Medieval Britain*

Introduction, Contexts, Definitions

In part, this cemetery is not about memory in the traditional sense. In many ways, Tucson had historically endeavored to forget about the cemetery in the middle of its downtown, but in the twenty-first century, Pima County was determined to endeavor to make memory work in the broader sense—to operate in a social context, as a collective cultural and social phenomenon. The extensive work that Pima County has undertaken in coordinating, negotiating, and informing the various descendant groups and possible descendant groups on this project represents a set of procedures that should be copied by every governmental entity. The transparency of operations has dissipated many suspicions and concerns by the potential descendant groups. Many of the projects used for comparative purposes, in this and other chapters, have been excellent examples of modern mortuary archaeology. However, relatively few have undertaken the range of extensive and transparent work associated with this project.

The Joint Courts Complex Archaeological Project focused on 4.3 acres of land in the middle of a growing and changing downtown area, land that has been used by different groups of people for the last 4,000 years or more. That said, there is little evidence that subsequent specific occupants knew about the previous occupants' existence or use of the site, although there is evidence that the historical-period community as a whole was aware of the site's past. Indeed, each of those who looked to this property as a likely place to solve a problem or focus their efforts over the last 4,000 years seems to have had different reasons for doing so—resource processing, settlement, cemetery, roadway, railroad access, vacant lot, railroad warehouse district, residential district, commercial district, and in the future, the public courts system.

Today, we tend to understand the lack of knowledge a town's inhabitants may have about previous inhabitants of a locale, but we shake our collective heads in amazement that a town could have deliberately built and sold house and business lots in a cemetery, particularly a known cemetery regularly used by all of its inhabitants. Perhaps certain movie genres have made us assume all cemeteries will have ghosts that haunt, or we have become too sensitized to a collective ethic that says such actions violate the public good. But, as noted in earlier chapters, at least two significant things happened in Tucson in the 1870–1890 period: (1) the Southern Pacific Railroad arrived in 1880, with its prospects for prosperity, and (2) there was a more than 25 percent decline in population during the 1880s as a result of military withdrawal from the region and the failure of a number of silver mines. These two circumstances in combination had a great social and economic impact, especially when people were already beginning to see the cemetery as a nuisance because the town was developing around it.

Before we examine the implications of the cemetery for the future and for our understanding of cemeteries, it is instructive to examine the definition of a cemetery, or what the concept of "cemetery" means or represents. There is an extensive literature on the nature of cemeteries, and a brief summary of some recent work may help put the Alameda-Stone cemetery into a broader cultural context.

Three relatively recent articles in the journal *Mortality* (Francis 2003; Reimers 1999; Rugg 2000) represent examples of scholars' continuing struggle with the idea of a cemetery in terms of *definition* (Rugg 2000), *communication* (Reimers 1999), and *landscape* (Francis 2003). Rugg (2000) asked the question, "What makes a cemetery a cemetery?" She reviewed literature relating to burial sites from ca. 1760 to the present, focusing on the United States, Australia, and Europe. Importantly, Rugg also drew her materials from a number of different disciplines: history,

historical archaeology, geography, sociology, and social policy. She presented the following categories within which one can identify defining characteristics for cemeteries: "physical characteristics, ownership and purpose, sacredness, and the ability of the site to celebrate or protect the individuality of the deceased" (Rugg 2000:260).

In her analysis, Rugg (2000) recognized that burial spaces are not immutable—"the passage of time alone can change the nature and meaning of individual sites" (Rugg 2000:272). She went on to note that ownership of the cemetery could change, and each generation will—because they define their own reasons for disposing of the dead in a particular way—alter management practices, and this will affect the cemetery landscape. Sites can become more sacred or less sacred. The reasons Rugg (2000:272–273) provided for changes in sacredness include general shifts in the attitudes toward the dead; whether the site contains famous dead, and influence of revisionist histories that may claim a site for political purposes. In her discussion, she outlined a number of areas and questions that have not received much detailed study, including the issue of how bereaved individuals and groups respond to the use of mass graves. One of her points is that a mass grave is not a cemetery, and how do descendants deal with this issue in the future?

According to Rugg (2000), the following represent the characteristics a burial space has to have to be a cemetery:

- Cemeteries are close to, but not necessarily within, settlements.

- Cemeteries have an established perimeter, as well as entrances that indicate the meaning of the site literally or symbolically. These perimeters can be walls, fences, or even hedges.

- Cemeteries provide a context to memorialize a particular individual, by providing maps, roads and paths, etc., so that each grave site has an "address." These contexts are often marked by individual or family markers.

- With a few notable exceptions, cemeteries generally serve the complete community. Military cemeteries are a bit different because they tend not to be owned and operated by the community, and they may hold some additional cultural significance. As Rugg (2000:272) has noted, some scholars have argued that war or military cemeteries convey an inherent critique of conflict, and others suggest that they convey a commitment to democracy or can stand as symbols of a country. In this volume, we suggest that the military funeral and cemetery and the principle of reburial/recovery sends the clear message to current troops that they are valued as individuals and will always be returned "home," no matter how long ago they died (see Chapter 11).

- Rugg (2000:272–273) also discusses "pantheons," which are defined as "a monument or building commemorating a nation's dead heroes." Pantheons do not always hold the remains of individuals, and they do not always commemorate military heroes. These sites are usually owned by the state and have political significance. Sometimes, this sacred quality grants permanence to the site, but this focus can also make them vulnerable if whoever is honored falls out of favor (e.g., Stalin, or particular revolutionary heroes by the counter-revolutionary winners). Cemeteries and burial grounds themselves can acquire pantheon status because of the people buried there—for example, notorious folk heroes.

In her analysis of graves and funerals as cultural communication, Reimers (1999) focused on a multicultural Swedish cemetery and added to the discussion of the nature of cemeteries by employing Goffman (1967), Durkheim (1915), and others to point out that in both funerals and cemeteries people make choices that can be seen as part of their individual and collective self-presentation. This does not mean that there is no such thing as a Catholic burial, but rather that burials and customs include regional, national, and ethnic differences. The rituals performed at such events—and which are at least partially represented by the physical cemetery and the material culture within it—not only illustrate preferred identity, but the rituals actually engender identity. By making a series of choices on death, funeral, and burial, "the bereaved communicate not only who the deceased was but also who they are and where they belong" (Reimers 1999:163). Reimers (1999:163) outlined her primary point: "whether or not different practices in the funerary rituals are brought about through deliberate choices, they are part of the self-presentation and identity construction of the group involved." People don't just reiterate what they already know, but they incorporate new customs, and some old customs take on new or different symbolic meanings. Cemeteries mark both individual and collective identity.

Reimers (1999:164) made an especially interesting point about the bereaved in multicultural cemeteries: they can choose different religious and ethnic markers to distance themselves from the local culture and assert their common heritage, or they can blend practices and construct a new ethnically diverse identity. In her analysis of cemeteries as cultural landscapes, Francis (2003) revisited the work of Warner (1959) and Sloane (1991) to note that funerary landscapes do not just reflect and express cultural continuities and community transformations, but that they also help to write that history. She encouraged further cross-

national and cross-cultural research to supplement, advance, and revise the study of death.

This chapter begins with an outline of the Alameda-Stone cemetery in the definitional sense discussed above, then it places the site in a broader context of what we know about cemeteries of this period, and finally focuses on what we can learn from the cemetery and its analysis. This multivolume report is necessarily a description and summary with a somewhat limited amount of detailed or advanced analysis. However, future citizens and researchers can use these data to address a number of important anthropological and historical questions, including questions that may be posed by descendant communities. All of the sites used for comparison in this chapter generally fit the definition of a cemetery, which is important for comparative purposes.

Definitions and the Alameda-Stone Cemetery

At the time it was created, the Alameda-Stone cemetery fit most of the definitional criteria outlined by Rugg (2000). The cemetery was originally placed at what was the edge of Tucson, and there was a clear perimeter for the cemetery. In fact, there were two perimeters; one high wall marked the military section, and another wall marked the edges of the cemetery (see Chapter 4, Volume 2 of this series). We do not have records of a map or ways to memorialize individuals and families, but we have been able to document distinct geographic areas within the cemetery. Further, the spatial arrangement within the cemetery suggests that people knew where others were buried. The Alameda-Stone cemetery represented the entire community at the time, and there was a separate military section in the cemetery. If there were pantheons, they were not documented or preserved. The cemetery itself was apparently not considered a pantheon, considering that it was built over relatively soon after its founding, a period of just over 20 years. One could argue that the cemetery may have functioned, at least partially, as a pantheon to the multicultural nature of early Tucson, and when Euroamerican settlers increased in number, wealth, and power, it was convenient and important to erase notions of egalitarianism and cooperation. Whatever the case may be, the cemetery has taken on some of the status of pantheon today, as one can visit the cemetery's new location with its permanent public markers and art.

Comparisons

As noted previously, the Alameda-Stone cemetery was the only municipal cemetery in use in Tucson during the mid-nineteenth century. Because of this, evaluating the demographic profile of the skeletal remains recovered from the cemetery provides a picture of Tucson's population at the time. Although historical-period and modern exhumations, urban expansion, and utility work obliterated evidence of some graves and burials, the remains of 1,386 individuals were recovered as part of the current project. Not all of these remains were in perfect condition, but the good to excellent condition of the majority permitted extensive analyses.

Throughout these volumes, various authors have used a number of different sites and references for comparative purposes. Some sites are better to use for comparison when working with osteological data (see Chapter 7, this volume, and Chapters 7–13, Volume 2 of this series); others provide greater insights when the focus is on historical and social distinctions and practices. There are a few sites that have been used for comparison by most of the Alameda-Stone cemetery analysts. In this chapter, comparisons focus on sites in the United States that date to approximately the same time; include a relatively large number of individuals; could be examined on similar variables; and, as a group, reflect a broad geographic range. The eight sites selected are: Uxbridge Almshouse Burial Ground, Uxbridge, Massachusetts (Bell 1987; Elia and Wesolowsky and Wesolowsky 1991);[1] Voegtly Cemetery, Pittsburgh, Pennsylvania (Beynon 1989; Ubelaker and Jones 2003); Milwaukee County Poor Farm Cemetery, Wauwatosa, Wisconsin (Richards 1997); Grafton Cemetery, Grafton, Illinois (Buikstra et al. 2000); Michigan City Old Graveyard, La Porte County, Indiana (Strezewski 2003); Freedman's Cemetery, Dallas, Texas (Davidson 2004); Potter's Field, Secaucus, New Jersey (Louis Berger Group 2005); and Old Snohomish Cemetery, Snohomish, Washington (Tallman and Carrilho 2006) (Table 32). Most of the cemeteries in this sample differed from the Alameda-Stone cemetery in several ways—each represents a longer span of time, they were generally cemeteries for a particular subgroup within the larger community, and they were generally not multicultural cemeteries. The cemeteries in the sample represent pauper communities, African American communities, or communities with relatively little ethnic diversity. None has the multicultural diversity found at Alameda-Stone, and none has a majority Hispanic focus. It is not the case that such comparable sites were excluded; similar cemeteries have not been excavated and reported to date.

Cemetery-Level Overviews

Table 32 demonstrates that, on a broad scale, the Alameda-Stone cemetery was not significantly different from other archaeologically documented cemeteries of the same

[1] The Uxbridge Almshouse Burial Ground is not large, but it is well documented, often cited, and geographically represents the eastern United States in this sample.

Table 32. Comparison of Historical-Period Cemeteries Generally Contemporaneous with the Alameda-Stone Cemetery

Data Category	Alameda-Stone, AZ	Uxbridge Almshouse, MA	Voegtly Cemetery, PA	Milwaukee County Poor Farm, WI	Grafton Cemetery, IL	Michigan City Old Graveyard, IN	Freedman's Cemetery, TX	Potter's Field, Secaucus, NJ	Old Snohomish Cemetery, WA
Reference	This volume	Bell 1987; Elia and Wesolowsky 1991	Beynon 1989; Ubelaker and Jones 2003	Richards 1997	Buikstra et al. 2000	Strezewski 2003	Davidson 2004	Louis Berger Group 2005	Tallman and Carrilho 2006
Time period	1860–1880	1831–1872	1833–1861	1882–1925	1834–1873	1835–1864	1869–1907	1900–1962	1866–1923
No. individuals	1,386	32	724	1,649	252	ca. 400	1,157	4,571	313
Dental health	relatively good	poor	poor	unknown	fair to good	fair to good	poor	variable	not indicated in report
Rows	yes	yes	yes	yes	yes	yes	yes	yes	yes
Orientation	east-west	east-west	north-south	east-west	east-west	east-west	east-west	northwest-southeast	east-west
Coffin wood types	pine, juniper, or cypress	pine, yellow poplar, chestnut	not indicated in report	pine, elm	pine, coniferous wood, black walnut, other	pine, walnut/ butternut, ash, undefined hardwood	pine or basswood	not indicated in report	not indicated in report
Coffin shape	hexagonal, rectangular, trapezoidal	hexagonal, rectangular	hexagonal	rectangular, hexagonal, octagonal	hexagonal, rectangular, octagonal, tapered	hexagonal	hexagonal	hexagonal, rectangular, tapering	not indicated in report
Coffin hardware	nails, screws, tacks, few handles	nails, screws, hinges, viewing windows	nails, tacks, escutcheons, few handles	nails, handles, few tacks	nails, screws, escutcheons, hinges, handles, viewing windows	nails, tacks, hinges, handles, viewing windows	nails, tacks & screws, caplifters, plaques, viewing windows	nails, some handles & plates	nails, handles, viewing windows
Grave inclusions	coins, bottles, toys, frames, ammunition	ceramic fragments	glass, ceramics, coins	religious items, personal items	bullets, pencil	none	bottles, ceramics, toys, coins	coins, pipes, ceramics, bottles, toys, personal hygiene items	personal hygiene items, pencil
Artifacts related to body preparation	buttons & fasteners, fabric	fasteners, pins, fabric	coins, pins	buttons	coins, buttons, fabric	pins, buttons, fasteners, fabric	coins	buttons, coins	buttons
Personal adornment	buttons, religious items, fasteners, shoes, jewelry	buttons	clothing, shoes, some jewelry	medical-related items, leather, shoes, clothing fragments, buttons, religious items	clothing, buttons, fasteners, hair, jewelry, shoes	pins, buttons, fasteners, fabric, combs	jewelry, canes, eyeglasses, shoes	buttons, jewelry, medical-related items, religious items, shoes, clothing	jewelry, clothing fragments, shoes, buttons

general period in its size, organization, or in the placement or basic composition of burials. Large cemeteries were established in urban areas at the edges of town, and under certain circumstances (dependent upon time and geography) in more rural settings; the organization of each of the cemeteries was in rows (although these rows varied dramatically in precision, length, and composition of individuals placed together); coffins were constructed of local woods (the use of pine possibly representing mass-manufactured coffins in some places); orientation of graves was generally east-west; the same set of coffin styles and shapes were represented; coffin hardware was primarily utilitarian, with a few notable exceptions; and artifacts (not including coffin-associated artifacts) were proportionately few in number and type. In general, these trends *and* any differences represent time, age groups, ethnic or religious groups, or other particular distinctions within the cemetery. At a very general level, the Alameda-Stone cemetery fits the general model of a nonurban cemetery for the 1860s–1880s, but examining the data more closely, a number of interesting differences, as well as similarities, appear.

As noted earlier, the period of use of the Alameda-Stone cemetery was a time of significant change in southern Arizona. Tucson remained a frontier community on the margins of the Civil War and was also on the margins of a developing nation until railroads entered the scene; long-distance commerce and travel were limited in Tucson until the arrival of the railroad. All of these factors undoubtedly had an impact on breadth and nature of diet and access to materials, so it is not surprising to find a continuation of patterns that were already established while Tucson was a Spanish colonial settlement.

Table 33 provides a comparison, in simplified graphic form, of the nature of the populations in each of the comparison cemeteries. Several things stand out about the Alameda-Stone cemetery: (1) it is the only example of a large, predominantly Hispanic cemetery that was also multicultural, (2) it is the cemetery with the highest proportion of religious items within the cemetery, and (3) both poor and middle-class individuals were buried there. The Alameda-Stone cemetery is one of the few cemeteries that represent the entire community at the time.

Reasons for Excavation of Sites in the Comparative Sample

> To visit the village cemetery . . . is to understand the enduring values of small town life, and the way that life can be celebrated and appreciated in a place where *not* thinking about death is not possible.
>
> Janet Hulstrand, "In the Village Cemetery (at Essoyes)"

This quote is in regard to a French village cemetery, but could apply to many such cemeteries around the world. This report, however, is about a cemetery that a town left behind as it grew into a city. People worked to actively erase the memory of this cemetery. However, the values that resulted in the abandonment of the Alameda-Stone cemetery have shifted once again, and today we believe that such places deserve respect, study, and placement in a new location that will result in its continued incorporation into local society and values. We regard old cemeteries differently today, and this results in our having to excavate them occasionally.

For the last 25 or more years, it is unusual for a cemetery to be excavated for other than development-related reasons. That said, it would be easy to state that all of the cemeteries included in this comparison were excavated because some sort of development threatened them. Although this is ostensibly true, the specific reasons for excavation can tell us something about the treatment of historical-period cemeteries, views of the dead over time, and how such treatment has changed. To see how changes in thinking about cemeteries have occurred, each cemetery in the comparative sample will be examined according to the date it was excavated and the specific circumstances of the project. In each case, unless otherwise noted, information comes from the published report cited at the beginning of the description.

Several of the projects discussed here represent cemeteries related to so-called poor farms, public institutions, or those who cannot afford burial. Others are the cemeteries of minority groups whose descendants were not powerful enough to lobby for their preservation. Another group represents early community cemeteries that have been abandoned by development and growth. In each case, the sites represent change in values of the larger communities: (1) decisions regarding how the poor should be treated, especially at death; (2) the value of all individuals to the community as a whole; and (3) the consequences of unrestricted growth and development.

The Uxbridge Almshouse Cemetery, Massachusetts

Excavations at the Uxbridge Almshouse Cemetery in Massachusetts (Elia and Wesolowsky et al. 1991) were conducted in the mid-1980s because a planned state highway project was going to go through the area. The cemetery (1831–1872) had been properly reserved in deeds, but after the almshouse property was sold in 1872, the town stopped maintaining the cemetery, and eventually knowledge of the site was lost to most. The cemetery was also not subjected to archaeological fieldwork when the area was first surveyed for the project. When construction workers found tombstones, the original archaeologists indicated that it was a small Quaker cemetery that was not

Table 33. Composition of the Cemeteries Compared to Alameda-Stone Cemetery

Cemetery	Euroamerican	Hispanic	Native American	African American	Poor	Middle Class	Religious Items?
Alameda-Stone cemetery, AZ	X	**X***	X	X	X	X	yes
Uxbridge Almshouse, MA	**X***		X		X		no
Voegtly Cemetery, PA	**X***					X	no
Milwaukee Co. Poor Farm, WI	**X***				X		few
Grafton Cemetery, IL	**X***					X	no
Michigan City Old Graveyard, IN	**X***					X	no
Freedman's Cemetery, TX				**X***	X		no
Potter's Field, NJ	**X***			X	X		no
Old Snohomish Cemetery, WA	**X***		X			X	no

Note: The designation **X*** indicates that this group represented the vast majority of the individuals in the cemetery. References for cemeteries other than the Alameda-Stone cemetery are in Table 32.

significant. However, a group of people opposed to the road changes wrote a letter of protest naming the cemetery and the possibility of Native American burials on the property as reasons to halt construction. This group alerted the local Nipmuck Indians about the burials.

The Nipmuck Indians argued that, in addition to the cemetery, there might be three possible mounds on the property.[2] Within the cemetery itself, the Nipmuck thought it likely that the town may have buried one or more destitute Indians. The law that was used to force the excavations was the Massachusetts Unmarked Burial Law of 1983 that says that the state archaeologist shall undertake a site evaluation when there are Native American burials or burials more than 100 years old that are threatened or accidentally discovered. The same law allows for archaeological excavation of these remains under the oversight of the Commission on Indian Affairs. The commission and the state archaeologist decide how the remains will be disposed. Interestingly, although Indian remains are explicitly designated for eventual reburial in the law, non-native remains are to be deposited in a "curatorial facility." As a result of the Uxbridge project, this law was amended. In any case, prior to this law, the graves could have been excavated and reinterred in a modern cemetery, without study, by a professional funeral director.

Massachusetts has several laws prohibiting the disinterment of human burials in abandoned or neglected burial grounds, without a court order. The Uxbridge cemetery project is interesting because (although the situation was more complicated than outlined here) it was an early test of newly implemented state burial laws, and it forced the public to directly address the issue of abandoned cemeteries and the values these sites represent.

The Voegtly Cemetery, Pennsylvania

The Voegtly Cemetery in Pittsburgh, Pennsylvania (Ubelaker and Jones 2003) was excavated in 1987 because of planned highway construction. The large, urban cemetery was associated with the Voegtly Evangelical Lutheran Church, representing a Swiss-German population. Expansion to a new cemetery (Troy Hill) in 1861 and subsequent church razing, rebuilding, additions, etc., resulted in the abandonment of this site. The Church went through a number of different pastors, and eventually, church membership declined; in 1950, the church constructed an asphalt parking lot that covered the cemetery completely. The congregation officially dissolved in 1985. Local oral tradition indicated that the cemetery had been moved to the new location, but in fact only a few graves were moved. Records were poor or nonexistent.

Although the Voegtly project did not test new laws, it is interesting from the perspective of project management. There was no question that the graves had to be located and excavated, but work on the highway was not slowed down. Excavators had to stay ahead of daily construction,

[2] Upon investigation, it was found that mounds were the result of more recent disturbances and did not contain burials or Native American artifacts (Elia et al. 1991).

requiring them to work 10-hour days and 6-day weeks for almost 4 months. By the time the fieldwork was over, there was little time or money for analysis of the burials.

Milwaukee County Poor Farm, Wisconsin

Richards (1997) reports on the excavation of the Milwaukee County Poor Farm Cemetery on the Milwaukee Institution Grounds in Wauwatosa, Wisconsin. People buried in the cemetery were (1) residents of the almshouse or hospitals and juvenile facilities in Milwaukee County; (2) unknown, unidentified individuals, or those who died with no known relatives; and (3) individuals who were likely poor, but whose relatives had some involvement with the funeral. This cemetery was known, but was largely ignored by Milwaukee County, as the Milwaukee County Medical Complex developed and expanded. In 1991, during the construction of new facilities, burials were disturbed, and this discovery resulted in an unanticipated test of Wisconsin's newly instated burial sites preservation law (s.157.70 Wis. Stats.)

Under the Wisconsin law, all burial site disturbances on private or state land must be reported to the Burial Sites Preservation Office. The Director of the State Historical Society of Wisconsin must authorize, in advance, any excavation of burials. Further, not just anyone can excavate a burial — it must be someone who has been deemed a "qualified archaeologist" by the Director (s.157.70 Wis. Stats.) One major idea behind the law was to protect unmarked cemeteries or burials found outside cemeteries. Prior to the law, prehistoric and historical-period Indian cemeteries were unprotected. The law was specifically written to apply to all burials so that everyone would be granted equal treatment. Up until the Milwaukee County situation, the Burial Sites Preservation Office had primarily worked with prehistoric or historical-period Indian burials.

The Program Coordinator of the Burial Sites Preservation Office visited the site and determined that at least 150 additional burials were within the construction area. The recommendation was that professional archaeologists excavate the remaining burials, and the Medical Complex requested permission to do this. Although permission was granted, it became clear that the County had known since at least 1980 that as many as 5,000 individuals had been buried on County Grounds between 1850 and 1974 (Richards 1997:8). Although the County never publicly admitted prior knowledge, the County agreed to define the limits of the pauper cemetery, even beyond the current construction. The archaeologists recovered a total of 1,649 burials.

Richards (1997:9–10) has noted the irony that legislation forced the County to allow the systematic recovery of graves, and legislation also put into place the system that created the cemetery initially. The 1894 County Rules for the County Farm and Almshouse include Rule 17 that provided a template for pauper burials, including how they should be buried and marked, records to kept, etc. As Richards noted, both regulations were supposed to provide fair and humane treatment to a marginalized group. Milwaukee's earliest pauper cemetery was in the city, but as the city expanded, the County took on more of the responsibility and moved the cemetery west.

The size of the Milwaukee County Poor Farm Cemetery surprised everyone, and Richards (1997:270–271) has indicated that the construction project planners likely thought that the 1932 nurses' residence disturbed most of the burials in the cemetery. That building was placed in the center of the cemetery and there is documentation that at least 200 burials were disturbed. Nonetheless, it was also clear that county and Medical Center officials were displeased with having to pay for careful excavation of the cemetery and refused to acknowledge that they knew or should have known about the site. It was the relatively new Wisconsin Burial Sites Preservation Law that forced the systematic excavation and analysis.

The Grafton Cemetery, Illinois

The nineteenth-century Grafton cemetery in Illinois (Buikstra et al. 2000) represents a somewhat different situation than the first three cemeteries discussed. The citizens of Grafton, having been flooded out many times in the past, were finally, after the "Great Flood of 1993," determined to relocate their town from the floodplain to the bluff top. The cemetery was located during archaeological survey and testing of the relocation area. The City of Grafton, the Illinois Department of Commerce and Community Affairs, and the Federal Emergency Management Agency (FEMA) sponsored the archaeological work. Although the cemetery appeared in the 1872 plat book for the county, it was gone by 1893. In later plat books, the marked cemetery is the Scenic Hill Cemetery, which is still in use. Local oral tradition indicated that burials from the Grafton Cemetery had been moved to Scenic Hill in 1872 or 1873, but Buikstra et al.'s (2000:10) discovery of 252 graves suggests that this transfer was, at best, incomplete. There was evidence that a number of grave markers were moved to the new cemetery, but it is unclear that associated graves were also moved. Buikstra (2000:144) suggests that the original move of the cemetery could have been due to lack of space and changes in overall views of death. These changes (Buikstra 2000:143–144), associated with the Victorian "Beautification of Death" movement, included increased mortuary ostentation, professionalization of the undertaking industry, and a trend toward mortuary monuments and facilities, as well as parklike cemeteries.

The Grafton project was not associated with new laws. There was no debate about whether or not the cemetery would be excavated because it was handled under existing state and federal laws. Local oral tradition informed

the archaeological work, but that information was shown to be problematic at best.

The Michigan City Old Graveyard, Indiana

The Michigan City Old Graveyard in Indiana (Strezewski 2003:1) was located as a result of the remodeling of a junior high school. In building a new cafeteria, construction crews encountered skeletal remains while digging a trench for a sewer line. Because the bones were human, but appeared old (e.g., not a recent murder), the coroner contacted the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology. Construction was halted, and an archaeological investigation was conducted. The state office recommended that all burials and associated objects be removed before construction continued. Once again, this was a nineteenth-century cemetery that quickly became too small for the growing community, and in less than 20 years, even the expanded cemetery was inadequate. The town attempted to move the remains to a new location in 1882, but lack of records and loss of grave markers made that project incomplete. An unusual complicating factor at this cemetery was the ubiquitous presence of dune sand in the area.[3] It was reported that some burials were covered by up to 4.9 m of drifted sand (Strezewski 2003:6).

Although the work reported by Strezewski (2003) is the first professional archaeological work conducted at this site, it is known that some school additions yielded human bones and coffin hardware during construction. Most recently (1980), these materials were interred in the new cemetery, and a plaque noting the presence of the original cemetery was installed in the new Performing Arts Center (where the remains were found). The archaeologists who excavated and analyzed the cemetery for the current report attribute the original relocation of the cemetery to the development of the rural cemetery movement, with its reaction against urban cemeteries.

The Freedman's Cemetery, Texas

The Freedman's Cemetery in Dallas, Texas, an African American cemetery created in 1869 (Davidson 2004), was located as a result of archaeological survey work in 1985, prompted by highway expansion through downtown Dallas. A state transportation archaeologist found an unusual city park that was marked with a sign that read "Freedman's Memorial Park, A Public Cemetery." The park had been dedicated in 1965, but due to an error in the construction of a new building, the right-of-way for a major highway had to be shifted. Its new location intruded into the park. Many local, state, and federal entities, as well as members of the public, became involved. For almost 3 years, excavations took place, and resulted in the exhumation, documentation, and analysis of 1,150 burials containing the remains of 1,157 individuals (Davidson 2004:6). The boundaries of the cemetery went far beyond the park.

Davidson (2004:8–9) notes that the original cemetery had been about 4 acres, but due to "a series of unscrupulous land sales by numerous parties," the cemetery had been made increasingly smaller, resulting in the 1.22 acres that was transformed into a city park, with playground equipment and picnic tables over the unmarked graves. The city covered the burials with about a foot of sterile soil when creating the park, but they also covered the city's past questionable actions in regard to this community. The relocation of the cemetery by the archaeologists was a revelation to the city, serving as a proxy to measure the success of the African American community, as well as their resistance and self-determination, in choosing not to conform to the dominant ideology (Davidson 2004:14). Freedman's Towns were a series of settlements ringing the Dallas city limits that were created and settled by African Americans following the Civil War, despite the city of Dallas's efforts to keep them away.

The Potter's Field Cemetery, Secaucus, New Jersey

The Potter's Field Cemetery in Secaucus, New Jersey, is another example of a so-called pauper's cemetery that was excavated as a result of a highway interchange project and related improvements (Louis Berger Group 2005). This was an extremely large project, posing many difficulties:

> The disinterment and reinterment of individuals from Potter's Field presented a myriad of considerations, stipulations, mandates, and regulations that required scrupulous and well thought out approaches in order to achieve a balance between maintaining the sanctity of the deceased while successfully completing the professional scope of services. . . . While the multidisciplinary team of experts had to locate unmarked graves and recount events that had taken place at the burial ground, they were also tasked with the responsibility of reclaiming the identity of thousands of individuals who had found Potter's Field to be their final resting place on earth [Louis Berger Group 2005:1-4].

The funding agency here was solely the New Jersey Turnpike Authority, a financially independent state agency; state tax dollars are not used in the operation or

[3] Michigan City is located near the Indiana Dunes National Lakeshore, and the entire area consists of soils formed in sandy outwash, sand dunes, and beach ridges. The dunes are still active today.

construction of the Turnpike. The set of laws used to authorize this project were complicated; the state board that oversees cemeteries argued that they were not sure that the site was a cemetery under the law. The Turnpike Authority filed suit and the matter had to be resolved via a series of court decisions. One of the interesting portions of these decisions is as follows:

> The Turnpike Authority would create a trust fund dedicated solely to the perpetual maintenance and preservation of the graves used for the reinterment and memorial monument, landscaping, and other improvements installed at the reinterment cemetery by the plaintiff in accordance with N.J.S.A. 8A:4-2. In addition, the Order also noted that the Turnpike Authority was responsible for obtaining any permits and approvals from state, region, county, or municipal entities as required by law or regulations [Louis Berger Group 2005:2-6].

The Potter's Field Cemetery project resulted in the recovery of a total of 4,571 individuals (representing 46 percent of the individuals listed in the county burial registers) and is (to the extent of the author's knowledge) the largest cemetery excavation project undertaken under a single contract in the United States, as well as the largest disinterment of a potter's field. The pattern of burial at the site started in the southwest portion of the property circa 1880 (now under the Turnpike) and progressed to the northeast until 1923, beginning again in the southwest in imported fill and proceeding northeastward until interments ceased in 1962. Preservation at the site was variable, but with a number of pieces of evidence, the Louis Berger Group was able to positively identify 825 individuals.

The Old Snohomish Cemetery, Washington

The Old Snohomish Cemetery in Snohomish, Washington, was a local cemetery dating from 1866 to 1923 (Tallman and Carrilho 2006). The cemetery was eventually abandoned, and some graves were relocated, but the numbers are not documented or certain. The examination of the cemetery was prompted by the construction of a city-owned senior citizen facility. The circumstances of this project caused both local and state governments to become involved, as well as native tribes. There was already a senior facility on the property, but this was housed in a donated residence that was brought to the property. As early as 1965, local citizens attempted to restore the cemetery as a historical-period site. Two burials that were reportedly Native American were exposed during a city road widening. The property was reported to be the location of an ethnographic village as well as a historical-period city cemetery (Tallman and Carrilho 2006:3–4).

In 1997, the city hired a cultural resource management firm and a geophysical survey firm to determine if historical-period graves, Native American graves, and artifacts from an earlier Native American occupation remained at the site. Some evidence of pre-contact and historical-period period materials were found, as well as one burial and two possible grave shafts. During these investigations, two local families and the non-federally recognized Snohomish Tribe sought to stop the city development. Eventually, a court order allowed the city to proceed but established procedures for work, as well as requiring work to be consistent with an interlocal agreement with the Tulalip Tribes of Washington (Tallman and Carrilho 2006:4). The total number of persons buried at the cemetery had never been established, and the number of graves removed and reinterred elsewhere was also unknown. The permits for the project discussed here were eventually given in 2005.

The work reported in Tallman and Carrilho (2006) includes a calculation of 313 possible graves. Of these, there are 309 individuals potentially interred in the cemetery according to archival research. A total of 136 were relocated in 1947, and 113 were positively identified in this project. It is still unknown whether the cemetery includes both native and non-native individuals; preservation was highly variable.

Summary of Reasons for Excavations

Combining the information for the comparative sample and the Alameda-Stone cemetery, a number of interesting patterns in historical-period mortuary archaeology appear:

1. Although all of the excavations were prompted by development or construction-related projects, the basis and funding for these projects varies widely. Most do not fall under any federal laws, but were conducted based on local and state laws and court orders. In a number of cases, these court orders were the result of lawsuits on the part of local citizens in opposition to the project.

2. A number of the state laws that were specifically developed to protect Native American burial sites were written broadly enough to cover all historical-period burials. Although it was thought that the majority of cases of application of these laws would be for Native American graves, the laws were tested and applied in major non-native historical-period cemetery projects.

3. Archaeologists (and some courts) agree that the historical-period cemeteries included here fit the definition of a cemetery, even though some of the qualities

itemized by Rugg (2000) are missing from some of the cemeteries. In particular, her so-called road maps are either missing or minimal, as are documentation and monuments. That said, it is generally clear that graves were marked in some fashion, as most graves did not overlap. The differences between these cemeteries and Rugg's list of characteristics may be the result of a more open and less structured view of cemeteries in the development of United States funerary practices during the nineteenth and early twentieth centuries.

4. The pauper cemeteries in the sample rarely include only the poor. They can perhaps be best characterized as the poor, the unhealthy, and the unnamed, as these cemeteries also included those who were hospitalized or kept in institutions, as well as those who had the misfortune of dying in situations where no one knew who they were or where they belonged.

5. The studies included here represent a wealth of osteological, historical, and archaeological information that can be used for future studies of specific sites or as comparative material in new projects. Especially given the fact of reburial, investigators have tried to document their work so that it can be subsequently used by others.

6. Few projects have focused on community cemeteries (perhaps because these are more likely to be preserved?), and the Alameda-Stone cemetery is one of the only projects that represent a large multicultural population that is not an almshouse-type cemetery.

7. The old village cemetery that Hulstrand (2010) has described may not be something that people in the United States today see as a primary value. Although we have changed past views and try to treat past cemeteries with respect, the location of the place itself is of less focus. This may simply be because it was known that "preservation in place" was not possible in these instances, but the creation of a particular kind of landscape for the dead is not addressed in most of these reports. This issue will be examined in a subsequent section focused on reburial in these projects.

8. Most of the cemeteries in the sample represent some type of transitional cultural status, many at the beginning of the Beautification of Death movement. This most likely reflects the time period chosen for those in the sample, but it is interesting that every project report discusses such a transitional state. For instance, Landers (2003:8) noted that the Voegtly Cemetery excavations revealed a "society in transition . . . where elements of the traditional Old World German culture apparently clashed with nineteenth century mainstream urban America." Perhaps this state results in a less apparent, less monumental, and more vulnerable cemetery. In any case, the transition in all cases is visible in the mortuary site.

Comparison of Research Findings with Those from Other Cemeteries

In addition to comparing how excavations of compared cemeteries came about, how the Alameda-Stone cemetery compares to the archaeological results of excavations at other cemeteries is briefly discussed below. Archaeological characteristics that could be compared include grave and coffin preparation, grave inclusions, artifacts related to body preparation, items of personal adornment, dental health, and spatial relationships within the cemetery.

Grave and Coffin Preparation

For different reasons, the Beautification of Death movement of the second half of the nineteenth century was barely evident in the Alameda-Stone cemetery and several of the other cemeteries in this comparison (see Chapter 8, this volume, and Chapter 5, Volume 2 of this series). In the case of the Alameda-Stone cemetery, Tucson was too remote—it was not yet part of transportation networks during its period of use. In the other cemeteries, the relative lack of Beautification of Death characteristics may have had more to do with the particular subset of the population buried within them. However, like all of the cemeteries in Table 32, the Alameda-Stone cemetery appears to have developed a row-based structure consistent with the movement. Although individuals were generally placed in rows in the Alameda-Stone cemetery, analyses have determined that there were distinctive spatial units or clusters of rows within this overall framework. This was especially notable in the military section (Cemetery Area 1) and in Cemetery Area 3 (see Chapter 4, Volume 2 of this series). Similar spatial within-cemetery divisions have been found in most of the cemeteries in Table 32. These spatial distinctions represent different groups (military, children, families) and sometimes, time.

Headstones or other grave markers were not found at the Alameda-Stone cemetery for at least two reasons: (1) the entire cemetery area had been graded and built over and was hidden for many years; and (2) many of the markers used may have been made of wood or other less-permanent substances (O'Mack 2005, 2006; see Chapter 5, Volume 2 of this series).

More than 80 percent of the graves at the Alameda-Stone cemetery held coffins with at least one individual. Of the coffins where preservation was reasonable, shapes

were limited to hexagonal, rectangular, and trapezoidal; hexagonal was the most common coffin shape. Coffins were constructed expediently—local wood was usually used, with butted joints and a range of nails. None of the coffins appeared to have been mass-produced, and fewer than 100 coffins had any sort of mass-produced decorative hardware. More than half of the coffins were covered or lined with fabric. Some of the coffins were also painted bright shades of green, blue, red, or white; this custom was noted in the archival literature and also in several of the other cemeteries in the comparative sample (see Chapter 5, Volume 2 of this series).

The Alameda-Stone cemetery did not differ in terms of coffins and coffin construction from most of the cemeteries in Table 32. Where there were differences, the reason was often because the other cemeteries represented a broader range of time or because of the limited populations included in the relevant cemeteries. For example, Freedman's Cemetery in Dallas, Texas, although an African American cemetery, had considerable coffin hardware that Davidson (2004) has used in several detailed analyses, especially to help determine fine-grained chronology. Although Freedman's Cemetery may or may not have been "wealthier" than Alameda-Stone, Freedman's Cemetery did have a much longer and more recent period of use. Manufactured coffins and coffin handles would have been readily available via transportation systems. In the case of the more middle-class Grafton Cemetery (Buikstra et al. 2000), there were more mass-manufactured coffins and more coffin hardware; this may reflect the relative accessibility of materials via railroads, and/or it may also reflect the somewhat overall higher status of the individuals within that cemetery. What is interesting is that, given its location in a frontier setting and lack of mortuary professionals, the Alameda-Stone cemetery did have some evidence of the Beautification of Death movement. This is likely evidence of its transitional stage, but it also serves as evidence of how powerful this movement was and how broadly it impacted and affected ideas and traditions.

Grave Inclusions

For the purposes of comparison, grave inclusions were separated from coffins and coffin hardware, artifacts related to body preparation, and artifacts representing personal adornment. Grave inclusions are defined as items placed into the graves that were not part of the coffin and were not something that the deceased wore at burial. At Alameda-Stone, grave inclusions were limited and found with very few individuals.

Inclusions represented were bottles, possibly for holy water, clay smoking pipes, toys, and tools. Toys and tools and recovered from grave fill included a graphite stylus, a glass marble, and an iron scissor. The stylus was associated with a small child, the marble was recovered from the grave of an older adult Hispanic male, and the scissors came from the grave of a young-adult Hispanic male (Figure 121). Whether these items were intentionally placed in the grave with the coffin as a sentimental gesture or were included as the grave was filled is unknown. Both

Figure 121. Toys and Tools from the Alameda-Stone cemetery: (*a*) a stylus from Individual P, Grave Pit 591, a child of indeterminate sex or cultural affinity; (*b*) a pair of scissors from Individual P, Grave Pit 690, a young adult male of Hispanic cultural affinity.

Figure 122. Examples of frames from the Alameda-Stone cemetery.

the Grafton Cemetery and the Old Snohomish Cemetery also had graves with stylus or pencils. Bottles were recovered from several sites, and a small number of toys were also found in the comparative sample.

Inclusion of coins in burials was a custom that persisted in America, Europe, and Britain well into the 1900s (Davidson 2004:350; Puckle 1926:51). Coins have been recovered in Euroamerican and African American burials, including those in Dallas's Freedman's Cemetery (Davidson 2004), Voegtly Cemetery (Beynon 1989:147), Grafton Cemetery (Buikstra et al. 2000), and Potter's Field in New Jersey (Louis Berger Group 2005). Davidson (2004) reported coins located at the head, hips, and hands, and loose in the coffin fill. In Euroamerican cemeteries, coins were most commonly located near the head and shoulders or in the eye orbits. The Voegtly Cemetery excavations recovered 18 burials with coins placed over the eyes (Beynon 1989:147), and Grafton Cemetery in Illinois had 4 burials with coins near the eyes or in pants pockets (Buikstra et al. 2000). There were 13 coins recovered from 6 different burials at the Alameda-Stone cemetery (see Figure 7). See Chapter 6, Volume 2 of this series for a detailed discussion of the Mexican and U.S. coins found at the Alameda-Stone cemetery, as well as a poker token that apparently was used as a coin.

There were 19 frames (for holding and displaying images or other information) recovered from 18 separate burials. Five basic styles were determined: large rectangular, rectangular, square, oval, and oval with bale (Figures 122 and 123). Six of the individuals with frames were determined to have had a Catholic religious affiliation based on artifacts associated with Catholic burial traditions. Those buried with frames included all age categories; Euroamerican, Hispanic, and Native American individuals; and both males and females.

Ammunition was collected from 43 graves. Around 2 percent of the total number of individuals in the cemetery were directly associated with ammunition. In an approximately equal number of cases, ammunition was present in the grave but could not be directly associated with the individual and was interpreted as intrusive (i.e., the relationship to funerary activities was unclear). A few graves had a combination of intrusive ammunition and directly associated ammunition. Of the individuals associated with ammunition, 88 percent were adults and 12 percent were

Figure 123. Artist's rendering of frame with drawing from Individual P, Grave Pit 13689, a middle adult female of Native American cultural affinity.

Figure 124. Cranium with gunshot exit wound, Individual P, Grave Pit 534, Burial 1278, a middle- adult Euroamerican male.

children. All of the adult individuals with ammunition that could be assessed for sex were male.

Fewer than 20 individuals had skeletal evidence of weapons trauma and even fewer showed both skeletal evidence of weapons trauma and ammunition (see Chapter 7, this volume, and Chapters 6 and 12, Volume 2 of this series). Of the individuals with weapons trauma, 12 had evidence of gunshot wounds (Figures 124 and 125). As noted in other chapters of this series, there is a disparity between newspaper and personal accounts of violence in 1860s–1880 Tucson and evidence of violence found in the cemetery. In the sample of comparative cemeteries, only at the Grafton and Freedman's Cemeteries was there evidence of gunshot trauma or bullets, and these were rare. In comparison to the rest of the sample, the incidence of violence at Alameda-Stone was high. Moreover, even though osteological evidence for weapons trauma was less than might be expected, the level of trauma overall was high in comparison to the other cemeteries, suggesting that Tucson may have been a relatively hazardous place to live (see Chapter 7, this volume and Chapter 12, Volume 2 of this series).

Artifacts Related to Body Preparation

Comparison of artifacts related to body preparation shows that all of the cemeteries yielded evidence of fasteners, straight pins, fabric, and buttons that likely held together burial shrouds or covers. Some buttons and pins were clearly associated with clothing and are not included in this category. Coins are included here in those cases where they were found on the eyes of the deceased. Customs that resulted in the use of shrouds or covers seem to have been universal during this time, although it was not a practice for all individuals, and it may have meant different things at different times and places. In the case of the Milwaukee County Poor Farm (Richards 1997), for example, the presence of shrouds may have reflected the relative lack of status of the individuals buried.

A number of authors (e.g., see Elia and Wesolowsky and Wesolowsky 1991; Richards 1997) noted their surprise in finding considerable evidence of clothing, as opposed to shrouding, in the compared cemeteries. Although there was evidence for both clothing and shrouds at compared cemeteries, researchers had assumed that shrouds would be more prevalent, especially in the context of a poor farm. This lack of fit with preconceived assumptions is likely based on assumptions we make regarding the nature of poor farms and government institutions; the populations represented in these cemeteries is likely more diverse than we generally presume.

Items of Personal Adornment

Consistent with what has already been outlined earlier, the artifactual evidence suggests two major sections of the Alameda-Stone cemetery: the more populous northern Hispanic Catholic section and the southern secular section.

In general, artifacts of personal adornment—apart from clothing fasteners—were most often located in Cemetery Areas 3 and 4 than in any other area of the cemetery. This can largely be attributed to the higher numbers of women and children interred in the northern half of the cemetery when compared to the southern half. Clothing fasteners were distributed throughout the cemetery, although there were noteworthy differences between clothing-fastener

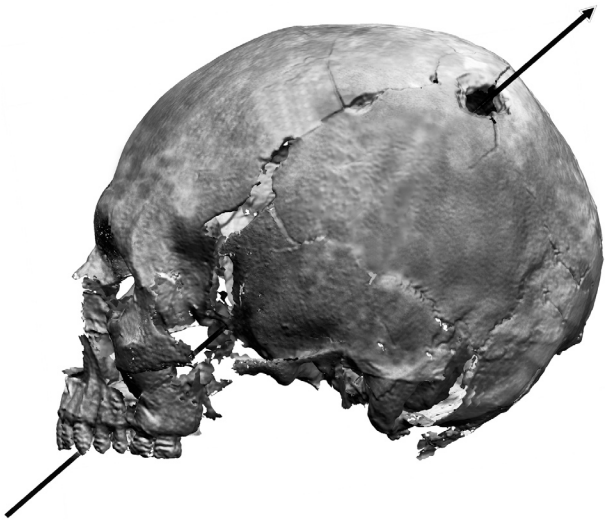


Figure 125. Three-dimensionally rendered image of cranium indicating direction of shot, Individual P, Grave Pit 534, Burial 1278, a middle-adult Euroamerican male.

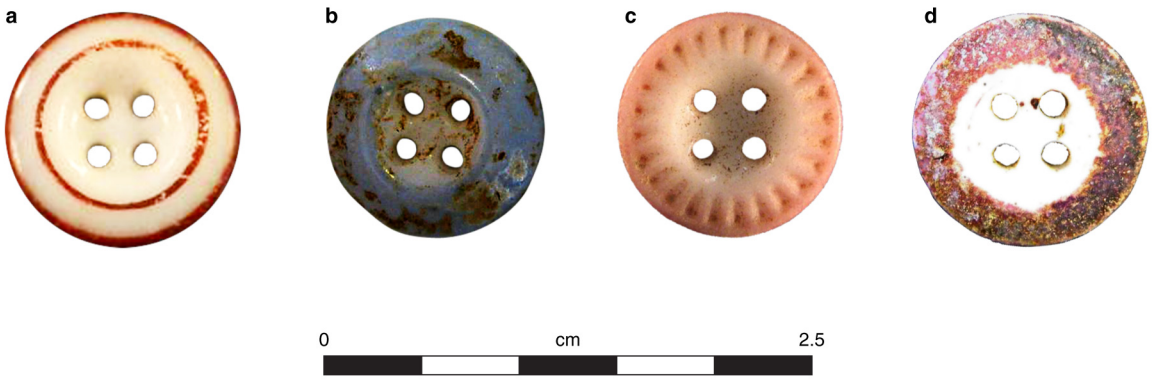


Figure 126. Painted button types from the Alameda-Stone cemetery.

types and age or sex. Decorated Prosser buttons (e.g., painted, transfer-printed, or molded) and engraved shell buttons were more frequent in Cemetery Areas 3 and 4, suggesting a preference for decorated buttons in the northern half of the cemetery (Figure 126). Apparently, this was not only because there were more females in the northern half of the cemetery than in the southern half; transfer-printed Prosser buttons, molded Prosser buttons, and engraved shell buttons were more common among adult males than adult females. Glass shank buttons and hook-and-eye fasteners were more popular among adult females. Military buttons, riveted studs, coat buttons, and cinch buckles were more popular among adult males. As a group, juveniles were interred with more patterned Prosser buttons, gaiters, and hook-and-eye fasteners than adults (Figure 127).

Footwear was also more common among juveniles. Among adults, females were more likely to have been interred with shoes. Again, footwear was most common in Cemetery Area 3. In almost every one of the comparative samples, shoes or evidence of shoes were found, but the range of shoes and their associations was considerable. Although Davidson (2004) suggested that a single shoe on the coffin may represent folk beliefs, the other shoe inclusions seem to reflect clothing. There is also a pattern of finding shoes with children. However, it should be noted that the Potter's Field cemetery in New Jersey—which represents a long and more recent time span—yielded a total of 2,155 shoes and boots, with only 8 associated with infants or children (Louis Berger Group 2005).

Religious objects were almost exclusively restricted to the northern half of the cemetery in Cemetery Areas 3, 4, and 5. There were only two religious artifacts recovered in the southern half of the cemetery, both near the northern edge of Cemetery Area 2. Catholicism was more frequently represented in the cemetery than any other religious affinity. Adults were more likely to have been buried with rosaries, whereas children were more likely to have been buried with traditionally Catholic floral crowns. Frames, which in many cases may have held religious images, were also confined to the northern portion of the cemetery.

Religious objects were not commonly found in the comparative cemetery sample; only the New Jersey Potter's Field and Illinois' Grafton Cemetery yielded numbers of religious objects, and these were not common. For example, in the Potter's Field cemetery of 4,571 individuals, the Louis Berger Group (2005) found religious items with 204 burials. The greater number of religious items at Alameda-Stone is likely because of several characteristics of the Alameda-Stone cemetery: (1) the population was primarily Catholic, and Catholics tend to place more items in graves during this time; (2) preservation in general was better at Alameda-Stone than other cemeteries, and evidence of items such as floral crowns was preserved here and not elsewhere in the comparative samples; and/or (3) the Alameda-Stone cemetery was primarily Hispanic; unlike any of the other samples. Hispanic Catholic traditions of the period encouraged placing items in the grave, especially with infants and children.

Artifacts associated with personal adornment, apparel, religious objects, and other personal artifacts found in burial contexts within the project area were relatively abundant and diverse. In fairly rare cases, ammunition was either intentionally buried with an individual as a personal artifact or left within the body cavity as result of weapons trauma. The specific meaning or function of many artifacts was often difficult to determine, but variation in multiple artifact types according to demography and spatial location suggests that further analysis of artifact distributions—including analysis of covariation in multiple artifact types and feature characteristics—could contribute to a deeper understanding of cemetery organization. Burial artifacts associated with individuals, in combination with other evidence, should also provide a basis for understanding social and religious variation in mortuary practices as implemented in the cemetery and in other cemeteries of the

Figure 127. Examples of transfer-printed buttons from the Alameda-Stone cemetery.

period, particularly those associated with Hispanic Catholic religious traditions.

The multivariate analyses of the Alameda-Stone cemetery, described in Chapter 9 of this volume, provide the beginnings of several important insights about the Alameda-Stone cemetery. All of the multivariate approaches indicate that age and sex were of primary significance, along with cemetery area. The combination of these variables represents biological and spatial qualities of the individuals and their burials, and as a set, allows comparison of these variables according to mortuary observations.

The multivariate analyses support the earlier discussion that adults and children, more than Hispanics and Euroamericans or males and females, were treated differently at death. All of the mortuary observations were influenced, to varying degrees, by age. Significantly, the other major factor that the multivariate analyses identify is that there were significant differences between the north and south portions of the site. The divisions within the cemetery follow a north-south distribution with Hispanics in the northern part and Euroamericans in the southern portion.

Dental Health

Table 32 includes a variable (row) on dental health but not one on general health or pathologies because of differences in preservation and recording methods at a number of the comparative sites. Even if bone preservation is very poor, teeth are often preserved, allowing for some comparisons to be made. Further, dental health reflects variation in diet, health, personal dental hygiene, and access to professional dental care. Two of the most revealing dental pathologies, in terms of diet and generalized stress, are caries and enamel hypoplasias, and most of the comparative studies include these.

Samples representing predominately middle-class communities had high rates of caries. Unlike frontier settlements, these communities were located in places with well-established transportation networks and access to a wide range of foodstuffs, including sugar and refined flour. Freedman's Cemetery in Dallas (Davidson 2004) represented a community that, even though poor and African American, would have had relatively easy access to transportation networks, especially by the late nineteenth and early twentieth centuries, when the cemetery was in greatest use. The Freedman's Cemetery sample had the highest individual caries rate of any group compared. A diet based on local, less-processed foods generally resulted in fewer caries. Caries rates in Tucson, including the Alameda-Stone cemetery and two earlier places of burial, were comparatively low, indicating a diet that did not typically include sugar and refined flour.

Enamel hypoplasias also occurred in the Alameda-Stone cemetery at low frequencies in comparison to other cemeteries. Roughly a quarter of the individuals at the Alameda-Stone cemetery had enamel hypoplasias, in contrast to about three-quarters of the individuals in two earlier Tucson cemeteries as well as at Freedman's Cemetery (see Chapter 7, this volume, and Volume 2 on dental health). Frequencies of enamel hypoplasias even lower than that seen at the Alameda-Stone cemetery were reported at the Voegtly Cemetery. Enamel hypoplasias can reflect periods of metabolic stress, including nutritional deprivation and exposure to disease. The earlier Tucson population, represented by the San Agustín Mission and Presidio cemetery samples, likely experienced higher levels of stress, and possibly, disruption of food supplies or other hardships that were the result of periodic Apache raids.

Overall, dental health in late-nineteenth-century Tucson was consistent with that expected for a frontier settlement of this era. Caries and hypoplasia were fairly common conditions, but they were not as prevalent as in some other communities. The limited evidence of professional dental care in the Alameda-Stone cemetery sample was consistent with a pre-railroad frontier community.

Discussion of the Alameda-Stone Cemetery and Internal Spatial Relationships

Although the overall picture of dental health, trauma, spatial orientation, coffin manufacture and decoration, and artifact distribution in the Alameda-Stone cemetery conforms to general expectations for a cemetery associated with a mid-nineteenth-century frontier settlement in the United States, there were intriguing differences *within* the cemetery between (1) men and women and children, (2) spatially defined cemetery subdivisions, and (3) individuals with different biological and cultural affinities. In an earlier section of this chapter, the spatial distinctions in artifacts were outlined and discussed. Table 34 provides a summary of the distinctions between males and females, as well as the distinctions between the northern and southern portions of the cemetery.

In general, the identification of subgroups within the cemetery followed expectations: Tucson at this time was a mostly Hispanic community, with African American, Euroamerican, and Native American individuals also living and dying here. The distribution and placement of these groups throughout the cemetery suggest some degree of spatial patterning, with an overall east-west division of Cemetery Area 3, and a north-south division of the entire cemetery (see Volume 2, Chapter 4 of this series). Cemetery Areas 1 and 2, the southern portions of the cemetery, reflect the hypothesized population structures predicted for those areas: military personnel and Euroamerican males who immigrated to Tucson during the nineteenth century. The composition of the southern cemetery areas biases the overall cemetery sample because it excluded the youngest and oldest members of

Table 34. Spatial Distribution of Variables in the Alameda-Stone Cemetery, by Sex and Cemetery Area

Variable	North Area			South Area			Comments
	Male	Female	Child	Male	Female	Child	
Higher survival rates	X			X			Females in southern areas lived longer than females in northern areas.
Dental caries				X	X		Low in Area 5; more in southern areas.
Enamel hypoplasia				X	X		
Antemortem tooth loss	X	X					Low in Area 5.
Tooth wear	X			X			More in northern areas; low for Euroamericans.
Dental restorations				X			
Dental abscesses	X	X					
Head niche and no coffin	X	X					Slightly more males with head niche and no coffin.
Grave arches				X	X		
Coffin shape: hexagonal				X	X		Highest popularity in southern areas.
Coffin shape: all types	X	X	X				Differences were noted between Areas 3 and 4.
Professional undertaking				X			
Bottles			X				
Smoking pipes				X			
Coins and tokens	X			X			
Frames	X	X	X				
Ammunition	X			X			Not in Area 5.
Personal adornment		X	X				Present in southern areas, but uncommon.
Transfer-print Prosser buttons	X						
Molded Prosser buttons	X						
Engraved shell buttons	X						
Patterned Prosser buttons			X				
Glass shank buttons		X					
Coat buttons, buckles	X			X			
Footware		X	X				More with juveniles.
Religious objects	X	X	X				Only two instances in Area 2.
Rosaries	X	X					
Floral crowns			X				
Frames	X	X	X				

Note: An X denotes the highest prevalence of a variable. Absence of an X in a cell does not necessarily mean total absence; it may just have been less prevalent.

the population. By contrast, the demographic structure of Cemetery Areas 3, 4, and 5—which included individuals of all ages and was composed primarily of Hispanic individuals—was more representative of the local (Hispanic) population of Tucson at this time. The southern portion of the cemetery (Cemetery Areas 1 and 2), and possibly the northern extension (Cemetery Area 5), were likely used by immigrant populations.

For each of the comparative samples, analysts noted some significant differences in the spatial distribution of artifacts, grave treatment, and/or age and sex. Often, the assumption was that the distinctions were based on time, but others noted that this was not always the case. In the case of the Alameda-Stone cemetery, the differences appear to have resulted not from time, but from differences in cultural affinity, sex, age, and immigration status.

Final Disposition of Individuals Excavated

Continuing the comparison of the cemeteries in the sample, an examination of final disposition practices proves interesting. In each case, the excavating archaeologist assumed that the remains would be reburied, but not all of the reports indicate the actual process or final disposition of the excavated remains.

For the Uxbridge Almshouse Cemetery (Elia and Wesolowsky et al. 1991), one individual was repatriated to a local Native American group, and as noted earlier, the state law was amended to insure that the remainder of the individuals could be reburied, as opposed to only "curated." The new amendment to the law provides for reburial and/or curation. Precise arrangements made for the remains, and any associated ceremonies, were not discussed in the report.

Subsequent to completion of the analysis of the remains at the Voegtly cemetery (Beynon 1989; Ubelaker and Jones 2003), all remains were reburied at the nearby Troy Hill Cemetery. Details of ceremonies or process are not included in the reports. As Beynon (1989:196) has noted, the Swiss-German people who used the Voegtly cemetery had two options: they could reject the values of their new country or they could assimilate. This group of German Evangelicals chose to assimilate into the mainstream society while still maintaining their ethnic identity, and this shift is reflected in the cemetery. She ends her discussion and analysis by highlighting the contributions made by these people, and suggesting that they should not be forgotten by future generations.

The Milwaukee County Poor Farm cemetery (Richards 1997) has a particularly interesting ending story. Toward the end of the excavations, the temporary residents and staff of the Milwaukee Rescue Mission pooled their resources to purchase a traditional floral cemetery memorial. This memorial was placed at the site during the early morning hours and greeted the excavators when they arrived to dig (Richards 1997:294–295). The presence of this memorial indicates that the homeless individuals of the present day viewed the cemetery in a very personal way and felt moved to transmit their feelings and sympathies to those long gone.

As noted earlier, there were limited funds for analysis of the remains and artifacts, and the human remains were kept in a facility for many years while the physical anthropologist struggled with the analysis of this much material with no assistance and no graduate students. Eventually, the state indicated that the human remains had to be returned, and this led to a discussion about what should be done with them. The ultimate decision was (by law) in the hands of the Director of the State Historical Society of Wisconsin, as advised by the State Burial Sites Preservation Board. The University of Wisconsin-Milwaukee Archaeological Research Laboratory (where Richards now works) argued that the remains should be curated and studied, and offered to create an appropriate facility that would show respect for the remains, but would also allow future researchers to learn from the cemetery; they also agreed to complete the skeletal inventory. A number of scholars and organizations wrote letters supporting UW-Milwaukee's request. The Wauwatosa Historical Society argued that the remains should be reburied immediately, and their request was supported by a number of other individuals and groups. Milwaukee County did not submit an opinion. The final decision was to give the remains to University of Wisconsin-Milwaukee, with an understanding that all materials would be appropriately treated and accessible to researchers. One reason that the project ended this way was that the physical anthropologist had had the remains for more than 15 years and had never produced a report or a complete inventory. Another reason was that, given the hierarchy of standing in the Wisconsin law, the University had greater standing than anyone else making a claim to the remains.[4]

The Grafton Cemetery project (Buikstra et al. 2000) was one in which the town (including some who were related to the remains recovered) had to move the cemetery so that the town could be relocated on the bluff top, out of flood danger. Although project personnel assumed that the remains would be reburied in the newer Scenic Hill Cemetery, as far as the author knows, this reburial has not happened and the remains are curated in Springfield, Illinois. The only confounding factor that Buikstra (personal communication 2010) suggested is the fact that the remains are in a very poor state of preservation. At this writing, it is not known whether a plaque or marker was placed commemorating these early citizens.

[4] This information comes from my personal experience with this collection and project, as well as discussions during 2007 with Patricia Richards and the Director of the State Historical Society. Standing is: direct descendant, lineal relatives, group or tribal affiliation, scientific community, general public, and others.

Remains from the Michigan City, Indiana Poor Farm Cemetery were reburied in another cemetery close to the original cemetery location (Strezewski 2003). The report does not indicate whether another memorial plaque was created. The Michigan City Schools covered the costs of reburial, but there is no discussion of whether or not there was a ceremony associated with the reburial.

The Freedman's Cemetery in Dallas, Texas, was the focus of much publicity during excavation, as well as activism and anger from the African American community and others at the previous treatment of the cemetery. Davidson (2004:7–8) has noted that the land south and contiguous to the cemetery was later used as a reburial space for all of the remains exhumed. He does not describe the reburial ceremonies, or indicate the process by which remains were reinterred.

The Old Snohomish cemetery was not completely excavated as of the date of the report used for this comparison (Tallman and Carrilho 2006). However, there is evidence that the remains have likely been reinterred; Tallman and Carrilho (2006:4–5) outline the requirements imposed on the project by the court order, and the work phases include a search for descendants and development and arrangement for disposition of the remains, including reinterment as necessary.

The reburial phase of the very large Potter's Field project in New Jersey most closely resembles the Alameda-Stone project in its approach. It is the only report that has an explicit section on reburial, which outlines exactly how the reburial site was determined, how the remains were conveyed and enclosed, and how the new burial site was organized. The Louis Berger Group (2005:10-1) outlined the set of tasks associated with reinterment: "selection of a reinterment cemetery; preparation of the reinterment parcel, including installation of burial vaults; documenting the transfer of remains from Potter's Field to the new cemetery; and design and installation of monuments memorializing the Potter's Field disinterment and reinterment program." This list closely mirrors the tasks undertaken for the Alameda-Stone cemetery (see Chapters 2 and 11).

The Potter's Field project had hoped to reinter the remains in another cemetery within the same county, but this proved to be impossible (Louis Berger Group 2005:Chapter 10). Given the circumstances, the Turnpike Authority and the Court allowed reburial in a cemetery in an adjacent county. A total of 94 pre-cast concrete vaults were loaded with remains, leaving 6 empty vaults for future use, if needed.

The vaults were numbered, and the number required was determined by measuring the number of containers that could be placed in each vault. There were three different-sized containers used. Each container was labeled according to the system used in excavation. Berger ensured that all containers from a particular grave were reinterred in the same vault. Their computerized checklist was the basis of the reinterment inventory database that is a key document for both the Cemetery as perpetual overseer of the remains, and for any potential future inquiries concerning deceased relatives who were once laid to rest at Potter's Field. After reburial was completed, two memorial monuments were designed and installed to commemorate the disinterment and reinterment of the remains from the Potter's Field (Louis Berger Group 2005:Chapter 10). A small monument was also placed along the edge of the Secaucus Interchange to memorialize the former site of the cemetery. The memorial at the new cemetery is large and somewhat similar to that erected for the Alameda-Stone cemetery in its roughly semi-circular shape and list of individuals who may have been buried in the original cemetery. There was an ecumenical service held at both the beginning of the excavation project and once all remains had been reinterred and the monument placed.

This brief summary and comparison of the disposition procedures followed at a series of historical-period cemeteries excavated in the United States raises a number of questions, and suggests a number of generalizations. Although the majority of the burials excavated were reburied or otherwise repatriated, the status of many burials was not recorded in reports, and in two cases, the remains are still being curated. What can we conclude from such variability? Differences in laws, differences in local attitudes, and differences in what the communities wanted and expected from the cemetery excavations. In terms of the reports, archaeologists often tend to focus on their specific realm, and fail to include discussions about final disposition of remains. However, it is also the case that final disposition details may not have been completed by the time the report was prepared. In any case, discussions of final disposition have been relatively rare.

The quote by Williams that opens this chapter raises two important points: first, that memories of the dead and the past can often define the present, and second, memory can in part be regarded as a collective social phenomenon (Williams 2006:3). The projects discussed here reflect a shift in how Americans view death and memory today. Past public policy resulted in many cemeteries covered over after abandonment, with people told that the remains had been moved. The goal was to satisfy a rapidly growing population, or accommodate those who got rich with the arrival of the railroads. Occasionally a local historical society may have erected a sign on or near a historical-period cemetery or location, but most never noticed it was there. Today, it is more difficult to believe that someone would be able to cover over a cemetery and pretend it had been moved; although someone might attempt it, the public outcry would be large. With historic preservation laws and a growing appreciation for the multicultural contributions of the past, we are beginning to see that memories of the dead can indeed define the present, and also that in order for memory to work on a community scale, it has to be a collective social phenomenon.

Conclusions

This project has resulted in the collection of an enormous amount of information from a number of different lines of evidence, even though there is much more analysis that researchers in the future can and will undertake. Outlined below are some of the most important and broadest implications of the work conducted:

1. The Alameda-Stone cemetery was large, with more than 1,300 individuals recovered, and many of the remains were in good to excellent condition. Documentation of the remains, artifacts, and the context of the graves has been detailed and extensive. There were a number of descendant groups and many stakeholders represented in the project. The project's scope and complexity has been large, but at the same time, this project in many ways represents a model of how a project of such scale and complexity should proceed. The data from the Alameda-Stone cemetery will be extremely useful to scholars for comparative purposes, and—because the documentation was thorough—there are many more-detailed studies that can be done, even though all remains and artifacts have been reburied.

2. The Alameda-Stone cemetery represents and reflects the entire population living in Tucson at the time. This is unusual; most large historical-period cemeteries that have been previously excavated (especially in the United States) have been poor farms or those of a particular subgroup. It is unusual to have the opportunity to document the full range of a multicultural community's population. Some practices represented here have not been documented elsewhere, and this may be because of the range of individuals represented. One example is the so-called head niche (see Figure 25); it is interesting that these had a complementary distribution with the distribution of grave arches. Fine-grained analysis may be necessary to understand why these practices occurred, and further analysis may provide additional clues to their meaning. Another example noted in Chapter 9 of this volume was the presence of small, engraved shell buttons that were often worn at the collar (see Figure 100). These could represent individual attempts at personal identity distinction or even hidden identity messages, and the number recovered here will allow for additional analysis.

3. The Alameda-Stone cemetery is one of the few examples of an excavated historical-period cemetery with a significant Hispanic population, but one that was only used for about two decades. The data can and will be used for comparisons for many years. Indeed, the cemetery represents a transition period in Tucson culture in which the community began to move away from long-held Hispanic and Native American traditions to a more Euroamerican-influenced manner of burial. As the cemetery neared the end of its period of use, the Euroamerican influence increased, and elements of the Beautification of Death movement were slowly incorporated. This influence was most prominent in Cemetery Area 3. However, overall, the Alameda-Stone cemetery was likely less an example of Beautification of Death and more an example of the concept of the "good death," in which the dead were given fortification for the spiritual journey ahead through preparation of the dead and ritual performed by the Roman Catholic church (Will de Chaparro 2007:12–13; see Chapter 8). Despite the influence of newly arrived Euroamericans, the population maintained its Catholic traditions and may have found new ways of expressing identity through religion, clothing fasteners, and other mundane objects.

4. The cemetery was used from the 1860s to 1881, an unusual period in the history and development of Arizona and the Southwest more broadly. Tucson, still in its frontier days, had been involved in the Civil War but not as intensively as other regions; most of cemetery's use dated to the immediate post-war years (see Chapter 5, this volume, and Chapter 4, Volume 2 of this series). It was a place with multiethnic and multicultural foundations. As Sheridan (1983:17) has noted, "before the Southern Pacific forged iron ties with the rest of the United States, Anglo entrepreneurs in Tucson often formed business, military, and even marital alliances with powerful Hispanic families." Hispanics pioneered ranching, agriculture, and mining in the Southwest, with a number of their innovations later adopted by Anglos (Sheridan 1983:11). Even though alliances and adoption of techniques were common, it was also the case that the arrival of Anglos in Tucson eventually resulted in the Hispanic work force becoming primarily based in blue-collar occupations because they did not have access to national and international sources of capital. By 1860, Anglos controlled almost 88 percent of the town's wealth as documented in property values, but they made up less than 30 percent of the population (Sheridan 1983:15). The cemetery provides a unique view into this important transition period, and this transition is represented by differences in osteology and burial treatment.

5. The burial agreements called for complete excavation and collection of all human remains at the site, so there was no sampling, and all soil in the project area was screened, even from disturbed areas. Even small isolated bone fragments were collected and analyzed. Although this created many managerial issues, it does

mean that Statistical Research and Pima County are reasonably certain that all human remains have been removed from the project area, and the cemetery is as reasonably complete as it can be after 130–140 years of historical and modern disturbances.

6. In determining cultural affinity for the individuals, Pima County and Statistical Research adopted a multidimensional approach for which several lines of evidence—osteological, contextual, historical, and oral traditions—were incorporated (see Chapter 6). One dimension was not privileged over another; instead, each was treated equally and then compared in order to determine whether an integrated statement of cultural affinity could be made. Given the number of constraints and the number of children (whose cultural affinity is often difficult to determine), the project managed to do an impressive job of assigning affinity for a large proportion of the individuals in the cemetery. The overall approach to determination of cultural affinity is one that can serve as a model in other situations because it consciously took into account cultural issues that are often ignored by traditional assessments.

7. This project represents one of the largest, most transparent, and consciously thoughtful archaeological cemetery excavations that have been conducted to date. The focus on planning, inclusiveness, and on the full participation of County government made a huge difference in project success (see Chapter 11). One can contrast this situation with many in the past, but one can also contrast it with the present. *The New York Times* (Applebome 2009) published an article about a Revolutionary War site in Fishkill, New York. The site has been built on again and again, even though people have tried to preserve parts of it. Most recently, ground-penetrating radar discovered more than 100 graves in a corner of the site, and there could be many more. The town is being encouraged to protect the site, but unless someone puts forth a development proposal that includes interpretation and green space for the graves, it appears that the site will either sit empty or be developed into another strip mall.

8. The role of technology in this project has been significant; it was a major factor in completing the fieldwork on time and was also crucial in the coordination of the different parts of the project (see Chapter 2, Volume 2 of this series). The project has made effective use of technology in tracking information and integrating various parts of the project. Future scholars will likely benefit from the carefully documented scans that were done; even though all remains and artifacts from this project have been reburied, these data represent usable and measurable information. Most impressive has been the geospatial information systems (GIS) work and scanning portions of the project; mapping for fieldwork was made relatively simple by on-site GIS work. Everything was updated daily, and each grave was integrated into the overall system. The potential of this work is demonstrated when multiple variables are compared. The GIS group also made certain that the reburial was accomplished so that each individual was put in the same relative position that they were originally found; they insured that the cemetery was "recreated" as close to the original as possible (see Chapter 11). In addition to the technological innovations used, the project also developed other less high technology, but equally useful tools. Prime among these was the extensive, detailed "button book" developed by Sewell (see Chapter 6, Volume 2 of this series), which provides detailed descriptions of more than 500 individual button varieties.

9. Because the burial agreements required the total excavation and documentation of this parcel, we know more about this particular postcemetery historical neighborhood than any other in Tucson, and more than most neighborhoods in other cities (see Chapter 12, this volume, and Volume 3 of this series). These data should be beneficial to a number of projects and research in the future, as well as to a number of descendant groups.

10. The reburials from this cemetery were the direct result of a process that allowed any and all potential descendant groups to come forward to make a claim (see Chapter 11). Importantly, once all such claims were evaluated and recognized, the descendant groups actively participated in the project. They provided significant information about their groups' historical mortuary practices, they could visit the excavations and observe anything they wanted at almost any time, and they played a major role in the reburial and repatriation process. The descendant groups were actively engaged and informed. At the end of the project, a new location for the Alameda-Stone cemetery was created, with appropriate monuments and markers (see Rugg 2000).

There is little question that the ground at Alameda-Stone was sacred during the cemetery period, and we treat it as a sacred space today, although the cemetery was transformed once again from its original state and place. Indeed, the County has moved the sacred space to another venue and reestablished it there (see Chapter 11). But, it is also clear that at certain points in history, many people did not view this place as sacred ground, and they worked hard to make sure the ground did not remain sacred.

We do not have to go back very far in time to find that sensitivity to cemeteries has not always been a primary

value. In the archival research for this project, there is one image that stands out *not* because it represents history long ago. It is an advertisement for a company that worked on the construction of the Tucson Newspaper building in the 1950s (Figure 128). In the 1950s, the Hunziker Construction Company boasted that they had managed to have burials from the Alameda-Stone cemetery professionally excavated and then were able to proceed and finish the construction project.[5] In addition, if you hired Hunziker, there was always the possibility that you may find something equally amazing. The idea that these burials may be related to someone living, or that perhaps the project might be changed or modified, was never considered.

Other historical-period cemetery sites were examined in this analysis, and in general, the projects included here showed both a respect for the dead and an understanding of the kinds of data that must be collected and recorded for these sites to continue to have importance in the future. A few years ago, Davidson (2007) expressed his doubts about the progress that historical-period cemetery excavations and analyses had made. Although he is still correct that there is a need for new advances in material culture studies, more focus on original and extensive historical research, and a need for standardization and more detailed photo-documentation in recording graves and material culture, he may be too pessimistic about the overall state of affairs. More cemetery excavation projects are focusing on these issues, and a number of states have begun to require more standardization in recording. As more anthropological scholars see the potential of research in historical-period cemeteries, we may be able to, as Davidson puts it: "finally move cemetery archaeology out of the purview of glorified funeral directors with backhoes, and squarely into the realm of anthropology, where it really belongs" (2007:15). Hopefully, the Alameda-Stone cemetery project is a new example of what can and should be done.

As we move beyond reburial of this historical cemetery, the descendant groups and the citizens of Pima County will likely create new sacred ground, but also new kinds of memory about this place and these people. Williams (2006) provides an interesting commentary that is equally appropriate for Tucson:

> Social memory . . . involves the selective remembering and the active forgetting of the past. Social memory is therefore inherently selective, active and performative in nature, and can be mediated by material culture and ritual performances as well as by the written and spoken word.

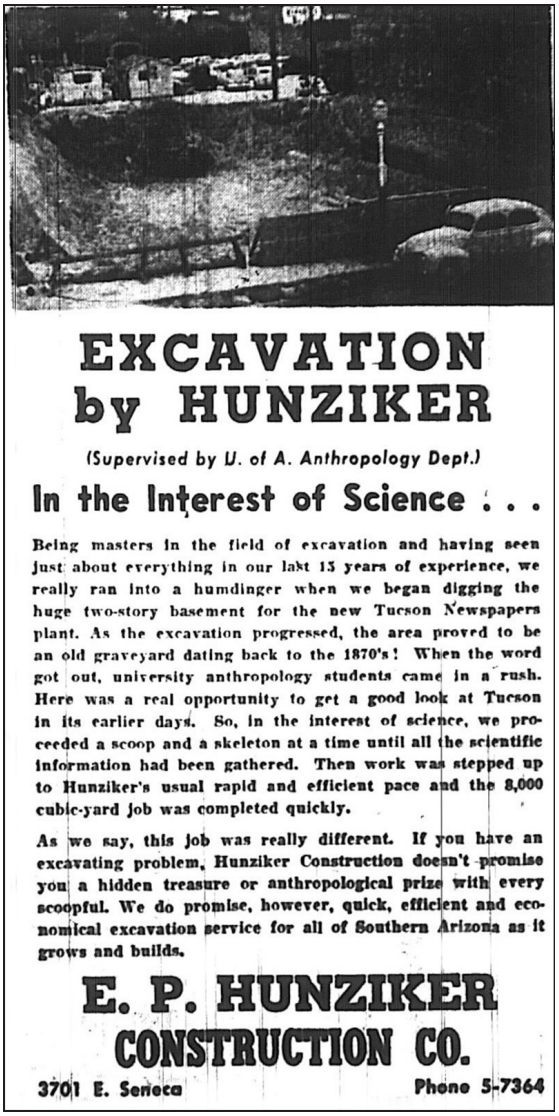


Figure 128. Hunziker Construction newspaper advertisement from the 1950s.

The new cemetery location is a completely new representation of material culture that not only creates new sacred ground, but also allows and encourages social memory about early Tucson and its inhabitants to flourish. Tucson may have grown too big to think in terms of village cemeteries, but the new cemetery location and monuments create a different sort of village cemetery of the type that Hulstrand (2010) so enjoys. Preservation is important, but change and development may require new kinds of memorialization. This is also an important legacy and contribution not only to the descendant groups, but to the general public as well.

[5] The project the advertisement references is the Tucson Newspaper building.

CHAPTER 11

Cemeteries, Consultation, Repatriation, Reburial, and Sacred Spaces Today

Lynne Goldstein and Roger Anyon

Introduction

Throughout the world, urban development and industrialization have affected cemeteries (e.g., Mytum 2004). Space in urban centers is a premium resource where the living compete with the dead for the right to use that space. More often than not, the living prevail. In London, England, for example, the Museum of London's Center for Human Bioarchaeology houses more than 17,000 human skeletal remains derived from archaeological work performed in greater London in advance of modern development. Remains from prehistoric, Roman, medieval, and historical-period cemeteries are included in these collections. In the center of Leicester, England, in 2005, the planned development of a shopping center resulted in the uncovering of a long-abandoned church and its associated cemetery. In use from the twelfth century, Saint Peter's Church was demolished in 1573, and the cemetery fell into disuse. About 1,300 individuals were excavated from Saint Peter's cemetery (BBC News 2006), a number comparable to the population excavated at the Alameda-Stone cemetery in downtown Tucson.

Urban growth covered the Alameda-Stone cemetery within 20 years of its closure by the City of Tucson. Being located between the existing edge of the built town and the new railroad, the Alameda-Stone cemetery occupied an area that was rapidly transformed from a space beyond the edge of town to a space ripe for urban growth, which is typical in the southwestern United States, where development tends to be rapid and occurs in bursts of commercial expansion. In Great Britain, among other countries, the same process occurs, as once rural lands become engulfed by urban expansion. In Great Britain, at least, there seems to be a somewhat more sedate pace of land change than in the United States. Upon dissolution of the monasteries in the mid 1500s, many were either demolished or redeveloped for other uses. Modern urban expansion and development has uncovered many of these monastic cemeteries situated around the historical cores of British towns in what had been rural lands but that have over the centuries become part the expanded urban environment. In the United States, urban development routinely impacts prehistoric cemeteries associated with ancient settlements, resulting in the archaeological excavation of thousands of ancient burials every year. Historical-period cemeteries also bear the brunt of urban development. In some cases, these cemeteries are unknown and are discovered during development, but in other cases, the cemeteries are known, and archaeological excavations can be planned and conducted ahead of development.

By 2004, when Pima County decided to construct a courts complex on about 4 acres of land in downtown Tucson, it was known that this space had once been the location of a military and the town cemetery, now called the Alameda-Stone cemetery. At that time, however, the extent of the cemetery was unknown, and the number of burials still in the ground after more than a century of urban use was also unknown. As detailed in this report, subsequent archaeological excavations revealed many more individuals than originally anticipated, and the project became the largest, most complex, and most costly archaeological project conducted to date in southern Arizona. Even so, it is a project that fits comfortably within the range of historical-period cemetery excavations in the United States and beyond.

Anthropological and Historical Context

Most people are confident that they would be able to recognize a cemetery if they saw one. Indeed, they may even

be fairly certain that they could recognize cemeteries in different places around the world, even though they may be aware that not everyone invokes precisely the same mortuary practices. Nonetheless, the idea of a cemetery as a "permanent, specialized, bounded area for the exclusive disposal of the dead" (Goldstein 1980; Saxe 1970) is not necessarily a fixed idea; that is, cemeteries as mortuary or sacred spaces are not immutable. They change over time, and they may change several times in the future, for a variety of different reasons. One obvious reason is that they grow with the addition of individuals, but community values, circumstances, and worldviews may also result in changes in the nature and structure of a cemetery, and even the notion of what is sacred can change. Cemeteries may be obvious landscape features, where "public space constitutes a storehouse of collective memory" (Hayden 1996:9), but both public space and memory can change and be changed. As archaeologists discovering a cemetery, we don't always remember or keep this idea in mind.

When an individual dies, the people who remain have the immediate problem of disposing the body, but beyond solving that practical problem, how one disposes of or "treats" an individual can be solved or addressed in an almost infinite number of ways. That infinite number is culturally constrained, and at any given time, society (and by extension, law) determines what is appropriate. Having said this, we know, from personal, ethnographic, and archaeological experience, there is often some distance between prescription, tradition, and what is actually done.

The New York Times on December 15, 2009 (Mydans 2009:A20), reported on Singapore's current problems in disposing of its dead. Singapore is out of room and has closed all but one of its cemeteries. By Singapore law, bodies must be exhumed 15 years after burial to make room for new burials (although this law is not strictly followed). Singapore is simply an illustration of the growing scarcity of land throughout Asia. Although there is a move to increase the use of crematoria and columbaria, even these are filling up—there is a real competition for space between the living and the dead. Biodegradable urns are now in vogue, as are mechanized columbaria that deliver an urn from an underground repository. In accommodation, traditions and ways of thinking have changed accordingly. As a gravedigger interviewed for the article noted, once an exhumation is completed, "the ghosts drift away" and construction continues. This way of thinking is new; it is not the traditional way that people thought about either their cemeteries or their ancestors.

In a recent, powerful analysis of how prescribed practices and traditions may or may not happen, Lever (2009) examined nineteenth-century graves in the Jewish section of the Melbourne General Cemetery in Melbourne, Australia. His analysis of a group of unmarked Jewish graves counters traditional history and documentation of local communal practice and identity. A separate section of Jewish pauper burials within a Jewish section of a cemetery represents a divergence from traditional norms. Jewish tradition dictates that people are not differentiated at death—the community supports its members and pays for the funerals of any Jewish dead.

If this was true, how did Jewish paupers get into these so-called public or pauper graves? It was the government, not the Jewish community, who paid for the burials of paupers. Lever calculated that 34 percent of the Australian Jewish burials between 1856 and 1892 were public pauper burials. He determined that although the paupers were considered Jewish enough to be buried in the Jewish section of the cemetery, the more successful Jews in the community who originally came from Britain but were more accepted and assimilated in Australia, chose to highlight their new-found elite status and minimize their ties to their less-affluent Jewish brethren. The process of assimilation varied dramatically based on class and position. Ironically, as the more assimilated group became accepted and wealthier, they were more willing to accept money from the state to bury less fortunate Jews. Some of the nonelites in the Jewish community did complain, but these folks were overruled. Ethnicity became historically and spatially contingent. Subsequently, even while this practice was ongoing, and especially after it changed, "the community apparently selected those Jews it wished to know; and those it sought to distance itself from in life, and forget in death" (Lever 2009:481).

Lever's study focused on Melbourne's Jewish community, but his point could be made about other communities—there is often a distance between what is prescribed, what is tradition, and what actually happens in a particular location at a particular time and place, and at that same place over time.

The point of raising these examples is not to criticize or pass judgment on the past or the present, but to highlight the many different lines of evidence available, from historical documents to images to oral traditions to ethnographic data to archaeological data, to gain a more accurate picture of what happened and why, to document how customs and practices change, and to determine why they change.

This brings us to modern-day Tucson, Arizona. As noted above, the Joint Courts Complex Archaeological Project has been a large and multifaceted project whose primary focus has been the removal, analysis, and eventual reburial of a large nineteenth-century cemetery (the Alameda-Stone cemetery) in what is now downtown Tucson. One of the questions most puzzling to people today is how people in the past could have built over and essentially erased what was apparently a large intact, marked cemetery. Didn't anyone care? A partial answer to that question, and a discussion of the approaches to the reburial of the more than 1,300 individuals recovered from the cemetery, requires a more nuanced understanding of this cemetery and what happened here, as well as a review of some of the history already covered earlier in this and other volumes of this series.

As discussed previously in this volume, in 1856, the United States took control of Tucson from the Mexican government. Tucson was already expanding beyond its presidio walls, and as more settlers arrived, the town grew. With the arrival of the railroad in 1880, the town grew even more. The area around the old Spanish Presidio, in what is now downtown Tucson, included residential buildings, followed by commercial construction. What is now termed the Alameda-Stone cemetery was the first cemetery established in Tucson after southern Arizona became part of the United States. An estimated 1,800–2,100 people were originally buried in the cemetery's two sections. A small, walled section was used by the U.S. Army from 1862 until 1881. The larger and separately walled section was used by the primarily Hispanic population of Tucson from the early 1860s until 1875 or perhaps as late as 1880. Most of the military burials were removed in 1884, but few of the civilian burials were removed.

O'Mack (2005:35) documented that the general area of what is now Alameda and Stone Avenue may have been used as a cemetery as early the 1860s or even a few years earlier. He also suggested that the cemetery may have been associated with, or even been prompted by, the arrival of Union troops in Tucson in 1862. This Civil War link may have some significance for perspectives of the cemetery and its history. In her impressive documentation of the treatment of death during and after the Civil War, Drew Gilpin Faust (2008) noted that we "approach death in ways shaped by history, by culture, by conditions that vary over time and across space." Even though we all die, "we do so differently from generation to generation and from place to place" (Faust 2008:xi). She made several points that are relevant here: (1) bodies became highly visible in Civil War America because of the sheer numbers, the use of casualties as evidence of military success (or failure), and the first use of photography; (2) Americans had to figure out what to do with more than half a million dead, and this number included a lot more than soldiers; (3) this job fundamentally changed U.S. culture and attitudes toward death; and (4) by the mid-1860s, the notion of the Good Death (which had been prominent among Protestants) was incorporated across all religious and geographic boundaries (Faust 2008:6–8). When soldiers died away from home (which most did), it became important to everyone that they did not die alone.

Another important point highlighted in Faust's work is the contrast between individual, community, and nation. What counted in a world transformed by war (Faust 2008:265)? Faust argued that the new U.S. destiny became bound up with the nation—its increased power, its wealth, its extent, and its influence. "The nation's value and importance were both derived from and proved by the human price paid for its survival" (Faust 2008:268). There was a vast expansion of the federal budget and bureaucracy and a rethinking of the government's role. National cemeteries, pensions, and records that kept track of names and identities changed the nature and relationship of the citizen and the state. "Citizens were selves—bodies and names that lived beyond their own deaths, individuals who were the literal lifeblood of the nation" (Faust 2008:269). The dead became what their survivors chose to make them. Eventually, they became a unifying project of memorialization. The Civil War established the policies that led to today's commitment to identify and return every soldier killed in the line of duty (Faust 2008:271).

Tucson was at the edge of the Civil War, involved and impacted, yet clearly not as devastated by it as the eastern United States. Nonetheless, the impact of the war was real, and many government policies had a real impact in Tucson and national changes in culture also were felt here. The shift in military and civilian culture was definitely reflected in Tucson in the post–Civil War period.

Given this context, it seems surprising that such a large cemetery could be "forgotten" or built over. However, it was likely that a number of factors allowed this situation to occur. First, in 1871, word of the railroad passing directly through the platted cemetery, which actually was the case when the railroad was constructed in 1880, caused a local businessman to buy a number of lots within the cemetery enclosure. O'Mack (2005) suggested that this area was not where people had already been buried, but it would certainly have opened up the idea that closing the cemetery might be a profitable idea. A road was also built across the northern end of the cemetery area. Once this happened, there were frequent discussions in the newspapers and in the town record that the cemetery was not well kept and that the place was dangerous. Eventually, people were told to move their dead, but the town did not take on the responsibility itself, and it proved difficult to locate old graves because markers were wood or ephemeral, and they had long since been knocked down, vandalized, or worn away. Interestingly, although the Civil War may have resulted in greater record-keeping elsewhere, this did not happen in Arizona until some time later. Except for the military section of the cemetery, there were no records of where people were buried in the cemetery. The Catholic Church kept some records of who died, but not necessarily their burial location.

Today, people tend to associate the idea of reburial with Native American human remains and archaeology. However, it is part of regular mortuary practices for many cultures, and in that context is known as secondary disposal of the dead—something that is done after the initial mortuary treatment, but triggered by some action other than death. The reasons for doing it differ, and they must be analyzed in a larger cultural context.

In a worldwide study of secondary disposal of the dead, Schroeder (2001) and Goldstein and Schroeder (n.d.) note that in a number of societies there is a relationship between secondary treatment and the powerful symbolism of the bones themselves to represent social identity, social history, and what Weiner has termed inalienable wealth (Weiner

1992). The study of the symbolism of the bones may indicate more clearly and specifically their association with social hierarchies, inheritance practices, social histories, and the definition of social identities (Goldstein 2000:201). Given the frequency with which secondary treatment represents group association over individual distinctions, it can perhaps most often be characterized as a mechanism of alignment and expression of rights to define and continue the group. When we attempt to apply this to the present, it is easier to understand why a group today may use reburial as a way to express rights and identities, in addition to the more obvious religious meanings.

Consultation

Consultations with descendant groups, the public, the media, and politicians were critical to the success of the project, especially in the 2 years prior to the start of archaeological excavations (see Chapter 2). Here we focus on certain issues regarding the burials and descendant groups. Because the project area was owned by Pima County, a political subdivision of the State of Arizona, and the project funds were all County bonds, state burial law applied. Consequently, the federal Native American Graves Protection and Repatriation Act (NAGPRA) did not apply regardless of who was buried in the cemetery. This, in our opinion, was actually better for the project, as state law provides more flexibility than NAGPRA regarding the identification of cultural affinity, repatriations, and reburials. In addition, any descendant group can participate in the process under state law, including any and all non–Native American groups, which was advantageous given our expectations about the burial population.

An incident in the mid 1990s, about a decade prior to the inception of the Joint Courts Complex project and only a few years after the passage of the state burial law, resonated loudly. Excavations for a gas line along Alameda Street to the west of the present project area discovered burials associated with Tucson's Presidio Cemetery, the predecessor to the Alameda-Stone cemetery, and resulted in emergency archaeological excavations. According to local knowledgeable sources, the identifications of cultural affinity and repatriation for the Presidio burials did not go smoothly, nor was the outcome of consultations entirely satisfactory to either of the two descendant groups, Los Descendientes del Presidio de Tucson and the Tohono O'odham Nation. Pima County did not want a repeat of this experience on the Joint Courts Complex project.

The first concern was that we consult with all groups that might have an interest in the people buried in the Alameda-Stone cemetery. We decided that the way to identify these groups was to cast a wide net and allow the groups to self-identify and establish their stake in the project. This did not mean that the County would entertain any group that self-identified as a claimant group, only those that could establish a reasonable connection to the burials potentially located within the cemetery. Initial contacts were with nine American Indian tribes (the Tohono O'odham Nation, the Pascua Yaqui Tribe, the Gila River Indian Community, the Ak-Chin Indian Community, the Salt River Pima-Maricopa Indian Community, the San Carlos Apache Tribe, the White Mountain Apache Tribe, the Fort McDowell Yavapai Nation, and the Hopi Tribe); Los Descendientes del Presidio de Tucson; the Arizona Department of Veterans' Services; the Buffalo Soldiers Museum and Association; the Roman Catholic Diocese of Tucson; the Jewish community (Jewish Federation of Tucson and Jewish History Museum of Tucson); the Tucson Chinese and Asian community; the Church of Jesus Christ of Latter Day Saints; and the Pima County Interfaith Council.

All burial consultations were conducted under the aegis of the Arizona State Museum, as required by state law. It quickly became clear which groups had an interest and were valid claimants for the post-1775 burials. Los Descendientes del Presidio de Tucson represented the interests of Hispanic burials, the Pascua Yaqui Tribe represented the interests of Yaqui burials, the Arizona Department of Veterans' Services represented the interests of military burials in the military section of the cemetery, the San Carlos Apache Tribe represented Apache burials, and the Tohono O'odham Nation, through mutual agreement with the other Indian tribes, took the lead for O'Odham and other Native American burials except for the Yaqui and Apache burials. Our concerns were threefold: (1) burial agreements must be negotiated and executed prior to the start of archaeological excavations, (2) burial agreements must provide some means by which we could distinguish burials related to each claimant group, and (3) the methods of burial documentation must be agreed to by all groups. Because we could not know cultural affinity until all documentation was completed, it was important that the methods of acceptable documentation were specified prior to excavation.

As might be expected, cultural differences emerged during consultations. The Tribes made clear that despite the fact that burials were under streets, buildings, and parking lots, the burials should not be excavated or disturbed. Los Descendientes, on the other hand, believed that the burials should be excavated as their current situation was disrespectful to their ancestors. The Tribes were adamant that if excavations did move forward, over their objections, then no destructive analysis of human remains or funerary objects would be tolerated. Los Descendientes preferred any form of analysis, including destructive methods that would provide information about their ancestors. At the conclusion of negotiations, it was determined that excavation would proceed and that no destructive analysis would be permitted as part of this project under the burial

agreements. One unambiguous point of agreement by all claimant descendant groups was that all excavated human remains and funerary objects must be reburied, a stipulation that was included in the burial agreements.

After 2 years of background research and consultations, archaeological excavations began. Once the excavations began, maintenance of the careful relationships established by the County was shared by Statistical Research as they excavated the cemetery. The County was actively involved on a daily basis, but Statistical Research's handling of the burials would be a major factor in how the project would ultimately be viewed by descendant groups and others.

As part of the burial agreements (see Appendix A), Statistical Research was required to keep track of each burial and was also required to keep each individual on-site. This meant that no materials from the cemetery could be removed from the physical cemetery site for processing or analysis without express written permission from the descendants each time someone wanted to do so. This serious restriction resulted in Statistical Research bringing in a series of modular buildings to the edge of the project area (once that area was cleared) to serve as laboratories. A set of "mobile minis" served as secure storage for the completed and analyzed burials and artifacts. As part of its responsibilities, Statistical Research agreed to develop a "chain of evidence"–like tracking system, so that it could know precisely where any individual burial or artifact was at any time during the project. This was accomplished using a computer database and scanning system, and is described elsewhere in this report (see Chapter 2, Volume 2 of this series). There were several important reasons for having the system, but one reason was for descendants—the idea was that any descendant should be able to walk in and ask about a particular individual at any time, and Statistical Research should immediately be able to know where that individual was. The on-site laboratory system was maintained until it was no longer necessary for analysts to gain access to individual burials or artifacts. At that point, the analysts moved to a different facility, and the burials were moved to Holy Hope Cemetery to await reburial at All Faiths Cemetery. Note that Statistical Research still kept track of the remains even while they were held at Holy Hope and continued to do so through their reburial at All Faiths Cemetery.

When consultations are about a soon-to-be excavated cemetery, discussions are in the abstract; however, when consultations change to the individuals excavated from the cemetery, discussions become much more concrete because the discussions are about specific burials. We wanted to make our decisions about repatriation and reburial of individuals as successful as our discussions about the excavation of the cemetery had been. In a way, these consultations can first be seen as negotiations with the past.

Culturally, our negotiations with the past focused on trying to determine who was in the cemetery: there was never a question that people and associated artifacts would be reburied, but the issue was how to negotiate reburial while honoring the many descendants who live in Tucson and surrounding areas today. Would we have sufficient information to identify specific groups to potential descendants' satisfaction? The issue of what Arizona terms cultural affinity[1] was also handled in an important way (see Chapter 6 and Appendixes C–F). As has been emphasized in earlier chapters, we did not privilege one kind of evidence over another. Each of the potential descendant groups was asked to provide information on mortuary practices that might be distinctive to their particular group. And, for each individual in the cemetery, we examined the historical, contextual, and osteological evidence available and used all of these data to make a determination. We discussed in detail those cases where there were disagreements and worked to resolve them. This process was explained to descendant groups, so that it was clear how the decision for each individual was made. Affinities were negotiated as transparently as possible with the past, the present, and in effect, the future, because affinity decisions could determine repatriation and reburial outcome.

There were three possible outcomes for reburial: (1) reburial by the military in a military cemetery; (2) reburial by specific Native American or religious groups in their own cemetery or mortuary facility; and (3) reburial in a special area within a large nondenominational cemetery by the County—this was the destiny of the majority of individuals.

The military section of the cemetery was small; the number of individuals buried in this portion of the cemetery was about 100. A total of 74 of these individuals was moved to the new military cemetery at Fort Lowell in 1884, and some of these graves were later moved to San Francisco when Fort Lowell closed. Because we found some of these original burials (either ones who had been missed or portions of individuals who had not been completely moved), at least a few of these individuals had been buried or reburied at least three times. The military did not find this to be a problem; they did not want to try and determine if individuals could or should be combined into one grave if we could demonstrate that we had found, for example, a portion of someone already reburied in San Francisco. The principle of "leave no man behind" was more important, and publicly demonstrating this principle was even more significant; the fact that an individual might be buried in several places did not matter, a proper military funeral did.

Repatriations and Reburial Ceremonies

The military repatriation and reburial ceremonies were conducted over 2 days on May 15–16, 2009, coinciding

[1] NAGPRA does not apply to this project, and thus it is not subject to its specific regulations, although the procedures followed in many ways go beyond NAGPRA rules and regulations for NAGPRA.

with Armed Forces Day. Few organizations organize an event or a spectacle as well as the U.S. military. Most interesting from an anthropological perspective was the mixing of symbols, time periods, and emotions. The Arizona Department of Veterans' Services and the Historical Soldiers' Relocation Project coordinated the event at Sierra Vista, Arizona, in a military cemetery adjacent to Fort Huachuca. This organizing group (a combination of veterans and current military) created a new fenced cemetery for any and all historical-period military remains to be returned now and in the future (Figure 129). They made all arrangements; created marble headstones for each of the deceased,[2] made special caskets for each burial, including special white ones for the children found in the military section; created a 35-star flag to represent the flag under which these soldiers once served; and covered each casket with one of these flags (Figure 130). The returned individuals were placed in the new cemetery once they were escorted from All Faiths Cemetery in Tucson to Sierra Vista.

The events of May 15 centered around the repatriation of the remains. Statistical Research ensured that the correct remains were moved from their temporary storage location at Holy Hope Cemetery to All Faiths Cemetery where the repatriation took place. Blessings were provided by Roman Catholic Bishop Kicanas of Tucson, and a statement was made by the U.S. Congressional representative from the 8th Congressional District, the Hon. Gabrielle Giffords. Serving military personnel loaded the caskets onto military trucks, which were then escorted by more than 200 veterans on motorcycles from Tucson to their new resting place at the Southern Arizona Veterans Memorial Cemetery in Sierra Vista (Figure 131). Congresswoman Giffords led this motorcycle escort on her Harley-Davidson motorcycle to accompany the remains.

Unofficially, the Arizona Department of Veterans' Services and the Historical Soldiers' Relocation Project allowed a group of historical-period re-enactors to conduct a special presentation the evening before the reburial. This group included men dressed in period military garb and women dressed as official mourners. As one of the men read the names of those who they thought would or could have been buried in the original cemetery, one of the women rang a bell after each name. Officially, the military frowns on these groups and does not recognize them, but unofficially, they tend to accommodate them. One subgroup of re-enactors that was accommodated and honored in particular at this event was the Buffalo Soldiers. One member of the group to be buried had been identified as a Buffalo Soldier, and this subgroup of re-enactors was especially excited about this event. Current armed-services personnel carried all of the caskets to the cemetery from the area where the ceremonies took place; a sole exception was made for the Buffalo Soldier (Figure 132a–d). Originally, Buffalo Soldiers were members of the U.S. 10th Calvary Regiment of the U.S. Army, formed on September 21, 1866, at Fort Leavenworth, Kansas. Eventually, the term became synonymous with all African American regiments formed in 1866. From 1866 to the early 1890s, these regiments served at a number of posts in the southwest United States, primarily participating in the so-called Apache wars. When excavated from the Alameda-Stone cemetery, the Buffalo Soldier burial was actually located north of the northern edge of the military cemetery. Because osteological and artifactual evidence identified him as a Buffalo Soldier, the burial was offered to the Buffalo Soldiers Association, and then with their consent, to the military to include with the other military reburials. This reburial allowed the Buffalo Soldier to be appropriately honored with other military burials.

More than 2,000 people attended the May 16 military reburial ceremonies. Attendees included military personnel, veterans, re-enactors, Boy Scouts, and curious citizens (Figure 133). Government officials from local, state, and federal governments were represented. Arizona Governor Jan Brewer spoke at the ceremony, as did Congresswoman Gabrielle Giffords, who also later entered comments into the *Congressional Record* about the event. The ceremony at Sierra Vista opened with prayers, including one from Joseph Joaquin, Tohono O'odham Nation, and it closed with a ballad expressly written for the occasion by Arizona's official balladeer, Dolan Ellis.[3] The ballad was written and sung to the tune of Amazing Grace (Figure 134).

All of these activities were proud memorials to the individuals who were buried in the military section of the Alameda-Stone cemetery. They were also a grand and deliberate display by the military to show that the United States government values and honors those who serve. The soldiers did not die in vain, and they would be returned home to a properly honored location. The message was not lost on the number of young, active-duty men and women present that day, who were visibly moved by the ceremony. They were very proud, and very pleased; one could not leave the ceremony unhappy or unimpressed.

How do other descendants of the Alameda-Stone cemetery treat their dead who were first buried here? Each of the three distinct tribes whose ancestors were identified in the cemetery chose to take a different path. The Apaches opted to let the individuals identified as Apache be buried with other burials in the large, special reburial area at the nondenominational All Faiths Cemetery in Tucson. The other two tribes decided to have separate repatriations and reburials. The Tohono O'odham chose to have a private repatriation and reburial, as has been their custom with the many thousands of prehistoric Hohokam repatriations

[2] Because we could not positively identify individuals according to legal standards, each headstone says only "Unknown Soldier." Our associations as to identity may be adequate for academic audiences but not for forensic situations or for the military.

[3] Dolan Ellis became Arizona's first Official State Balladeer in February 1966.

Figure 129. Photograph of new cemetery created for historical-period military burials at Sierra Vista military cemetery. Open graves are for individuals from the military section of the Alameda-Stone cemetery.

and reburials they have conducted over the years. We were able to observe the Pascua Yaqui repatriation and reburial, the first repatriation and reburial of human remains they have conducted (Anyon 2009; Sewell 2009). Unlike the military reburial, it was not a public event; no cameras were allowed, and no media were included. Also unlike the military, the tribe publicly acknowledged that these individuals had already been buried once and did not need a full funeral service again, at least not a full Yaqui service. The ceremonies were a combination of Yaqui and Catholic practices, using both Spanish and Yaqui languages.

The focus of Pascua Yaqui reburial was very different from the military. It was important that both the remains *and* participants in the ceremony have a ritual Yaqui cleansing or smudging, including the archaeologists who returned the remains. Further, of key importance to the Yaqui was that the remains and associated artifacts be placed in proper alignment within the coffin; both placement and containers were negotiated. In the case of the military, of key importance was what was visible; with the Pascua Yaqui, spatial structuring at all levels was equally important.

Following the Yaqui repatriation ceremony at Holy Hope Cemetery, there was an evening Catholic mass in the community church that included both Catholic and Yaqui elements. A community dinner consisting of traditional foods followed the mass. Throughout the night, in the community plaza, traditional Yaqui ceremonies were provided for the remains. The reburial took place at sunrise the next morning. Although the organization of events was somewhat informal, the timing of the events was of utmost importance to the Yaqui, both in terms of having the reburial quickly after deciding to accept the remains and the time of night and day of the ceremonies. It was also important that the remains not be left unattended. The other critical factor for the Yaqui was the fact that three of the five individuals returned were children. In this sense, feelings were similar to the participants at the military reburial. The military also did not want remains left alone, and they were very concerned about the presence of the remains of children. Services for the Pascua Yaqui were solemn, but not sad. This was something that must be done, but it was not necessarily an occasion used to make a greater point, as the military reburial ceremony was designed to do.

The final reburial included approximately 1,200 individuals and took place in a special dedicated section of All Faiths Cemetery in Tucson. The cemetery,[4] the Catholic Church, Pima County, and Statistical Research coordinated much of the reburial procedure. All descendant groups were invited, but only representatives of Los Descendientes del Presidio de Tucson were able to attend. Even though most of the individuals to be reburied were

[4] The cemetery is owned by the Diocese of Tucson Catholic Cemeteries, although all faiths have and control their own sections within it.

Figure 130. Covered caskets, part of the military reburial ceremonies. Flags were designed specifically for this event and have 35 stars, as they would have had at the time the Alameda-Stone cemetery was in use. The white casket is for a child buried in the military section of the cemetery and reburied with the rest of the military individuals.

Figure 131. The veterans' motorcycle escort accompanying the military burials to their new location at Sierra Vista.

Figure 132. (*a*) Buffalo Soldiers re-enactors; (*b*) military personnel guarding caskets and ready to remove flags and carry caskets to reburial location; (*c*) Buffalo Soldier re-enactors carrying the casket of a Buffalo Soldier to the reburial location; (*d*) military personnel carrying caskets to reburial location after flags had been removed. Flags were given to people who had a major role in the event.

Hispanic and Catholic, the ceremony was ecumenical in nature; both English and Spanish hymns were sung, and a rabbi, a Lutheran reverend, and the Catholic Bishop of Tucson,presented words of commendation.[5] This was a private service and was not open to the public or the media.

A large number of the individuals reburied at All Faiths have unidentified affinity, and we know that many were not Hispanic or Catholic.[6] In this context, what is most interesting about the All Faiths reburial is:

1. The reburial was done in a spatially separated section of the cemetery located at the entrance.

2. Individuals were placed in the ground in the same spatial relationship as they were placed originally in the Alameda-Stone cemetery. This could not be done precisely because the acreage and physical space is not the same, but it was done as close to the original relationships as possible.

3. The reburial had the physical, psychological, and memorial effect of both "moving" the cemetery to a new location and properly identifying it as a cemetery.

After completion of the initial reburial, which took about 2 weeks following the first reburial on February 15, 2010, a permanent memorial was erected on the site, and a public dedication ceremony took place on June 26, 2010. Again, the dedication service was diverse, with participation by representatives of Pima County, Tribal and Hispanic descendant groups, scholars, and religious leaders. The public and the media were invited and attended. Pima County government, the descendant groups, and the community are publicly making the statement that it is important that the early citizens of Tucson are given proper treatment and respect in what we today consider a formal cemetery.

[5] Neither the Pascua Yaqui nor other Native American cultural leaders were able to attend the reburial service on February 15, 2010.

[6] There is one individual who may be Jewish. Although not claimed for separate burial by the Jewish community, one Tucson rabbi and his synagogue did a separate funeral service for the individual.

Figure 133. The crowd at the military reburial ceremony. Note the military band members, re-enactors in crowd, and people of all ages.

Soldier grave dedication

GOD BLESS THIS SPACE
THIS RESTING PLACE
WHERE WE LAY THESE PRECIOUS FEW
ONCE THEY WERE LOST
BUT NOW THEY'RE FOUND
MAY THEY REST IN PEACE RENEWED

THEY CAME OUT WEST
THESE BRAVE AND BEST
AND THEY SERVED WITH PROUD REVERE
AND HERE THEY DIED
IN LOST GRAVES THEY HIDE
FOR MORE THAN A HUNDERED YEARS

SO WE SING TODAY
FOR THEM WE PRAY
AS WE LAY THESE LOST SOULS DOWN
AT LAST THEY REST
THEY END THEIR QUEST
AS THEY'RE LAID IN HALLOWED GROUND

GOD BLESS THIS SPACE
THIS RESTING PLACE
WHERE WE LAY THESE PRECIOUS FEW
ONCE THEY WERE LOST
BUT NOW THEY'RE FOUND
MAY THEY REST IN PEACE RENEWED

Figure 134. Ballad sung at military reburial service. Sung to the tune of Amazing Grace, the ballad was written and performed by Arizona's State Balladeer, Dolan Ellis in May 2009.

The memorial (Figure 135) honors the past, the people included in the cemetery, and the archaeology. Elements of each have been incorporated into the murals that make up the memorial.

Conclusions

Space is still a prime issue in cemeteries; as a critical resource, people will always battle about space, and the dead rarely win. In the late 1800s, the thought of expansion and the economic promise of the railroads were too much to convince the people of Tucson that the Alameda-Stone cemetery was worth protecting. Were there racist undertones in their actions? Probably, but there were also social and class motivations as well. Today, it is unacceptable for us to not acknowledge a cemetery that has already been built over, damaged, and partially destroyed. We not only invest many dollars to move the cemetery, but we try our best to identify those buried within the cemetery, linking them to their descendants when possible, and placing them in a new cemetery in the same relative order in which they were originally buried.

Ironically, at the same time that we conduct this reburial process, we are also providing credibility to the relatively new Tucson cemetery at the edge of town. The older cemeteries in Tucson are running out of space, and All Faiths is one of the few newer cemeteries with space available. It is often difficult to convince people to bury their loved ones in a new cemetery; people want to have their families and friends in one place. However, by moving the members of Tucson's oldest cemetery to its newest cemetery with a new monument and special section, the members of the community give the new cemetery a sense of history and place.

The dead become what their survivors and those that follow choose to make them. After the Civil War, many eventually became a unifying project of memorialization. The Civil War established the policies that led to today's commitment to identify and return every soldier killed in the line of duty (Faust 2008:271). We are now in the process of finding war dead from every American war, wherever they are in the world. And, in America today, we are trying to carry that commitment further still, creating a cross-cultural commitment to reburial of any dead. We do this, saying that it has always been this way. It may be what we culturally want or need to do, but it is not what has always been done. We need to leave room in our commitments for cultural variation and flexibility, as well as for memorialization.

The Joint Courts Complex Archaeological Data Recovery Project has been an excellent example of how reburial can be accomplished with community engagement and in coordination with repatriation and

Figure 135. Permanent memorial for all individuals from the Alameda-Stone cemetery. Memorial is at All Faiths Cemetery, Tucson. Rough rock in foreground covers the reburial area (individuals were placed in same spatial relationship as they were found). Memorial in background includes period photos that have been enlarged and transferred to tile, and lists of those individuals who likely were buried in the cemetery. List compiles names of those individuals in Tucson who were noted as dying in the city during the cemetery's period of use.

simultaneously provide important historical and scientific information. At every stage of this project, the community and the descendants had a voice in what happened and how decisions were made. This information was integrated into the process of determining cultural affinity, and descendants had the option of re burying their ancestors in their own way, or having them included in a community reburial that would put them back into a context similar to the one in which they had originally been placed. In all cases, the early people of Tucson have been carefully, properly, and respectfully memorialized.

CHAPTER 12

Evolution of a Tucson Neighborhood, 1875–2006

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In this chapter, we discuss the abandonment and development of the former cemetery as the land encompassed by the Joint Courts Complex Archaeological Project area transitioned from mortuary to residential to commercial to civic use. The context for this transition is provided as well as findings derived from the archival and archaeological investigations. A number of research questions relating to the postcemetery component were asked prior to excavation; these are listed in Chapter 1, Volume 3 of this series. We were able to answer all of the research questions and, in fact, generated much more data than we had hoped. Because of the necessity to conduct 100 percent excavation of the project area to recover human remains, we were afforded a rare opportunity to intensively investigate an entire neighborhood that was developed within the space of only a few years. We were able to examine questions concerning the treatment of the cemetery and its associated human remains by later site occupants; the changing face of Tucson after the arrival of the railroad; neighborhood demography and ethnicity; foodways; health and hygiene; and occupations and leisure activities around the turn of the twentieth century. Much information was collected about the infrastructure of the neighborhood as Tucson developed into a modern city, and issues of urban transition were examined in the evolution from residential space to commercial use. A total of 736 postcemetery features (Table 35) was excavated in the project area; these are shown on Figure 136. Feature types included privies, cesspits, refuse pits and refuse deposits, basements, landscaping pits, foundations, animal burials, and utility trenches, among others. As stated earlier, only one well was discovered in the Joint Courts Complex project area and unfortunately, this was not fully excavated due to its location adjacent to a standing building.

Archaeological analysis of the postcemetery period at the Joint Courts Complex project area was organized with the objective of studying the households that occupied bounded parcels of real estate, or lots. The concept of "household" is discussed further below. Volume 3 of this series provides the detailed results of our investigations into the postcemetery occupation of the project area, divided by lots. The lot boundaries used to organize the data were based on the 1889 and 1890 surveys, despite the fact that lot boundaries changed through time as ownership changed.

From Cemetery to Community

Transformation of the Joint Courts Complex project area from a cemetery to land viewed as suitable for a residential neighborhood took place over a period of almost 15 years, from closure of the civilian cemetery in 1875 to sale of the associated lands in 1889 and 1890. The process began in the early to mid-1870s, when the expanding town started to encroach upon the cemetery grounds. The Village of Tucson was incorporated in 1871 (it was granted city status in 1877), and according to Sonnichsen (1987:91), it was the act of incorporating Tucson that transformed it from a Mexican town to an Anglo community. The town's expansion eastward towards the cemetery created a movement among local residents to have the cemetery closed and a new cemetery opened outside of town. Although scant documentation exists from this period relating to the underlying motivations for the movement or the names of the persons who were spearheading it, numerous complaints about the "old cemetery" were lodged in local papers in the years following its closure. The complaints often declared that the cemetery had become a nuisance, citing that offensive smells emanated from it. Indeed, in the decade and a half following closure of the "Old Cemetery," it

Table 35. Feature Types Identified in Joint Courts Complex Postcemetery Contexts

Feature Type	No. of Features
Animal burial	5
Bank vault	1
Basement	10
Benchmark	1
Building	2
Cesspit	7
Concrete pier	15
Concrete slab	27
Drain	4
Fireplace	2
Foundation: adobe	19
Foundation: concrete poured	38
Foundation: concrete block	1
Foundation: stone and mortar	23
Freestanding wall	1
Landscaping pit	73
Machinery	10
Manhole	3
Pipeline segment	4
Pit	107
Posthole	236
Privy pit	6
Stairwell	4
Trash deposit	4
Trash pit	23
Trench	102
Underground tank	2
Utility vault	4
Well	1
Wooden curb	1
Total	736

became a much-criticized dumping ground (*Arizona Daily Star*, 27 February 1889a:4). Some of these complaints are discussed elsewhere in this report (see Chapter 7), as they pertained to calls for closing the cemetery and exhumation of the remains; the broader implications of the abandonment process for the cemetery are addressed more fully in previous chapters of this volume.

The final burial in the military section of the cemetery took place 6 years after the nominal closure of the civilian cemetery and after several years of complaints about the fact that the bodies within the cemetery had not yet been relocated to the new cemetery (see Chapter 5). Shortly thereafter, the Tucson Common Council passed a motion to notify the military that the cemetery was closed to additional burials. At the same time, the southern half of the project area, including the military cemetery, was deeded to the School Trustees of Tucson (*Arizona Weekly Citizen*, 20 February 1881a:4). Indeed, despite the late military burial, it is clear that the period between 1875 and 1881 marked a decrease in the sanctity of the cemetery space. This shift was demonstrated in the petition of Mr. Fuller, in March of 1881, to make adobe bricks from soil on a portion of the "old cemetery" grounds (*Arizona Weekly Citizen*, 27 March 1881b:4). Given the five possible preresidential borrow pits (Features 604, 642, 750, 3242, and 3364) (described in Chapters 11 and 15, Volume 3 of this series) discovered during this investigation, it seems likely that this request was approved.

Even prior to removal of the burials from the military cemetery in 1884, the Common Council showed signs that it was becoming eager to pass the problem of the remaining burials on to someone else and to sell lots on the "old cemetery" (*Arizona Daily Citizen*, 13 April 1884). With transfer of ownership to the school trustees, the City tried to transfer the problem of how to deal with the burials, stipulating that the trustees were responsible for removal of any bodies within the block. In November of the same year, the Council agreed to open a street across the project area (*Arizona Weekly Citizen*, 13 November 1881c:4). This section of what became Miltenberg Street (see Chapter 5, Volume 3 of this series) was, as this project discovered, built directly over the densest concentration of burials within the cemetery. The conveyance of land and the opening of a new street demonstrate how the City was trying to incorporate cemetery lands into the town proper. However, this incorporation apparently required, if not the actual removal of bodies, then at least removal of the surface evidence—the material constructs that declared it was a cemetery. However sacrilegious and disrespectful this conduct may have been, it was through actions such as these that the cemetery was transformed from a burial ground to a vacant lot with development potential. Indeed, although the City made many formal attempts to remove the cemetery, it was the informal processes of neglect, decay, and civic improvements that removed the symbols of the cemetery and allowed the land to be used for other purposes. Eager though the City may have been to develop the former cemetery lands, however, it was another 5 years before the first lots were sold.

In April, 1889, the City of Tucson auctioned off lots in Blocks 252, 253, and 255 for between $100 and $175 a piece (*Arizona Daily Citizen*, 15 April 1889a:4:2; this is somewhat contradicted by the Arizona Historical Society [n.d.], which listed prices as low as $50). By early 1890, the lots in Block 254 had been sold by the school trustees, thus completing the initial sales of land previously used as the cemetery.

The sale of lots in the cemetery proper was not the first sale of land associated with the cemetery grounds.

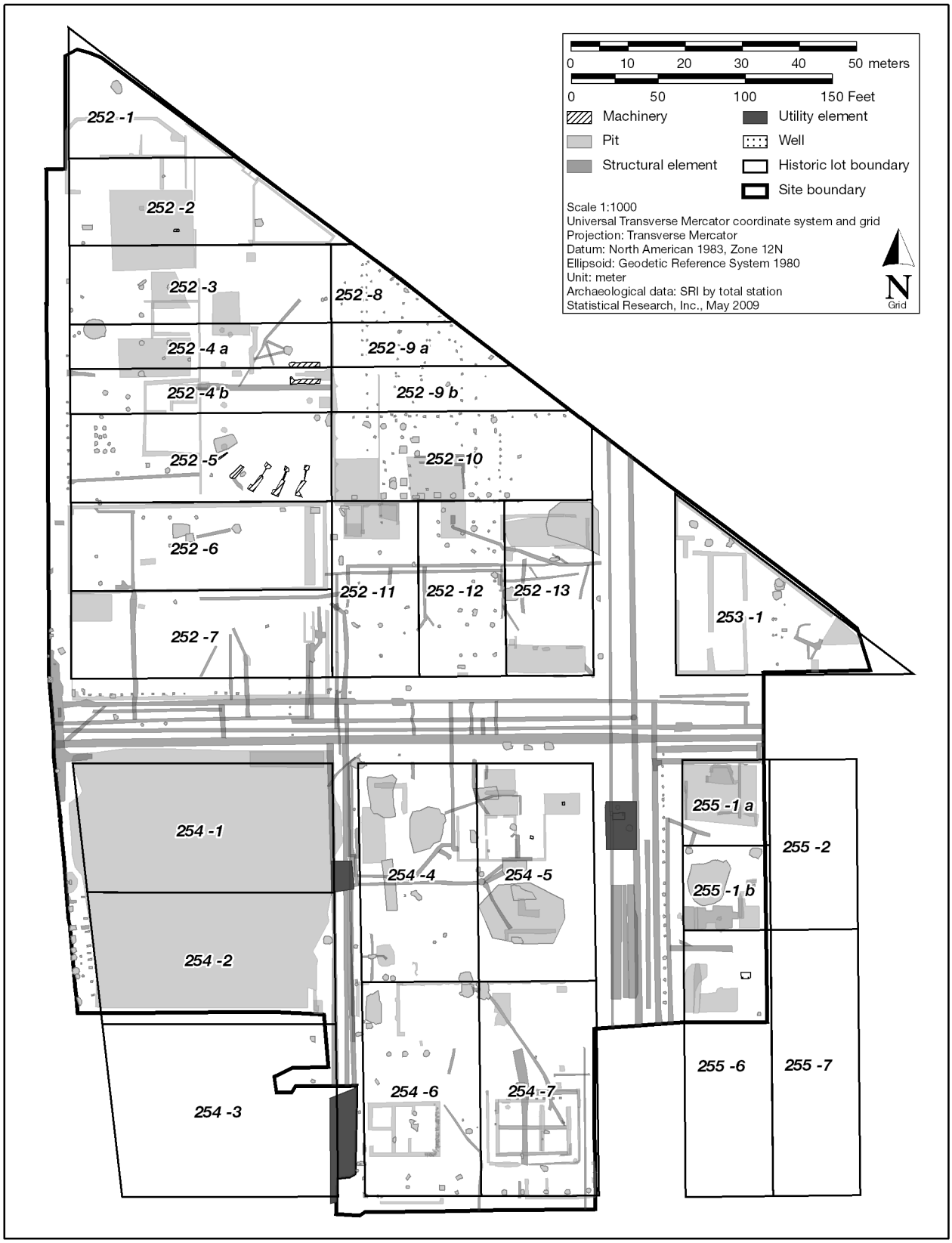

Figure 136. Project area showing original subdivisions of Blocks 252–255 and all identified postcemetery features.

A decade earlier, the people of Tucson had looked forward to the coming of the Southern Pacific Railroad, believing that it would improve access to goods, increase local technology, and support the local economy. They were certainly correct in the amount of change its coming would bring, because, from its arrival in 1880 until after 1950, the Southern Pacific Railroad was the dominant economic force in Tucson. To quote Devine (2007), the Southern Pacific

> turned the economic wheel with . . . jobs . . . provided musical attractions . . . sponsored a baseball team . . . filled social clubs . . . and certainly politically ran Pima County. . . . In the early part of the 20th century, Southern Pacific had nearly 1,000 people on the payroll in Tucson, making it not only by far the largest employer in a city of 10,000 inhabitants, but also its primary property taxpayer.

Southern Pacific's Pima County tax assessment in 1898 was $1.4 million. To speed the arrival of this economic juggernaut, the City granted the Southern Pacific a block of land on the eastern side of town, including a significant section of cemetery lands. Archival research yielded no evidence to suggest that there was any concern with the railroad occupying a substantial portion of the officially designated cemetery parcel; there is no report that any graves were disturbed during construction of the railroad or the warehouse district located just outside the Joint Courts Complex project area. This lack of evidence may stem from disuse of the eastern side of the cemetery parcel, but it may also reflect a general willingness at the time to overlook such details, especially considering the enthusiasm that greeted the arrival of the railroad (Devine 2004:136–178). As will be discussed later, the proximity of the project area to the railroad increased the area's importance to residents of the neighborhood, which served as home for many railroad employees.

What changing social values led to the apparent comfort with which the newly formed City of Tucson created a residential district atop a former cemetery? Historical documents indicate that concerns over the cemetery as a nuisance, coupled with enthusiasm concerning development, outweighed any lingering concern regarding the presence of burials. The bold economic forces driving land use in the American Southwest at the turn of the twentieth century must be acknowledged, particularly forces backed by transportation industry giants such as the Southern Pacific Railroad. Expectations for prosperity in the wake of the rail connection apparently outweighed taboos concerning construction or occupation of dwellings built atop known human burials. In a rapidly changing society where urbanization was accelerating, these forces held a formidable influence on even traditional behaviors.

Another factor that may have affected the treatment of the project area was a demographic shift that occurred during the 1880s. Between 1880 and 1890, the population of the City of Tucson dropped from around 7,000 to 5,150 individuals. This drop in population was largely caused by the withdrawal of the military at the end of the Apache wars and the failure of a number of silver mines in and around Tombstone (Luckingham 1982:23). There was a small exodus of Mexican Americans who moved to Mexico during the economic depression that ensued. It is likely that the loss of population caused the City to lose revenue and it may be that this loss of revenue made the sale of the "Old Cemetery" lots increasingly attractive. The conversion to residential lots would have created new "tax producing improvements" (*Arizona Daily Star*, 10 January 1907:2:1), creating revenue beyond even that generated by the sale of the land. It is also possible that the movement of people away from Tucson helped the town's memory of the "Old Cemetery" to fade. Finally, Tucson demographics continued to shift to a more Euroamerican makeup, so that familial and cultural ties to most of those buried in the cemetery were lost.

The Forgotten Cemetery?

Although memories of the Alameda-Stone cemetery may have fallen out of the general consciousness of the Tucson population, quite a few individual Tucsonans rediscovered the cemetery over the approximately 125 years prior to our investigations. The story of the neighborhood's development is rife with examples of how time and again, with a shovel full of fill, the cemetery would briefly reemerge, only to quickly settle back into obscurity.

It seems unlikely that those responsible for the initial development of the cemetery grounds were unaware of the nature of the land. This is especially true given that every early newspaper reference to this development discusses it in terms of the "old cemetery" or "Old Graveyard" (e.g., *Arizona Daily Citizen*, 30 August 1889b:4:2; *Arizona Daily Star*, 27 April 1889b:4:1). However, records of ownership (see Appendix F, Volume 3 of this series) show that, with one exception, the individuals responsible for building the houses on the old cemetery were not the initial owners of the properties. The exception was José Mariscal, who purchased Block 252, Lot 4, during the initial sale, but ultimately sold that lot and built a house on Block 254, Lot 10. This early turnover in ownership throughout the project area suggests the possibility that those who first built upon the cemetery lands were unaware of the history of the land.

Whether or not initial construction of residences was undertaken by individuals who had personal knowledge of the cemetery, there is compelling archaeological evidence

that they, or their agents, were not ignorant of its presence for long. For example, Cesspit 3040 was constructed by or for Benjamin and Edna Fairbanks sometime between May of 1890 and February of 1892 (see Chapter 16, Volume 3 of this series). Although the Fairbanks house intruded on a small number of graves, the intrusion did not impact any intact human remains. This was not the case with construction of the household's cesspit. Its initial excavation removed approximately half of Grave Pit 3041, and archaeological evidence demonstrated that whoever dug the cesspit was aware of the burial. A high percentage of the elements missing from the burial were discovered under a cap of clean fill at the base of the cesspit. This reburial showed that the individual(s) who disturbed the grave recognized the nature of the bone, collected it, and then reinterred it. This reinterment, especially given the cap of clean fill, appeared to indicate a degree of respect for the remains. However, it was an unusual gesture of respect to rebury human remains at the bottom of a cesspit. Although construction of the cesspit only impacted the lower half of the burial, elements of the right side of the body were missing up to the right scapula. Archaeological excavation revealed that these missing elements had been removed via horizontal excavation into the grave pit. It appeared that curiosity or a respectful, although ultimately unsuccessful, desire to keep the individual's remains together were probably the two most likely reasons for the horizontal excavation.

At about the same time as the construction of Cesspit 3040, Manley (or Mansley) and Agnes Snyder were building a house on the northeast corner of Stone Avenue and Miltenberg Street (see Chapter 10, Volume 3 of this series). Like the Fairbanks, construction of Snyder's house did not disturb any burials, having intruded only on the uppermost grave fill. Also similar to the Fairbanks, the Snyder's privy pit (Feature 16500) removed approximately half of a grave (Grave Pit 10809). Whoever was responsible for digging Snyder's privy pit also appeared to have recognized the nature of the burial and collected many of the bones that were encountered, which were found at the base of the privy pit. However, unlike Cesspit 3040, the bones in Privy Pit 16500 were found intermingled amongst the human waste and cultural material deposited by the Snyders and the residents who followed them.

In both cases, those digging the pits clearly recognized the human remains for what they were and for one reason or another removed them from the fill. In both cases, the perceived correct response, once the digging was complete, was the reburial of the remains. However, at this point, the respectful treatment offered the remains differed. In the case of Cesspit 3040, with apparent knowledge of the function of the pit, the laborers segregated the remains from the contents of the pit by capping them with clean fill. In Privy Pit 16500, this separation from the contents of the pit was apparently not deemed necessary. In this case, the human remains were reinterred at the base of the cesspit, but they were simply disposed of in the privy pit. Without knowing more about the two families or the workers who were probably hired to dig the pits, advancing a hypothesis to account for the difference in treatments would be pure speculation.

Finally, around the same time that human remains were being reinterred in Cesspit 3040 and Privy Pit 16500, a house was constructed at the northwest corner of Miltenberg Street and Grossetta Avenue. Unlike most of the houses in the project area, this dwelling was built with a basement and a number of graves were impacted by its construction. The total number of impacted graves is unknown, although it was probably around eight. Three graves were found and excavated as part of the Joint Courts Complex Archaeological Project. Given that there were probably more than the three known graves, it is clear that the presence of human remains did not stop those digging the basement from completing their job. However, one of the three graves revealed an interesting pattern of behavior. Grave Pit 674 was very obviously disturbed during construction of the basement. Much of the right side of the body was no longer articulated, including the mandible (lower jaw). However, the workers who disturbed the grave placed the disturbed elements back into the grave shaft and covered it. Furthermore, the original dimensions of the basement appeared to have been slightly changed to accommodate the grave. Again, at least some deference was accorded to the buried human remains from the cemetery. Although the presence of human remains did not stop construction of the basement, evidence suggests that those doing the digging tried to treat them in a respectful manner.

The next evidence for disturbance of the cemetery occurred just over a decade after initial construction of the residential neighborhood. In 1903, two separate municipal-utility projects trenched through the cemetery and the discoveries made the local papers. The first project was a gas line (Trench 7732) that was installed in Miltenberg Street, directly through Cemetery Area 4, the densest concentration of graves in the cemetery. According to the *Tucson Citizen* (19 February 1903a:5:3), the discovery that they were digging up a cemetery nearly caused the workers to strike. The trench was ultimately completed, but in the western portion, we found evidence for reinterment of the larger elements from the disturbed burials. Once the pipe had been laid in the trench and covered with a layer of fill, the collected remains were replaced within the trench and covered with the remaining fill. Several months after the gas line incident, in October of 1903, a crew installing a private sewer system north of Alameda Street discovered the remains of several individuals (*Tucson Citizen*, 9 October 1903b:5:3). The sewer system in question was almost assuredly represented by features in the Block 254 alley (see Chapter 5, Volume 3 of this series), and running across Lots 4 and 5 of Block 254 (see Chapter 15, Volume 3 of this series). It is likely, although not conclusively proven, that remains from one of

these individuals were reinterred in Refuse Pits 746 and 2045 (see Chapter 15, Volume 3 of this series).

Two points of interest arise from these accounts. The first is that the surprise of the workers at finding a cemetery, and the fact that it was reported in the local papers, indicates that the corporate memory of the cemetery was already growing weak. Perhaps this is not too surprising, because this was 28 years after the cemetery was closed, 22 years after the last burial, 21 years after removal of the cemetery wall, and 19 years after removal of the military dead. One generation had grown up without the "old cemetery" as an active part of the landscape, and enough time had passed that only "[o]ld timers remember the place" (*Tucson Citizen*, 19 February 1903a:5:3). The second point of interest is that the correct response to the discovery of human remains, as determined by the workers, was their reinterment near where they were found, although only after the rest of the job was complete. This was a response that would not be seen again for the better part of 100 years.

Evidence for workers knowingly disturbing the cemetery again occurred during construction of the commercial building at 240–250 N. Stone around 1929 (see Chapter 10, Volume 3 of this series). Although the building intruded on the upper grave fill of over 200 graves, it only seriously impacted a relative handful, mostly from the placement of footer trenches. On the east side of the building, a morbid response to discovery of the cemetery was unearthed by Statistical Research. Several of the graves showed evidence of what might be termed grave robbing. The interred individuals were in close proximity to the footer trenches for 240–250 N. Stone, and all of them were missing their heads. The reasons for the removal of these crania are unclear, and the potential hypotheses are myriad. However, this did reflect a distinct change in behavior in the intervening quarter century, both in terms of the treatment and in the reporting of the remains, which was noticeably absent for this period.

The next reported intrusion into the cemetery occurred in 1940, with construction of the Tucson Newspapers, Inc., building at 208 N. Stone. The skeletal remains of one individual were removed and stored at the Arizona State Museum (O'Mack 2006:6.5, Table 6.1). In 1950, with installation of a subterranean fuel tank for Durazzo's Union 76 station, and again in 1953, when the Tucson Newspapers building was expanded to the corner of Stone Avenue and Council Street (see Chapter 13, Volume 3 of this series), there was renewed interest in the discovery of human remains from the cemetery (O'Mack 2006:6.5, Table 6.1) (Figure 137). Subsequent accidental discoveries of human remains occurred in 1965, around 1970, and

Figure 137. Durazzo's Union 76 Station, 210 N. Stone Avenue, and the Tucson Newspapers Building, 208 N. Stone Avenue, 1953. (© Copyright Tucson Citizen. Reproduced with permission.)

again in 2001 (O'Mack 2006:6.5–6.6, Table 6.1). Each of the post-1939 discoveries was covered by the newspapers, but the response was an entirely new way of dealing with the remains. Anthropologists from the University of Arizona and, later, a private consulting firm were called to investigate each of the discoveries, and, indeed, some of the burials were either excavated or salvaged, and the remains were taken to the Arizona State Museum for study and curation.

The Joint Courts Complex Archaeological Project probably does not represent the final chapter in the disturbance of the Alameda-Stone cemetery. There remains a sliver of relatively undisturbed land near the corner of Stone Avenue and Alameda Street—outside the Joint Courts Complex project area—that may still contain intact burials.

The Residential Period, 1889–1920s

Except for the businesses that were located on Block 253 (see below for a discussion of the commercial period), the project area was otherwise entirely residential from the initial sale of lots in 1889 until the 1920s. During this period, Tucson's population grew from 5,150 in 1890 to 20,292 in 1920 (Luckingham 1982; *Tucson City Directory* 1920), and Arizona gained statehood in 1912. It has long been observed that the western frontier was more urban than earlier frontiers (Pomeroy 1965:6, 84, 120) and that most western urban centers were established by 1890 (McKelvey 1963). By 1890, Tucson had been designated as a "city" for 13 years.

By August 1889, construction contracts for residences on two lots within the project area were reported (*Arizona Daily Star*, 27 April 1889b:4:1), and at least four more were "being contemplated" (*Arizona Daily Citizen*, 30 August 1889b:4:2). By February 1890, much, if not all, of Blocks 252, 253, and 255 had been graded by Mr. A. J. Davidson "in preparation to erect houses" (*Arizona Daily Citizen*, 6 February 1890a:4), and it was reported that "Collector Snyder will begin a handsome brick residence in a short time" (*Arizona Daily Citizen*, 6 February 1890a:4). Collector Snyder was probably Mr. Manley (or Mansley) Snyder who, with his wife Agnes, had purchased Lots 6 and 7 of Block 252, the northeast corner of Stone Avenue and Miltenberg Street, from Mr. L. Young in 1890 (O'Quinn Title and Abstract Company n.d.).

Property Ownership Patterns

The earliest property owners, those that bought the "Old Cemetery" during the initial auctions, were largely speculators. In fact, only one of the initial owners appeared to have bought property for a reason other than to make a quick profit. Block 252, Lot 2, was purchased by William and Sophie Siewert, who after a few years put it to use as a rental property (Figure 138). A second round of buyers, people like Benjamin Fairbanks (see Chapter 16, Volume 3 of this series) and John Brown (see Chapters 9 and 10, Volume 3 of this series), was more interested in the neighborhood for personal residences. They were soon followed by others who, like the Siewerts, were looking for income from rental properties. Figure 139 shows a map of the project area as it appeared in 1901. Between 1889 and 1909, 18 houses were built in the project area, 12 of which were built as rentals. Of these houses, a total of 7 would see owner-resident occupations, including 3 that had been initially constructed as rentals. However, by the 1930s, all houses on the project area had been or were being used as rental properties. This would suggest that,

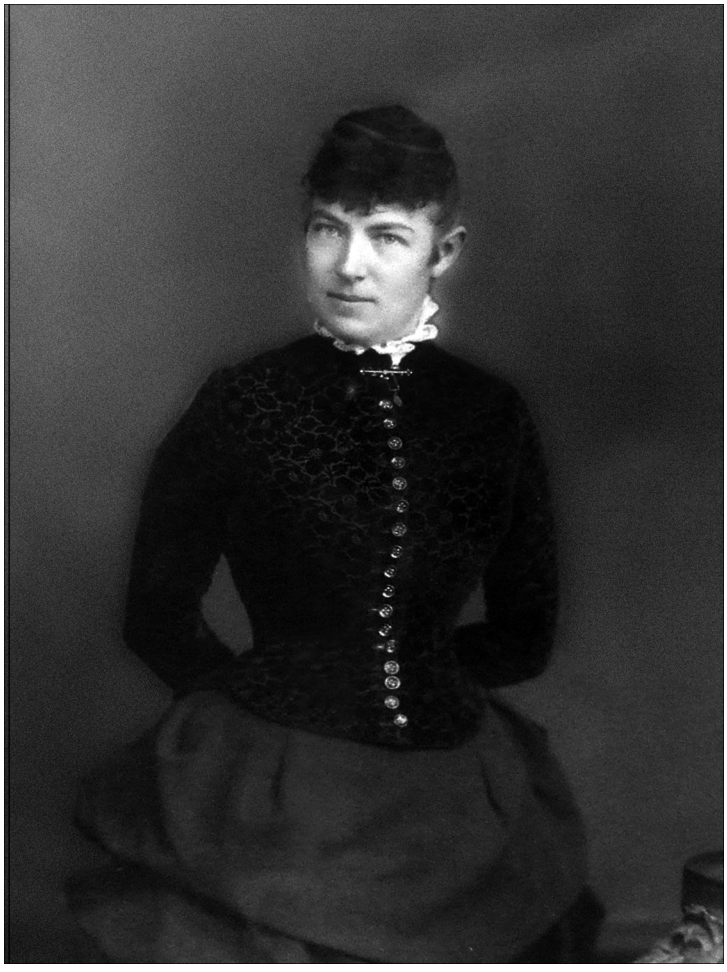

Figure 138. Sophie Siewert (photograph courtesy of the Arizona Historical Society, Tucson, Accession No. 691)

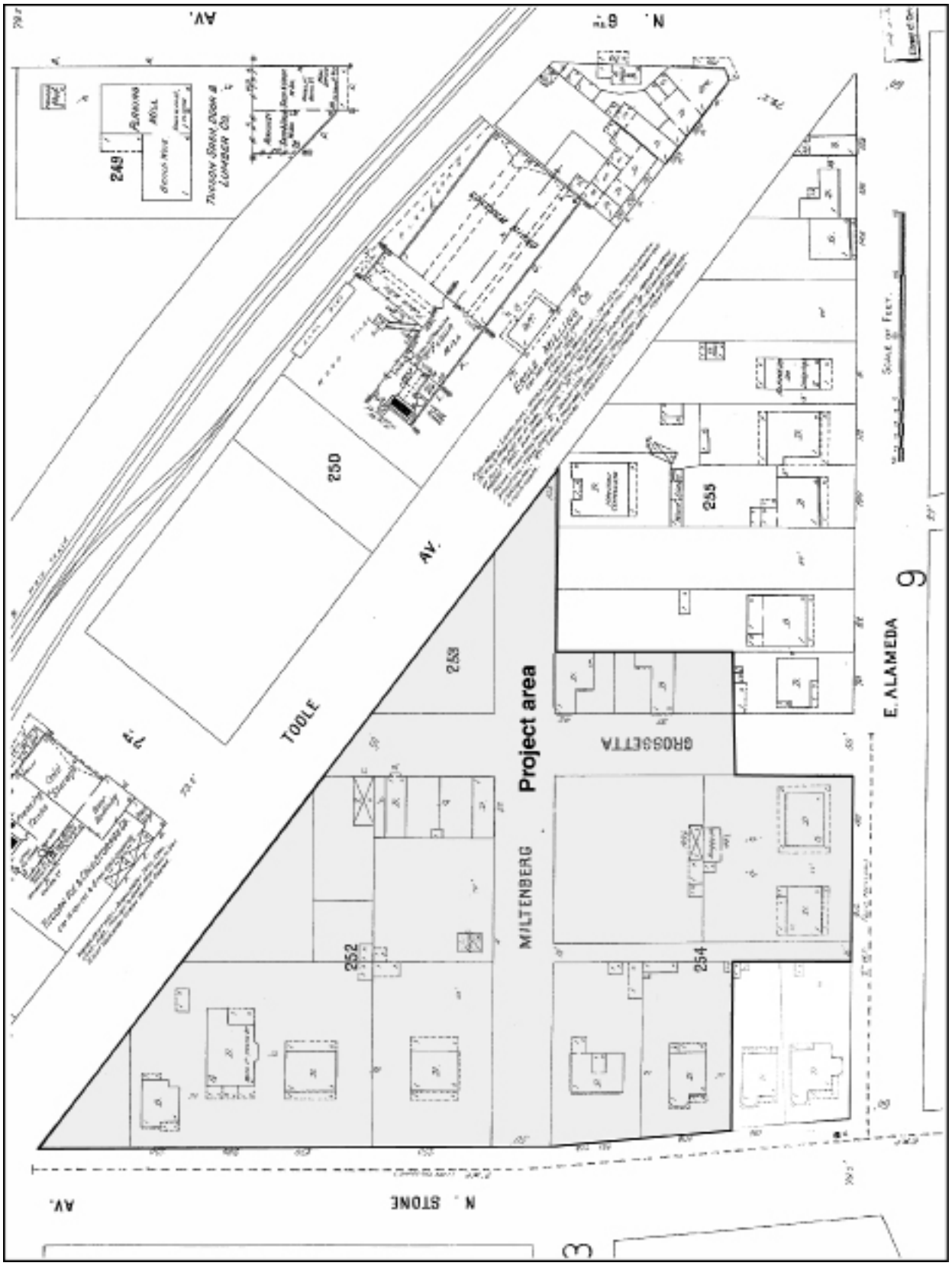

Figure 139. Portion of the 1901 Sanborn map of Tucson with the project area overlaid.

despite some interest in the land as a home place, the major focus of development in the project area was on land as income. Although real-estate ownership is often equated with middle-class status in contemporary America, this may not have always been the case. Historian Margaret Garb (2005) stated that home ownership afforded little benefit, either social or economic, to urban professionals in turn-of-the-twentieth-century Chicago. Several authors have noted that even low-earning immigrant workers could afford to own houses, but that home ownership did not confer higher status (Thernstrom 1964; Zunz 1982).

In addition to chain-of-title research (see Appendix F, Volume 3 of this series), we analyzed Pima County tax assessment rolls (see Appendix G, Volume 3 of this series) to provide additional information about the relative net worth of project area owners and occupants. This analysis caused us to suspect that some couples used their ability to hold property separately to protect themselves from adverse legal actions taken against the husband or his business interests. A. V. Grossetta, for whom Grossetta Avenue was named, may have engaged in this practice. In 1892, Grossetta was worth $7,554 ($3,500 individually and another $4,054 as Grossetta, A. V. & Co.), and his wife Bessie was worth $4,104 (Pima County 1892). Six years later, with no known business reversals, A. V. Grossetta was worth $425, and his wife was worth $25,080 (Pima County 1898). Project area residents may have also engaged in this activity. In 1920, Elizabeth Wills purchased 34 E. Alameda Street (Block 254, Lot 6) from Margaret Mahoney. In 1922, Thomas Wills, Elizabeth's husband, executed a quitclaim deed on the property. Such a deed makes no claim to the title, but surrenders any interest or rights that may have existed (Indiana Land Title Association 2009). The deed was executed despite the fact that he had never entered into the ownership record, either at the purchase of the property or in the acquisition of the mortgage. As Thomas Wills was a rancher, with interests in Pima and Pinal Counties, this action was undoubtedly designed to protect their house against any of his creditors, should his business interests have failed. This division of ownership between the domestic and business spheres, with the wife owning the house and the husband the business, has also been noted in Phoenix, Arizona (Hackbarth 1995), and it illustrates how complicated ownership issues can be, especially once marriage forms the corporate body.

Ownership data based on ethnicity are discussed later in this chapter. For an assessment of landownership in the project area by sex, we used six categories (Table 36). For two of the categories, business and government, sex was unknown or inapplicable. The male and female categories were used where only one individual was named. The categories of couple–female listed and couple–male listed indicate records where more than a single individual was listed; this usually appeared in the following form: Margaret Mahoney and husband, or John N. Brown and wife. Categories were applied separately to both the first party (seller) and second party (buyer), and only unique individuals or corporate groups were counted. Thus Amelia Steward, although she owned a number of properties, was counted only once. Margaret Mahoney and Margaret Mahoney and husband were both counted, as they represented two potentially separate decision-making units.

The state of Arizona has long had relatively liberal laws relating to ownership of property by women. However, in 1865, while repealing dower laws (the common law right of a widow to a portion, usually a third, of her husband's real property), the state legislature managed to grant husbands the right to administer their wives' property, common or not (Ross 1915). This right was apparently so obnoxious that in 1871 the legislature restored all property rights to married women over the age of 21. As the sale of property within the project area occurred well after that date, we can assume that at least some women owning project property were doing as their own agents and not simply as adjuncts to their husbands.

As expected, the analysis showed a significant difference between the number of men and the number of women listed as primary owner; however, the number of women was by no means insignificant. As individuals, women represented around 27 percent of the purchasing population. The number of women selling property as an individual was about half this number. Interestingly, a similar ratio existed for men acting as sole agents. As individuals, men represented approximately 57 percent of those purchasing property, but only 30 percent of those selling property. In general, it was unusual for married couples

Table 36. Project Area Property Ownership by Sex

First Party (seller)	Total	Percent	Second Party (buyer)	Total	Percent
Female	11	13.75	Business	8	10.13
Couple-female listed	8	10	Government	1	1.27
Male	24	30	Female	21	26.58
Couple-male listed	27	33.75	Couple-female listed	1	1.27
Government	5	6.25	Male	45	56.96
Business	5	6.25	Couple-male listed	3	3.80
Total	80	100		79	100.00

to purchase property together; couples were listed only four times (5 percent) as buyers, and only one couple listed the woman as the primary purchaser. The number of couples listed as sellers (n = 35, 44 percent) was around nine times larger than those listed as buyers (n = 4), and of the couples selling property, eight listed the woman first.

Results of the analysis by sex showed that there was a greater diversity and more-even ratios between sellers than between buyers. The three largest categories of sellers were couple–male listed (n = 27), male (n = 24), and female (n = 11), whereas buyers were overwhelmingly male (n = 45), then female (n = 21). It appears that through time, property ownership shifted from corporate ownership to sole ownership. Overall, the results indicate an ownership regime that was largely controlled by men but significantly influenced by women, either as individual actors or within the social role of wife.

The locations of owners' primary residences allowed us to examine the geo-social position of the project area within Tucson; if owners mostly lived in or near the project area, this would indicate a different landownership dynamic than if they all lived on the other side of town, or were absentee landowners. To explore landowner residence patterns, we used data from Tucson city directories for 1897–1898 through 1930 and plotted the locations onto a map (Figure 140). We did not limit the search to the years that they owned land in the project area, as we were trying to understand landowners as a class of individuals.

In the project area, the number of owner-residents was highest between 1889 and 1905, when it peaked at five properties. From 1905 until 1929, there were one to three owner-resident households in the project area at any given time. During the period from 1908 to 1921, absentee landowners represented around 50 percent of property owners, peaking in 1912 at around 65 percent (n = 7). The rate of absentee landownership started to decline in the mid- to late-1920s, as commercial development of the project area increased. Thereafter, there were no owner-residents in the project area until 1937, when the Rasmessens moved into a property they had been using as rental. They moved out in 1948, the last owner-residents in the project area.

The highest concentration of owner-residences in the project area and its neighborhood, shown as Locus B on Figure 140, was between 1889 and 1905, and nearly 80 percent (n = 19) of project area property owners lived in Locus B. Between 1906 and 1930, owners began moving north and east into Locus A, the area bounded by the railroad on the west and south, and the University of Arizona on the east. By 1930, only 23 percent (n = 4) of owners lived within Locus B, and 65 percent lived in Locus A. Locus C, defined as the area south of Congress Street and west of the railroad, contained a relatively low number of project area–owner residences. Locus C included the *barrios*, residential neighborhoods of working-class Hispanics, and represented an earlier area of settlement than the project area. The number of owner-residences in Locus C peaked at around 30 percent (n = 7) of owners in 1897 and was generally stable at around 10–15 percent thereafter. This analysis included a mix of pre-project area through post-project area ownership, and thus the results from Locus C did not simply represent a working-class wellspring, from which the ownership class arose. Instead, there appeared to be at least a small intermingling of project area–owners among the working classes throughout the study period. Indeed, almost no patterns of residence were observed relating to the dates of ownership within the project area. This may be because we only looked at a single ownership decision—purchasing property in the project area—and thus we missed a lifetime of other ownership decisions. One Tucson neighborhood that did show up in our analysis was "Snob Hollow," as the Paseo Redondo area was known (*Tucson Citizen*, 28 April 1929). This area had one of the densest concentrations of project area landowners outside of the project boundaries, and it represented one of the last bastions of owner-residences within Locus B.

The movement of owners out of the project area raised the number of rental properties and was probably a sign of the changing social and economic status of the neighborhood. Extrapolating this to the movement of people out of Locus B, it seems likely that this change in status was more-or-less locus-wide. As population density and commercial development increased within the urban center, coupled with the rise of automobile transportation, people were able to move to less-crowded neighborhoods in a classic "urban flight" pattern, and the project area became an almost totally income-producing neighborhood for its owners. The effect of motorized transportation on the project area is discussed later in this chapter.

In summary, land within the project area was largely seen as a source of wealth by the owners and only secondarily seen as a place of residence. Landowners were almost exclusively Euroamerican families. Despite the prevalence of family ownership, both men and women also owned land as individuals. Early on, owners lived mostly in the area of Tucson we have defined as Locus B. However, over time, the focus of residence shifted to Locus A, probably because of a decrease in the relative social and economic status of Locus B. This decrease may have been partially caused by the owners' focus on land as wealth, which brought about an increase in income-producing rental properties and commercial developments. The increase in income-generating properties most likely had a negative impact on the residential value of land in Locus B, causing the residential population to relocate.

Neighborhood Composition and Demography

An understanding of residential life in the Joint Courts Complex project area is directly related to an understanding

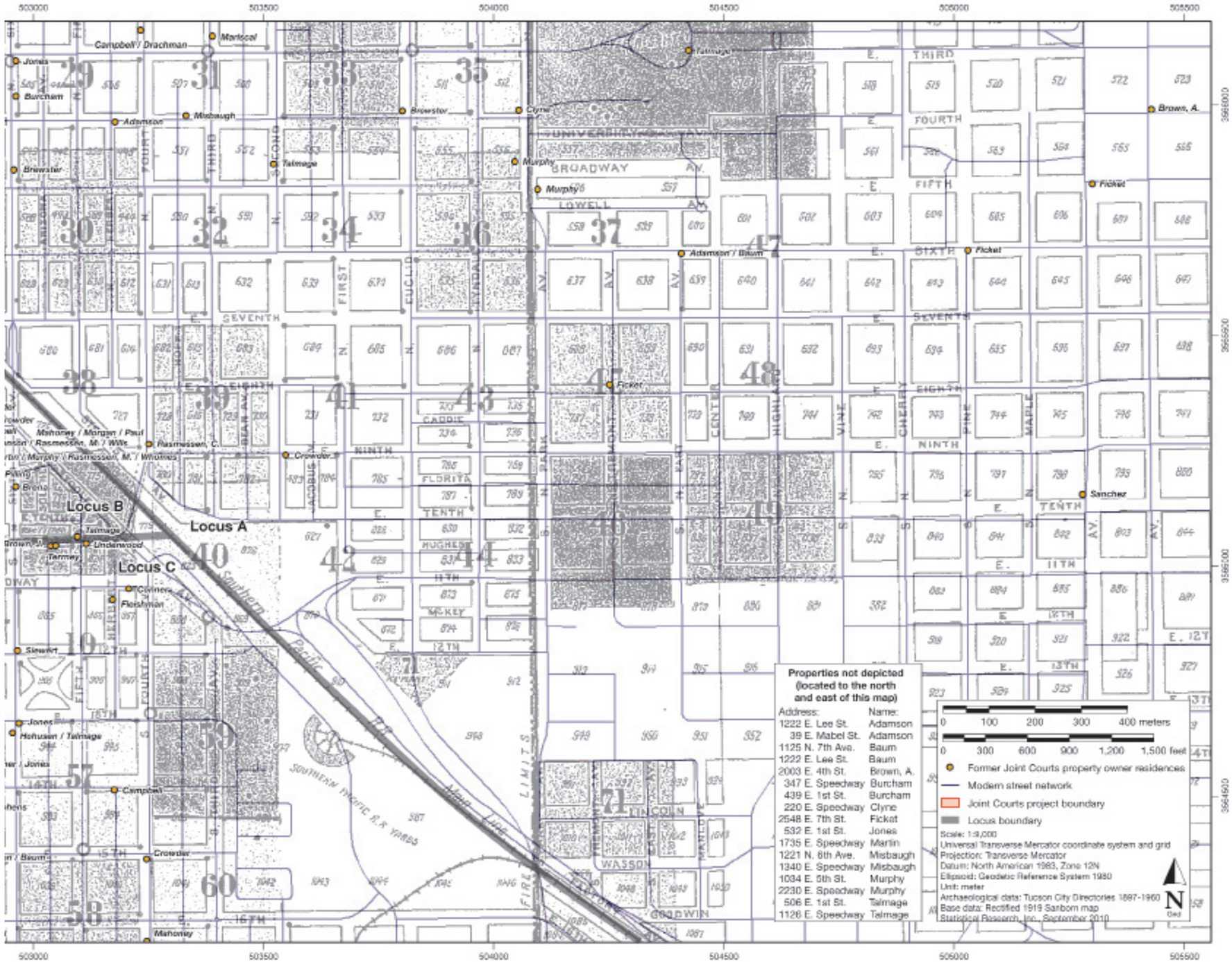

Figure 140. Locations of owner residences in project area.

of life within the individual households that made up the neighborhood. We analyzed the postcemetery residential period of the project area according to lots, thereby facilitating a comparison of households against each other through space and time. As a result, the overwhelming mass of collected data was broken into manageable units for analysis. The analytical results can also be applied to other archaeological household sites of the same period across the American West.

The household has become the primary unit of analysis in historical archaeology because it is a bounded entity in which social evolution occurs at the most basic level (Goody 1971; Laslett and Wall 1972). Households are the spaces where social identities are created, negotiated, and expressed, as evidenced through the acts of material-culture consumption and production (Voss 2008:37). Additionally, households form a neatly bounded space that can be easily treated using archaeological method and theory (e.g., Beaudry and Mrozowski 2001). All households consist of individuals who reside together. People living within a household are individual agents who make everyday decisions using bounded rationality based on their interpretation of existing social systems (Hodder and Hutson 2003:9; Johnson 1999:104). Although the fact that households consist of independent individuals cannot be denied, the archaeological deposits created by those households can be considered the result of the collective behavior of the household's members.

Households within the neighborhood now encompassed by the project area were influenced by the size of their dwelling, which varied widely across space and through time. Between 1890 and 1920, at least 34 individual dwellings were constructed and occupied within the project area. The largest of these dwellings was Fred and Amelia Steward's 4,400-square-foot house at 286 N. Stone Avenue. Most dwellings were similar to the 850-square-foot units of the Brewster Apartments that were built on Block 252, Lots 11–13. The smallest inhabited dwelling was a former 280-square-foot outbuilding on Block 254, Lot 4, that was shown as a dwelling on the 1909 and 1919 Sanborn fire insurance maps (Sanborn Map Company 1909, 1919).

The identities of many of the residents within each household in the project area were discovered in historical documentation. Appendix C in Volume 3 of this series provides head-of-household information gleaned from city directories, censuses, and other historical documents, and Table 37 summarizes the number of known household residents through time. However, it is probable that there were residents of the neighborhood who, because of timing or prejudice or other factors, escaped official notice and were, as a result, unrepresented in the historical record. The result of our multiple threads of data was a thorough, yet incomplete, survey of household composition within the project area.

Household population information was divided into two categories of data based on owner-occupancy versus tenant-occupancy. Of the 34 addresses, only 7 were occupied by the property's owner for any length of time, and owner-occupied households contained only 26 of the 318 known historical-period families in the project area. The median occupancy date for these households was 1902, although the earliest owner-occupied household (the Brown family) moved to the project area in 1890 and the last owner-occupied household (the Rasmessen family) left the project area in 1948. The longest owner-occupied residence was that of the Steward family. The Steward family and the Brown family were part of the same extended family that lived in the project area for nearly 40 years. John Brown was born in Ohio in 1844, and by the time he was 30, he had moved west and was ranching near Tucson (see Chapter 9, Volume 3 of this series). By 1877, Brown had married Delores Ybarra Mera and their daughter Amelia had been born. In 1899, Amelia married Fred Steward. Fred was originally from Ohio but was living in Oracle, Arizona.

Although owner-occupied households made up less than 10 percent of the total households in the project area, a greater amount of information was collected regarding the individuals in these households because of their immortalization in city and county assessors' tax and property ownership records. Owner-occupied households usually consisted of a married couple with children, other family members, or co-residing boarders. The largest owner-occupied household (1896–1901; see Chapter 14, Volume 3 of this series) consisted of the dentist Dr. George Whomes; his wife Adah; R. H. Forbes, a University of Arizona professor; a Zeckendorfs Department Store employee, C. W. Neece; a Mexican-born servant, Matilda Sturis; and a German-born miner named William Klug. Owner-occupied households were headed by individuals with white-collar professions such as banker, dentist, cattle rancher, business proprietors, and state and local politicians. These professions were sometimes found within renter households, but they were predominant among owner-occupied households.

Rental households were not as well documented as owner-occupied homes, but enough information was collected to provide an outline of who typically lived in these households. City directories, which primarily recorded the head of household, provided most of the information on renter household demographics. Throughout the postcemetery period, men were listed as head of household about 76 percent of the time (n = 241). Only 24 percent (n = 77) of household heads were women. Renters, both men and women, had a wide range of occupations. Men's occupations included salesmen, engineers, a golf instructor, clerks, waiters, grocers, a physician, law enforcement officials, truck drivers, and real-estate agents. Men were more likely to hold positions with higher titles or required higher education, or they were self-employed. Women were primarily employed in service and clerical occupations, including waitresses, clerks, bookkeepers, cashiers, seamstresses, and teachers.

Table 37. Summary of Known Residents of the Joint Courts Complex Project Area

Block/Lot	Address	Household Adults						Household Adults					
		Owner Occupied	Owner Occupied Period	Men	Women	Number of Children	Owner Occupied Period Total	Rental Period	Rental Period Known Heads of Household	Men	Women	Number of Children	Rental Period Total
252/2	294 N. Stone			—	—	—		1900–1929	6	6	8	2	
252/3,4a,8,9b	286 N. Stone	Steward Family	1900–1928	2	1	2		1931–1936	2	2	4	2	
252/4b,5,9b,10	270 N. Stone	Brown Family	1890–1914	1	1	2		1916–1934	10	5	6	—	
252/6,7	250 N. Stone	Snyder Family	1890–1893	1	1	—		1896–1902; 1910–1923	6	5	8	3	
		Paul Family	1902–1903	1	1	—				—	—	—	
252/11,12,13	52/58 Miltenberg			—	—	—		1897–1923	4	5	5	6	
	78 Grossetta			—	—	—		1900–1955	19	14	7	5	
	80 Grossetta			—	—	—		1924–1935	6	5	2	—	
	82 Grossetta			—	—	—		1924–1933	6	6	—	—	
	36 Miltenberg			—	—	—		1924–1955	5	6	5	—	
	38 Miltenberg			—	—	—		1924–1955	8	9	2	1	
	40 Miltenberg			—	—	—		1924–1955	9	5	5	—	
	42 Miltenberg			—	—	—		1924–1955	10	3	8	—	
	44 Miltenberg			—	—	—		1924–1953	11	7	4	—	
	52 Miltenberg			—	—	—		1924–1955	10	6	4	—	
	54 Miltenberg			—	—	—		1924–1952	5	3	2	—	
254/2	208 N. Stone	Whomes Family	1896–1901	4	2	—		1910–1935	8	9	12	16	
		H.D. Underwood	1901–1903	1	—	—				—	—	—	
254/1	220/223 N. Stone	Smith Family	1896–1914	2	1	—		1914–1928	5	5	1	—	
254/4,5	55 Miltenberg			—	—	—		1908–1952	17	16	7	4	
	57 Miltenberg	Rassmessen Family	1937–1948	2	2	—		1908–1952	15	9	8	2	

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Block/Lot	Address	Household Adults						Household Adults					
		Owner Occupied	Owner Occupied Period	Men	Women	Number of Children	Owner Occupied Period Total	Rental Period	Rental Period Known Heads of Household	Men	Women	Number of Children	Rental Period Total
	59 Miltenberg			—	—	—		1910–1953	19	17	5	3	
	46 Grossetta			—	—	—		c1930	1	1	1	2	
	46 Miltenberg			—	—	—		1924–1955	6	4	4	—	
	48 Grossetta			—	—	—		c1930	1	1	1	1	
	48 Miltenberg			—	—	—		1924–1955	7	6	2	—	
	50 Grossetta			—	—	—		c1930	1	1	1	1	
	50 Miltenberg			—	—	—		1925–1953	6	4	3	1	
254/6	34 E Alameda			—	—	—		1910–1932	5	5	3	4	
254/7	48 E Alameda	Fairbanks Family	1897–1903	1	3	—		1910–1934	14	10	7	1	
255/1	37 Grossetta			—	—	—		1897–1900	2	5	1	1	
	47 Grossetta			—	—	—		1910–1959	19	23	2	—	
	49 Grossetta			—	—	—		1918–1959	19	13	8	1	
	51 Grossetta			—	—	—		1924–1959	13	6	7	—	
	77 Miltenberg			—	—	—		1919–1918	3	3	1	5	
255/6	45 Grossetta			—	—	—		1899–1959	23	33	6	—	
Total				15	12	4	31		301	258	150	61	469

Demographics regarding households headed by women exemplified a transitional period in the history of women in the United States. The increase through time in project area women as head of household mirrored the wider entrance of women into the workforce between 1900 and the 1940s. An increasing number of women entered into the workplace after 1900 because they had been relieved from many household tasks by the introduction of new household machines, mass-produced food and clothing, and the decline of home-based industries. This allowed both married and single women to work outside the home in greater numbers. There was also a corresponding demand in the workplace for clerical, sales, and other service jobs during this period (Coontz 1992:156–157). As women entered the workforce, children became more of a liability, resulting in lower birth rates. The average number of children born to a woman who survived until menopause fell from 4.24 in 1880 to 3.17 by 1920 (Coontz 1992:157). The Great Depression sent even more women into the workplace to help provide for their families, resulting in an increase in married women in the workplace from 29 to 35.5 percent during the 1930s, and the percentage was even higher during World War II (Coontz 1992:158–160).

Except for the number of children in households headed by women, these statistics were reflected in the Joint Courts project area. Of the 77 households headed by women, 62 percent (n = 48) lived in the project area after 1930. Thirty-six percent (n = 28) lived in the area between 1910 and 1930, and only one woman head of household was noted before 1910—Ms. Alice Hayes, who lived at 34 Grossetta in 1900. Children were not noted in any of these households. These data contrasted with information on women who lived in homes where men were the head of household. An occupation was not listed for most women living in households headed by men. Although married women increased their employment outside the home during the 1930s and 1940s, the general public did not typically accept this and public policies were enacted to discourage married women from working outside of the home (Coontz 1992:159). Perhaps this is why most of our employment information was associated with women who were heads of household.

Historical documents indicated that household composition within the project area was diverse. Owner-occupied households were primarily nuclear families, although not all of these households had children. Although this trend was generally mirrored in rental households and continued through time, a high turnover in rental households during the twentieth century resulted in increasingly frequent information gaps. In addition, Tucson city directories generally showed a bias towards listing a single resident or cohabiting male and female couple.

From time to time, the presence of other household residents was indicated in the city directories. One example was the Gotto household that resided at 270 N. Stone Avenue between 1930 and 1935. In 1930, the nuclear family included the married couple Lorenzo and Enice B. Gotto (called Gatts in the 1930 census), their sister Helen E. Gotto, and six additional boarders. Enice Gotto's occupation was listed as landlady of a rooming house. In later city directories, none of the six boarders noted in the 1930 census was recorded at this address. The Gotto family was one example of the ever-changing household composition in the project area where high turnovers in rental households resulted in a number of individuals calling this location home at one time or another.

In some instances, the presence of boarders was not discovered in historical documents but was implied from contextual information. Two households were characterized in city directories as rooming houses. In 1925, Mary MacGoon was recorded as operating a rooming house out of her home at 78 E. Alameda Street, and Ola Garbo operated a rooming house at 270 N. Stone Avenue in 1930. Both of these women were listed as heads of household, and it is assumed that they had other, albeit generally unknown, individuals living with them.

According to several authors (Coontz 1992:136; Modell and Hareven 1973:467–479), the operation of small rooming or boardinghouses was common in the United States from the late nineteenth century until widespread social and moral prohibitions marginalized this activity during the first half of the twentieth century. Richard Harris (1992) suggested that rising incomes in host families, as well as the desire for more privacy, led to the decline of boarding in the early twentieth century. Conversely, he noted that lodgers eventually became stigmatized as their status was increasingly associated with poverty.

Rooming houses were often managed and operated by women (Purser 1991:12, 1992:112). In a society where women were discriminated against in the workplace, the rooming houses operated by Mary MacGoon and Ola Garbo provided a means of income that was under their control. Additionally, because of the close proximity of the project area to the Southern Pacific rail line, these women were also providing a necessary service for a nearby employer.

Historical documents and archaeological data about the project area provided complementary information about household composition. The archaeological record was not used to "fact check" the accuracy of historical documents; rather, it was employed to present a parallel text to the historical documents. This was because the two categories of data were created by different actors, for different reasons, using different techniques. Few archaeological features or strata in the project area could be directly associated to specific families because most dwellings were rentals at some point in time. The mean length of residency in the project area was about 2 years. Considering that the Stewards were residents for 28 years, this suggests that the rate of turnover amongst renters was exceedingly high. The recovered archaeological data consisted of deposits of material culture from multiple households that often appeared to

be mixed. In only a few cases could deposits be identified as to household; notable exceptions included the Brown/Steward families on Block 252 and the Fairbanks and Mose Kelley families on Block 254, Lots 6 and 7. Nevertheless, certain artifacts were found that indicated the presence of households that contained men, women, and children.

Evidence for the presence of adult men and women is strongly dependent upon the recovery of gender-specific artifacts. These are primarily health, hygiene, clothing, and personal artifacts. Health and hygiene artifacts, in particular, are discussed in further detail later in this chapter.

Toys are the most visible archaeological material left behind by children. The archaeological visibility of children increased during the latter half of the nineteenth century and into the twentieth century because of the durability and proliferation of their toys. The development of new technologies during the nineteenth century allowed toys to be mass-produced and marketed across the country. Moreover, as child labor laws were enacted, children's playtime was increased, strengthening their presence in the archaeological record (Heininger 1984).

Through play, children learned much about their expected roles as adults and about the greater societies of which they belonged (see Baxter 2005 for an excellent discussion of the archaeology of childhood). Within the Joint Courts Complex project area, toys appeared to reinforce dominant gender themes in greater American society. Over 200 artifacts classified as toys were recovered from 17 different archaeological features. They spanned the residential occupation period and included all but three addresses, or about 90 percent of all households in the project area. None of the lots without toys had children noted within any household. Few of the toys could be attributed directly to boys, but remains of a rubber horse and a toy train set were recovered. Most toy artifacts were fragments from at least 40 ceramic dolls and over 40 marbles. Although marbles were used for a number of recreational activities by both boys and girls, and games played by adults, ceramic dolls during the period were almost exclusively associated with girls. Dolls were one of the principal means by which girls were socialized for gender roles; caring for dolls during play mimicked expected roles during motherhood. Dolls also served to reinforce racial stereotypes. All of the doll fragments in the project area had fair skin complexions, which can be interpreted as having contributed to a subtle narrative on concepts of feminine beauty. Dolls with fair skin color were predominant until widespread civil rights advocacy by African Americans during the 1960s.

The remains of ceramic toy tea sets that included at least nine saucers, five teacups, and a teapot represented another means of socializing young girls into their expected gender roles. Turn-of-the-twentieth-century concepts of domesticity were instilled into girls from an early age. Part of this engendering process was women promoting the use of decorative tea sets and specialized ceramic tableware vessels in everyday life (prominent discussions of gender and ceramic tablewares in historical archaeology can be found in Cook et al. 1996; Klein 1991; LeeDecker et al. 1987; Wall 1991, 1994). Miniaturized versions of adult material-culture items are at the core of toys used for acculturation (Baxter 2005:47).

Ethnicity

Tucson at the turn of the twentieth century was a community that was becoming increasingly divided along ethnic and racial lines (Sheridan 1986; Sonnichsen 1987). The most visible division was between the established Native American and Hispanic population on one hand and recent Euroamerican arrivals on the other. However, the concept that it was acceptable to "conquer" the local people of Tucson certainly did not start with the Euroamerican invasion of Tucson during the latter decades of the nineteenth century. Starting with the eighteenth-century Spanish missionaries and soldiers who felt it was their right to subdue, convert, exploit, and enslave the local Native American population, each succeeding wave of settlers and explorers in the area sought to place its mark on the resident population (Sonnichsen 1987:10). In fact, even early Euroamerican settlers felt pressure from displacement in the city's power structure by later post-railroad arrivals. When the Society of Arizona Pioneers was founded in 1884, a burning question was the cutoff date for membership; it was ultimately determined to be January 1, 1870, although the date of the railroad's arrival in Tucson—March 20, 1880—was also considered (Sonnichsen 1987:113). Even today, with the Sun Belt migrations that have forced Tucson's metropolitan population over the one million mark, the long-resident population is dealing with changes forced on the city by relative newcomers.

By the early twentieth century, Hispanic identity in Tucson had been fused with racialized overtones by the non-Hispanic community. Euroamericans, who dominated much of the economic and political atmosphere of the town (Sheridan 1986:57–59), sought to solidify the privileges gained by this rise in strength and created a new social paradigm in which Hispanics were no longer considered to be members of the Euroamerican ethnicity. Economic and political success became tied to the newly created social divide between English-speaking descendants of western European immigrants and Spanish-speaking Tucsonans of mixed Spanish, African, and Native American descent. Between 1880 and the 1930s, neighborhoods became increasingly segregated and Hispanic Tucsonans were consistently relegated to lesser-paying, menial jobs (Kalt 2007:256–258; Sheridan 1986:80, 86, 185–187). Hispanic-owned property was appropriated by Euroamericans and a labor system was developed using immigrants from rural Mexico to provide the cheap labor (Sheridan 1986).

Historical documents can demonstrate the complex dialectic that occurred between Tucson's two principal ethnic

groups during the early twentieth century. However, ethnic groups can be mislabeled or overlooked because those who created the documents may have recognized ethnic groups based only on marked differences in appearance, behavior, or another trait (Barth 1969:15). Additionally, archaeologists may focus on a small number of attributes, such as surnames, that were not necessary for group membership.

Historical documents, such as property ownership records, from the Joint Courts Complex project area provided good information on this interplay. Property ownership within the project area was dominated by Euroamericans, and most real-estate transactions were conducted by Euroamericans from the earliest period of ownership within the project area. However, the fluidity of ethnic categorization made it difficult to associate properties to Hispanics. One example was property ownership by the Brown family. As mentioned previously, John Brown's wife was born Dolores Ybarra Mera. She married John N. Brown, who was from Ohio, and had two daughters (Figure 141). John gifted half of his property to his daughter Amelia when she married Fred Steward, a Euroamerican also from Ohio. Depending on the ethnic identification of Amelia, this may have meant that the property was owned by a Hispanic. Upon John's death in 1914, the remainder of his property in the project area reverted to Dolores who retained ownership until 1918. This meant that an additional landowner in the project area could be categorized as Hispanic despite a Euroamerican surname. The fluidity of ethnic identity is dependent upon both the analyzing archaeologist as well as the individuals being studied. In cases such as the Brown family, surname alone was not enough to indicate ethnic identity.

Although a number of individuals with Hispanic surnames resided in the project area, only Dolores Brown and three men of Hispanic descent owned property within the project area. Two of these men, José M. Mariscal and Rosario Brena, were wealthy businessmen who emigrated from Mexico to the Tucson area after the cemetery was

Figure 141. John N. Brown (1895) and Dolores Ybarra Brown (1897) of 270 N. Stone (photographs courtesy of the Arizona Historical Society, Tucson, Accession Nos. 23833 and 23836). Dolores Ybarra Brown was one of only four Hispanic property owners in the project area and the only Hispanic woman listed as a property owner.

closed. Mariscal may have briefly resided in the project area, but Brena never did. Both men purchased property in the project area primarily as investments and both sold their parcels within 2 years of purchase. The third man was Celestino Sanchez, who purchased property in the project area in 1929, towards the end of the residential period.

Extensive archival research was conducted for the Joint Courts Complex Archaeological Project prior to archaeological investigations (O'Mack 2005). Analysis of federal census information for residents of the project area indicated the occupation, racial affiliation, and place of birth for residents and their parents. Although it is important to note that the designation of race is often treated very subjectively, this category in combination with place of birth provided some insight into the ethnogenesis process for certain individuals within the project area. Census records were obtained for 1900, 1910, 1920, and 1930. The overwhelming majority of residents and their parents were born in the United States, but small numbers of individuals born in other nations were also documented as summarized in Table 38.

Table 39 chronicles the nativity and lineage of about 40 project-area residents who were not born in European countries or Canada. As this table shows, European heritage was not the primary determining factor for inclusion in the "white" category. Native American identity appeared to be separate from Euroamerican identity, as seen by the labeling of Nikolasa Antonio as "Indian" in 1900, but persons born in Mexico were noted as "white." From 1900 to 1920, persons of Mexican and those of mixed Mexican heritage were considered "white." Even people born in Syria and Japan were classified as "white."

By 1930, the census records suggested that residents of the project area with Mexican ancestry were considered to be members of a separate ethnicity or race. Eleven individuals at this time were classified as "Mexican," including people who had been born in the United States of Mexican parents. Notably, children of the Ewing family were classified as "Mexican" despite the fact that their father and mother were born in the United States. A similar situation occurred with Amelia Smith who had a Mexican mother and a father who was born in Texas. Clearly, by 1930, individuals of Mexican descent were considered to be members of a separate racial group.

Although the racial categorization of individuals was determined by both the census taker and the residents themselves, it clearly suggested a shift in ethnic categorization in which Hispanic people were no longer considered to be part of the Euroamerican ethnicity. Part of this could be attributed to the highly subjective nature of Euroamerican characterization. Hartigan (2005:59) wrote, "Who counts as white and what basis of solidarity ties such whites together? . . .The basis for answering such questions…begins with the recognition that whiteness is not simply a racial identity and that race is not an absolute social condition." Defining who is Euroamerican in the United States must address the historical creation of this ethnic group as distinct from other groups. It is true that the Euroamerican identity was used as a means for separating Europeans from the other ethnicities encountered during the early colonial period. But Euroamerican groups also differentiated between each other based on nationality, religion, and class. At times, competition between Euroamerican groups prevented the cohesion of a truly overarching "white" race (Hartigan 2005:78). Initially, in the project area, individuals and households who were not part of the African or Native American ethnic groups were considered to be Euroamericans. This included Hispanics. However, as the population of low-wage Hispanic laborers in Tucson increased, Hispanics began to be considered as part of a separate ethnic group, or race.

Historical documents indicate that about 8 percent of all identified residents of the project area were Hispanic, but it was difficult to infer the presence of Hispanics based on material culture. This was because of three main factors: (1) deposits at this site could rarely be associated unequivocally with specific households; (2) the material culture used by Euroamericans and Hispanics was overwhelmingly the same; and (3) archaeologists were searching for "ethnic markers" (i.e., culturally specific artifacts) that could be linked to Hispanic identity. Most recovered artifacts were mass-produced articles that were sold in a number of stores in Tucson, including stores in close proximity to the project area. Purchasing power was the main constraint to what items an individual could possess, regardless of ethnicity. Despite the change in racial terminology by the 1930s, household material culture assemblages remained the same because this ethnic separation was laid upon an existing economic system that already used cheap, mass-manufactured goods made in Europe and the United States. Hispanic Tucsonans continued to purchase mass-produced material culture independent of changes in ethnic terminology.

Analysis of ceramics from the project area, however, did indicate that Mexican ceramics made up a small portion of the collection, and that utilitarian Mexican vessels could be loosely linked to Hispanic households. Cesspit 10099 on Block 252, Lot 4a, yielded a small collection of Mexican vessels, including items that had been used for cooking. This suggested a continued reliance on functional utilitarian wares that had long been employed by Hispanic residents of the American Southwest. The remains of a red-bodied, coarse earthenware vessel with white- and black-enameled decoration—most likely from southern or central Mexico (J. Ayres, personal communication, 2008)—were recovered from this feature as well as several Mexican gray- and red-bodied earthenware sherds with slip or enamel decoration. Some of the sherds were blackened from use over a cooking fire. Cesspit 10099 was associated with a dwelling at 286 N. Stone Avenue where the Hispanic Ewing family resided from 1930 to 1933. The Mexican ceramic sherds were recovered from stratigraphic layers of fill that most likely incorporated

Table 38. Nativity Summary for Project Area Residents

Place of Birth	Men	Women	Children	Total
Alaska	—	—	1	1
Alabama	1	—	—	1
Arizona	—	10	21	31
Arkansas	2	2	—	4
California	6	6	14	26
Canada	2	4	—	6
Colorado	1	2	1	4
England	2	1	—	3
Georgia	—	2	—	2
Germany	3	—	—	3
Illinois	8	6	—	14
Indiana	1	1	—	2
Iowa	3	3	—	6
Japan	—	—	1	1
Kansas	3	2	1	6
Kentucky	2	—	—	2
Louisiana	1	—	—	1
Maryland	2	—	—	2
Massachusetts	2	—	—	2
Mexico	5	8	1	14
Michigan	2	1	—	3
Minnesota	1	—	—	1
Mississippi	1	1	—	2
Missouri	4	4	1	9
Montana	1	—	—	1
Nebraska	1	2	1	4
New Mexico	1	1	—	2
New York	—	3	—	3
Norway	—	2	—	2
Ohio	7	3	—	10
Oklahoma	—	1	1	2
Oregon	1	—	1	2
Pennsylvania	2	—	—	2
Scotland	1	1	—	2
Switzerland	1	—	—	1
Syria	2	—	—	2
Tennessee	3	4	—	7
Texas	7	—	5	12
United States	6	2	10	18
Washington	—	1	—	1
West Virginia	—	1	—	1
Wisconsin	—	4	—	4
Vermont	1	—	—	1
Unknown	194	94	6	294
Total	280	172	65	517

Table 39. Summary of Nationality and Racial Affiliation for Project Area Residents

Block[a]	Lot[a]	Address[a]	Year	Name	Age	Nativity	Father's Nativity	Mother's Nativity	Race
Unk.	unk.	186 N. Stone	1900	Nicolasa Antonio	18	Arizona	Arizona	Arizona	Indian
254	2	208 N. Stone	1900	Matilda Sturis	20	Mexico	Mexico	Mexico	white
252	3, 4, 5, 8, 9, 10	260 N.Stone (270 N. Stone)	1900	Dolores Brown	50	Mexico	Mexico	Mexico	white
252	2	294 N. Stone	1900	Clara Antonio	17	Arizona	Arizona	Arizona	white
255	1	47 Grossetta	1910	Adolph Weber	9	Japan	Germany	Japan	white
254	4,5	57 Miltenberg	1910	Raymond Brena	29	Mexico	Mexico	Mexico	white
			1910	Rose Brena	26	Arizona	Mexico	Mexico	white
			1910	Hortenze Brena	2	Arizona	Mexico	Arizona	white
254	2	208 N. Stone	1910	Guadalupe Blanc	37	Arizona	Switzerland	Mexico	white
			1910	Olivia Blanc	16	Arizona	Switzerland	Arizona	white
			1910	Hedwig Blanc	11	Arizona	Switzerland	Arizona	white
			1910	Fred Blanc, Jr.	8	Arizona	Switzerland	Arizona	white
252	6,7	250 N. Stone	1910	Annie Hendry	13	Mexico	Iowa	Missouri	white
252	3, 4, 5, 8, 9, 10	270 N. Stone	1910	Laura B. Brown (Dolores Brown)	57	Arizona	Mexico	Mexico	white
Unk.	unk.	186 N. Stone	1920	John Joseph	48	Syria	Syria	Syria	white

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Block[a]	Lot[a]	Address[a]	Year	Name	Age	Nativity	Father's Nativity	Mother's Nativity	Race
			1920	Mary Joseph	37	Syria	Syria	Syria	white
			1920	Mike Ayup	22	Mexico	Syria	Mexico	white
			1920	Joe Ayup	4	Arizona	Mexico	Arizona	white
			1920	John Mabarka	21	Syria	Syria	Syria	white
			1920	Mary Mabarka	17	Syria	Syria	Syria	white
			1920	Taft Mabarka	24	Syria	Syria	Syria	white
			1920	Charles Mabarka	20	Syria	Syria	Syria	white
Unk.	unk.	196 N. Stone	1920	Teresa Perez	18	Mexico	Mexico	Mexico	white
252	6,7	250A N. Stone	1920	Michael Wehby (Nehley)	43	Syria	Syria	Syria	white
252	11,12,13	58 Miltenberg	1920	Fernando Gutierrez	38	Mexico	Mexico	Mexico	white
			1920	Francisca Gutierrez	70	Mexico	Mexico	Mexico	white
			1920	Cleotilda Gutierrez	28	Mexico	Mexico	Mexico	white
			1920	Josephina Gutierrez	20	Mexico	Mexico	Mexico	white
			1920	Arnoldo Gutierrez	17	Mexico	Mexico	Mexico	white
Unk.	unk.	186 N. Stone	1930	Ernest J. Ewing	52	Vermont	Vermont	Vermont	white
			1930	Mary C. Ewing	46	Arizona	Mexico	Mexico	Mexican
			1930	Mary D. Ewing	12	Arizona	Vermont	Mexico	Mexican
			1930	Walter P. Ewing	9	Arizona	Vermont	Mexico	Mexican
			1930	Dora Monguia	25	Arizona	Arizona	Arizona	Mexican
			1930	Brenda Amariel	24	Arizona	Arizona	Arizona	Mexican
Unk.	unk.	196 N. Stone	1930	Rosa McAlpin	39	Mexico	Mexico	Mexico	Mexican
			1930	Richard McAlpin	25	Arizona	Mexico	Mexico	Mexican
			1930	Gilbert McAlpin	23	Arizona	Mexico	Mexico	Mexican
			1930	Julia McAlpin	21	Arizona	Mexico	Mexico	Mexican
254	2	208 N. Stone	1930	Amelia Smith	46	Arizona	Texas	Mexico	Mexican
			1930	Margaret M. Smith	9	Arizona	Maryland	Arizona	Mexican

[a] Not all addresses could be verified with historical data and census addresses were frequently wrong. Many of these individuals could not be associated to archaeological features or parcels used for the archaeological analysis.

sediments from across the property, used to fill in the privy when it was no longer needed. Other artifacts in these strata dated to the period before the Ewing residency and were most likely deposited by the long-tenured Steward family (1899–1928). The Mexican ceramic sherds could not be unequivocally attributed to the Ewing family, but this was the closest association with a Hispanic household in the project area.

The only other artifacts linked to a specific ethnicity were found in the historical-period Native American ceramic collection (see Appendix I, Volume 3 of this series). However, these were linked to ethnicity mainly in their manufacture but not necessarily in their usage. More than 1,200 historical-period Native American ceramic artifacts were found in postcemetery contexts. These were mostly undecorated slipped wares, and most were from Papago Red vessels. Only around 2 percent of historical-period Native American ceramics were decorated, and these were all from Papago Black-on-red vessels. Small numbers of Papago brown, Papago Plain, and a few Papago Glaze sherds were also found in postcemetery contexts.

The vast majority of historical-period Native American ceramic artifacts, around 85 percent, were Papago Red, and most of these were from jars with globular bodies and round bases. Found at low densities across the project area in contexts dating between 1890 and 1920, most Papago Red ceramic artifacts were likely from *ollas* used by Tucson residents of all backgrounds to store and cool water (Fontana et al. 1962). A large Papago Red bowl and a small jar or possible bud vase were also found in project area postcemetery contexts, but the general lack of Papago Red bowls and bean pots is consistent with their restricted use for storage (c.f., Mabry et al. 1994:171). Papago Plain ceramic artifacts

comprised less than 1 percent of the sample and came from at least two jars. Reasons for the low frequency of Papago Plain ceramic artifacts are unclear, but Sagebiel (see Appendix I, Volume 3 of this series) suggests that project area residents may have preferred the slipped Papago Red vessels over these unslipped vessels.

Historical-period Native American decorated sherds were rare and included a nearly complete three-spouted jar, a pitcher, and the cover to a conical incense burner. Interestingly, these were found in a limited number of contexts, and two of the contexts were associated with railroad workers, which suggested to Sagebiel (see Appendix I, Volume 3 of this series) that Papago Black-on-red vessels were acquired as curiosities during travels or that residents may have been purchasing Native American trade items. In Privy Pit 16500 on Block 252, Lots 6 and 7, which was associated with a residence at 250 N. Stone Avenue, a nearly complete three-spouted jar was recovered (Figure 142). Possibly a Maricopa vessel based on the lack of manure temper, the artifact unfortunately could not be attributed to a particular resident. Privy Pit 650 (Block 252, Lots 11–13) contained an effigy artifact that may have been the cover for a conical incense burner, based on heavy sooting of the interior surface (see Appendix I, Volume 3 of this series), as well as some pitcher fragments. Joseph Corbett, a railroad engineer who lived on this lot from 1897 to 1901, may have collected these items on his travels. A small bud vase or jar was recovered from Privy Pit 734 on Block 255, Lot 1. Finally, several decorated jar sherds were recovered from Cesspit 3042 (Block 254, Lot 6). The latter were most likely collected by Daniel Mahoney, who worked as a conductor for the Southern Pacific for 34 years.

Indeed, the three-spouted jar has technological and stylistic elements suggesting that it may have been a Maricopa vessel, rather than manufactured by O'odham closer to Tucson (see Figure 142). The small numbers of decorated historical-period Native American sherds contrasted sharply with findings from the adjacent Historic Block 180 project, where substantially larger percentages of decorated sherds as well as a higher diversity of decorated types were found (Whittlesey 1997). Like the Papago Red vessels, Papago Black-on-red vessels were deposited in project area contexts dating between 1890 and 1920.

Although constituting less than 10 percent of the historical-period Native American ceramics, Papago brown ceramic artifacts came from a higher diversity of vessel forms than other ceramic types, including jars, bean pots, bowls, and possible plates. In addition, their use in the project area appears to date to a more restricted range, between 1890 and 1910. Interestingly, no Papago brown ceramic artifacts were found in the Historic Block 180 project area (Whittlesey 1997), which Sagebiel suggests could indicate that these vessels were marketed for a short period of time by a limited number of potters who may also have marketed their wares only in specific parts of town. Sagebiel further suggests that, in contrast to other vessels used to store water or collected as curios, Papago brown vessels may have been used for cooking and serving, falling out of common use soon after non–Native American cooking and serving vessels became more widely available in Tucson.

Residential Architecture and Landscaping

Figure 143 is the earliest known photograph from the residential period of the project area, dated to 1890–1892 (see Chapter 2, Volume 3 of this series). This photograph provides an excellent representation of the project area during the initial construction period. Houses are depicted along Stone Avenue, and one residence is shown on Alameda Street. One item of note is the presence of buildings that were probably related to keeping livestock; it is likely that these buildings represented buggy houses and/or shelters for horses. Although some residential construction and renovation occurred into the 1920s, the major period of residential construction in the project area lasted from around 1890 until approximately 1909.

With respect to architecture, people "balance their cultural desires with their technological and financial abilities" (Gerlernter 1999:xiii). As such, architecture, especially vernacular forms, can often reflect ethnic traditions. Spanish Colonial styles, for example, were imported to the Southwest by Spanish settlers during the seventeenth century. A fusion of Spanish and Native American ideas, this style became more sophisticated and elaborate in the eighteenth and nineteenth centuries. Architectural traditions of the Victorian era were introduced to the Southwest in the nineteenth century by settlers from the east. These traditions were often more fashionable than practical, and architectural elements became more accessible with the arrival of the railroad. With better access to ready-made and prefabricated goods, older houses were often updated with Victorian porches and trim (Gerlernter 1999; Harris 1998; McAlester and McAlester 2000).

Archaeological discussions of the architecture of historical-period Tucson tend to emphasize the ethnic nature of three specific practices: adobe architecture, flat roofs, and the placement of housing to abut the street. In all cases, these practices are used as examples of indigenous Sonoran architecture (e.g., Ayres 1990; Thiel 2002). Given this, the transition of Tucson from a Sonoran to a Euroamerican town should be evidenced by three separate trends: an increased prevalence of pitched roofs, the replacement of adobe with brick or wood, and the movement of houses away from the streets and toward the center of the yards. To some extent, these trends were evident within the project

Figure 142. Papago or Maricopa Black-on-red three-spouted jar from Privy Pit 16500.

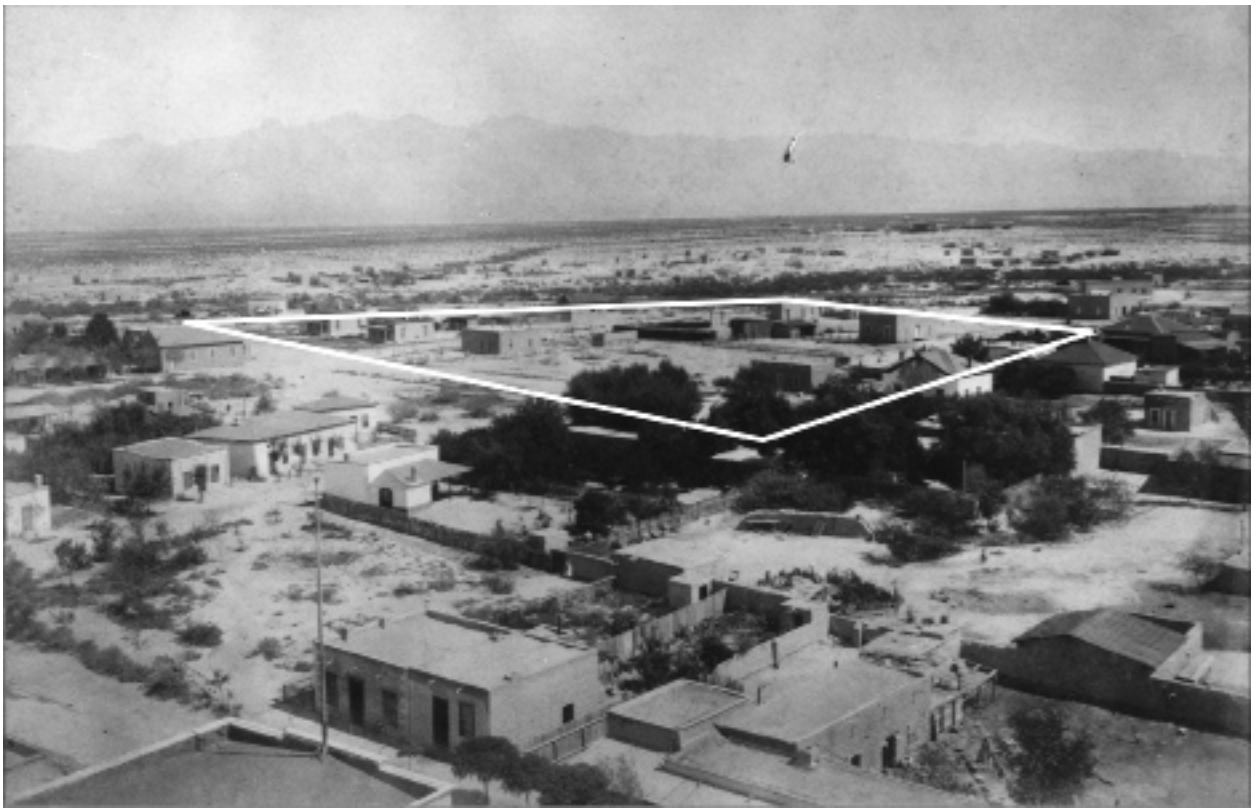

Figure 143. Earliest photograph of the project area neighborhood, outlined in white, 1890–1892.

area, but they were not as strong as might be expected, given the generally Euroamerican descent of the earliest residents.

As early as 1890–1892 (see Figure 143), there was already a mixed vernacular architectural tradition in the project area, with three Spanish Colonial–style adobe dwellings, four adobe outbuildings, and two Folk Victorian–style brick dwellings. By 1900, eight additional residences were constructed in the project area. The vernacular Spanish Colonial style was reflected in only three of the new buildings, and five were Folk Victorian in style, three of brick and two of adobe. Only six more adobe dwellings would be constructed in the project area, the last in 1923; none of these was Spanish Colonial in style. Overall, however, most of the residences built in the project area, approximately 75 percent, were built with adobe, and the ratio of adobe to brick construction actually increased with time. Figure 144 is an aerial view of the project area taken in 1924, showing the fully developed residential neighborhood immediately before its transition to a commercial neighborhood.

Other styles making an appearance in the project area included Egyptian Revival, Craftsman, Spanish Eclectic, and Art Deco. Unlike the earlier styles born from functional needs and available materials, these styles were more associated with aesthetic desires and architectural fashion.

Only three houses in the project area were ever built abutting the road, and these were all built to be rental properties along Grossetta Avenue by Charles Rasmussen during the earliest period of residential construction. All three houses were constructed of adobe and had flat roofs, making them the most Sonoran of the buildings in the project area.

The building materials, land-use patterns, and architectural forms of the Rasmussen rentals were entirely Sonoran, and yet Rasmussen was not. Nor, from what we can tell of the residential history, were his tenants predominately Hispanic. It could be that the economics of the rental industry made the choice to use indigenous materials and forms attractive. The less money spent on the building of the rental, the higher the proportion of profit to cost. However, although rentals were predominately built of adobe, they were not the only buildings to use the material. Benjamin Fairbanks, one of the wealthiest men on the project area, also built his house of adobe, in the Spanish Colonial style. Although he would extensively remodel the building prior to his death in 1901, adding a wood-framed second story among other additions, it is telling that he chose to initially build a more Sonoran-style

Figure 144. The first known aerial photograph of the project area, 1924.

dwelling. In the classic formulation, both his ethnicity and economic standing would not suggest the use of vernacular Sonoran architecture. According to conventional thought, this is a man who should have built a brick, Folk Victorian house.

To reconcile the choices of people like Benjamin Fairbanks, and possibly Charles Rasmussen, it may be necessary to replace the strict ethnic duality of Hispanic and Euroamerican. Perhaps the economic conditions that led to a decline in Tucson's population between 1880 and 1890 also affected the purchasing power of the landowners who built residential structures in the project area. This could at least partially explain the prevalence of local building materials in residential structures. That the economic depression continued into the 1890s was evidenced by the following quote from a bakery ad, "On account of the continued hard times, I have concluded to give the people of Tucson a further reduction in prices, and from this date will sell thirty bread tickets for $1" (*Arizona Daily Citizen*, 19 December 1895:4:2).

However, we must recognize that, although many emigrated from the East, the Southwest was not the East. Forces and influences appeared to create a new Southwestern tradition from Euroamerican, Hispanic, and Native American cultural elements. In 1890, John Brown purchased close to an acre of land on Block 252 and built a modest brick house in the Folk Victorian style (Figure 145). His daughter, Amelia, and her husband, Fred Steward, started married life in what might best be described as an aggressively eastern-style mansion (Figure 146). The approximately 4,000-square-foot building was also built in the Folk Victorian style, complete with lattice work, scalloped shingles, and spindlework posts. The Stewards lived and raised their children in this house for the first 29 years of married life. Then, in 1928, they moved to what was then the far east side of Tucson, now known as the Sam Hughes historic neighborhood. There, at 2003 E. 4th Street, they built a new house, which survives today. It was not a house in the Folk Victorian style. Rather, the Stewards chose to build in the distinctly Southwestern style known as Mission Revival.

Building materials used in residential structures in the project area were diverse and reflected the use of both locally available materials and a smaller number of materials available because of the railroad. The foundations of the vast majority of the dwellings on the project area were constructed from basalt, which was locally available from the Sentinel Peak quarry site (Encinas 2005). This is unsurprising, as the economics affecting the production of stone for foundations was unlikely to be significantly more advantageous elsewhere, and the cost of shipping rock would have been prohibitive. Likewise, the production of adobe bricks was undoubtedly local. With the major costs being the water necessary to make soil into mud, and the labor necessary to make the mud into bricks, it is unlikely that this market could be undercut. The use of adobe for residential construction in the project area was probably also influenced by a general lack of native lumber and the high price of imported lumber. That lumber was produced locally prior to residential development of the project area can be seen in Tucson barkeep George Hand's remarks on the comings and goings of the "sawmill fellows" in his diaries of 1875–1878 (Hand 1994:81). However, in 1879, Sam Hughes placed a $47,500 order for lumber, to be shipped into Maricopa (Casa Grande) via the Southern Pacific Railroad (*Arizona Star*, 3 April 1879:3:2). Although it is difficult to say how much lumber was locally produced, orders such as this show that it clearly couldn't meet demand.

On April 13, 1878, George Hand (1994:179) wrote, somewhat ominously, "Bedford came in from the mountains—the sawmill has shut down." Whether this was a seasonal closure, based on water availability in Sawmill Canyon, or whether it closed permanently, is not noted, but it points to the precarious nature of the Tucson lumber industry. Two years later, the 1881 *Tucson City Directory* listed the A. & C. Lumber Company as a Tucson industry. It was said to have sawmills in Alta and Dutch Flats, California, and to have shipped lumber to all parts of Arizona (*Tucson City Directory* 1881:45). Unlike stone or adobe production, the local lumber industry was affected by the economic advantages in other areas of the country. Larger, less-remote stands of timber existed in places like northern Wisconsin, Michigan, and Minnesota. Indeed, Minneapolis was the top lumber producer in the world in the 1890s (Blegen and Nydahl 1960) and, as the A. & C. Lumber Company shows, there was also a nascent lumber industry in California and the Pacific Northwest (Brown 1919). In short, once the railroad opened Tucson to the national lumber market, it is unlikely that production of lumber

Figure 145. The John and Dolores Brown residence, 270 N. Stone Avenue (photograph courtesy of the Arizona Historical Society, Tucson, Accession No. 62776).

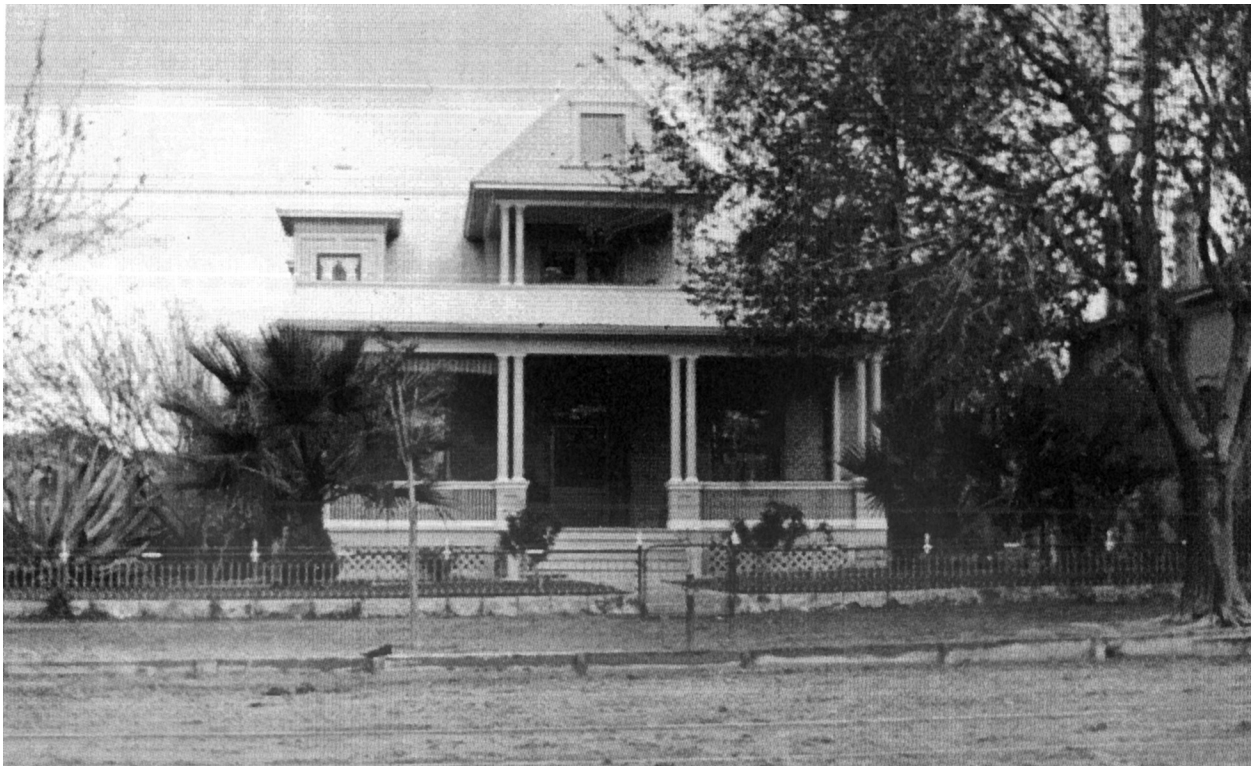

Figure 146. Fred and Amelia Steward residence, 286 N. Stone Avenue, ca. 1910 (photograph courtesy of the Arizona Historical Society, Tucson, Accession No. 41590). The date of the photograph can be inferred from the lack of pavement on Stone Avenue and the presence of trolley tracks.

in and around Tucson could have met the needs of a growing population.

Once the railroad reached Tucson and lumber became more accessible, one of the first visible changes was an increase in the number of houses with pitched roofs. This included both new construction and the remodeling of existing roofs, as can be seen in photos of the project area (see Figure 144). The early roofs of Tucson were often constructed of rough beams, covered with a layer of fabric, on which sat a layer of dirt (Parker 1948). Indeed, several of the early residences in the project area may have had just this type of roof. However, by around 1908, and despite their wall fabric, all of the houses in the project area had pitched roofs. The fact that, even after the introduction of the railroad, wood was the most expensive of the available building materials probably explains why its use was generally reserved for roofs and other constructions where it held a technological advantage over adobe or brick.

Brick was another building material used in Tucson that held a number of technological advantages over the humble adobe. If nothing else, it was not susceptible to erosion. It may have also possessed an ideological advantage with at least a segment of Tucson's population, representing modernity and the urban culture of the East. However, despite a possible bias toward brick construction around 1900, which could be attributed not only to the desire to be "modern" but also possibly an explicit rejection of Sonoran ethnicity in favor of a more Euroamerican identity (e.g., Diehl and Diehl 2001; Sheridan 1986), there were few residential structures in the project area built of brick. Given that brick was more durable than adobe and cheaper than lumber or stone (Diehl and Diehl 2001), it is surprising that so little was used. This could be the result of several economic factors, such as the economic depression previously mentioned, or the fact that many of the dwellings were constructed as rental properties. Although brick was cheaper than wood or stone, it is unlikely that it was cheaper than adobe. Further, although adobe was technologically deficient compared to baked bricks, much of that deficit could be reduced by the use of architectural features such as stone-and-mortar foundations and pitched roofs with eaves. These features would have alleviated much of the contact that the adobe walls had with heavy moisture or running water, and thereby seriously reduced the rate of adobe melt.

Another possible reason for the use of adobe rather than brick is that until around 1900, Tucson most likely had no large-scale brick-making capacity. Depending on the source, Quintus Monier, husband of Elsie Siewert (first owner of Block 252, Lot 2), started the Tucson Pressed Brick Company either in the early- to mid-1890s (Diehl and Diehl 2001) or in 1900 (Chapman Publishing Company 1901). This was not the first brick factory in Tucson; indeed two brickyards were mentioned in the 1881 *Tucson City Directory*, but Monier's was probably the first "to employ engine-driven machinery for mass production" (Diehl and Diehl 2001:425). Without the advantage of mass production, it is likely that local bricks were considerably more costly than adobe and that production capacity was too restricted to meet the needs of a growing town. Indeed, in the 1880s, despite the local brick industry, bricks were being imported on the railroad as well (Diehl and Diehl 2001). This indicates that demand was reasonably high for brick but also argues against its use for rental properties. Instead, it is more likely to have been used in owner-occupied residences (e.g., the Brown house, 270 N. Stone Avenue, and the Steward house, 286 N. Stone Avenue) or the construction of civic and commercial buildings.

That adobe might have been chosen by Euroamerican landowners for reasons other than economics cannot, and should not, be ruled out. Five of the adobe houses in the project area were built by David Cochran, a well-known local architect and builder. Cochran used local materials and Southwestern styles in more than one building, including one of his own houses and those of some residents in the upscale Paseo Redondo neighborhood (Arizona Historical Society 1943; *Tucson Citizen*, 28 April 1929).

Construction- or maintenance-related artifacts, such as paint and paint cans, linoleum, wallpaper, and tar paper, recovered during fieldwork, showed a local/extra-local pattern that was the reverse of that seen in the building materials. Although most of the artifacts could not be specifically sourced, they were often artifact categories for which there was no known industry in Tucson at the time they were used. Other construction-related artifacts could have been locally manufactured, including wire nails, ceramic tile, window glass, and hardware (e.g., drawer pulls, doorknobs, and hinges). However, it is likely that most of these were also imported. For instance, only six hand-forged artifacts were collected. This lack of hand-forged goods indicates that most of construction materials were probably made in factories employing mass-production techniques. As with lumber, the economics of place and scale probably precluded existence of a local machine shop or factory that could produce hinges, nails, or doorknobs at a price that was competitive with those being imported via the railroad. In a 1948 article, Margaret Parker suggested that "the restricted character of manufacturing was natural in view of shortage of local raw materials other than certain minerals, the lack of a local source of power, and Tucson's location in a sparsely peopled area far from major markets" (Parker 1948).

This suggests that most of the wire, plumbing, glass, hardware, and other materials necessary to build a modern house in the 1890s probably came from outside of Tucson. According to a "boom-bust" model proposed by Hardesty (1991:31), the extractive nature of southern Arizona industry—mining and to a certain extent ranching—brought in capital investment. This investment swelled the population and focused industrial development into those areas related to the resource extraction and exporting of raw materials. Finished goods

were then imported and sold to those extracting the raw materials. With time, the developments associated with resource extraction eventually led to a more balanced industrial base within Tucson, and by the 1940s, there existed a local manufacturing base for items intended for local as well as export use. This included factories producing paint, glass, and doors (Parker 1948). It is possible that some of the later building materials recovered from the archaeological excavations came from these local enterprises.

Finally, the differential distribution of trees in early photographs of the project area provides evidence of how the landscape of Tucson changed around the turn of the early twentieth century, as once open desert was developed into residential neighborhoods. Photographs document an increase in the number of trees in the Tucson and this was observed archaeologically in the identification of 73 landscaping pits throughout the project area.

Foodways

Archaeological and historical investigations of the Joint Courts Complex postcemetery component yielded an immense amount of data about the foodways of project area inhabitants. Table 40 summarizes the faunal remains recovered from the postcemetery lots. With these data, as well as pollen and macrobotanical remains, contemporary cookbooks, home-economics manuals, advertising brochures, and newspapers, we are able to offer conclusions about the food choices that residents made in the late nineteenth and early twentieth centuries. These resources allowed us to place plant and animal use in context and examine overall availability of various taxa, popular cooking methods, the degree to which different ethnicities shared certain foods and recipes, meat costs, and other aspects of food acquisition and consumption. We examined the degree of self-sufficiency practiced by local residents, as well as evidence for local trade. For instance, a set of receipts found in Cesspit 3040 (see Chapter 16, Volume 3 of this series) provided details on food purchases made by one household during the month of June 1911.

Poultry and Other Birds

During the early twentieth century, chicken was often an expensive seasonal resource. Hens were generally valued as egg producers more than as meat sources, and the benefits of a chicken dinner had to be balanced against the loss of future eggs (Horowitz 2006). Chickens could be purchased at the store, either live or dressed, but even if the consumer did not have to consider loss of future egg production, they were not always a low-cost meat option. Different cooking methods were employed for differently aged chickens. For instance, the most tender and most expensive was the spring chicken, a bird aged up to 5 months (Allen 1924:416). A local 1909 cookbook called for a spring chicken as a component of chicken with *calabasitas*, a dish of chicken, pumpkin, and other vegetables fried in lard without added liquid (St. Ann's Society 1909:5). Older, less-expensive birds were referred to as chicken, roasting chicken, fowl, or stewing chicken. In spite of the high price of spring chickens, they were not always desired for every recipe. For example, a 1938 publication by the women of the Tucson Trinity Presbyterian church stated firmly that for cream of chicken soup "an old chicken is much the best" (Women of Trinity Presbyterian Church 1938:116).

Seasonality of chicken can be seen in 1899 *Arizona Daily Star* advertisements for the Fulton Market, located on East Congress Street. Spring chickens were offered in June and early July (*Arizona Daily Star*, 3 June 1899a:3). By late July, chickens were advertised as roasters (*Arizona Daily Star*, 24 July 1899b), and by November chickens were not advertised (*Arizona Daily Star*, 3 November 1899c:6). Finally, chickens and turkeys reappeared for holiday dinners in mid-December (*Arizona Daily Star*, 14 December 1899d:4). Household flocks likely had a few roosters as well as hens, and a cook needed to be aware of a bird's gender as well as age and adjust accordingly. The classic French dish, *Coc au vin,* is literally "Rooster in wine," and calls for rooster meat simmered in a good red wine.

Chicken bone and bone from chicken-sized birds together made up slightly less than 15 percent of the entire postcemetery faunal collection (not counting eggshell), and 20 percent of the bone from the four major economic taxa: cattle, sheep/goat, chicken, and pig (see Table 40). Birds were not distributed evenly across the lots and features. No bones from either chickens or chicken-sized birds were identified in Block 252, Lots 3 or 4; only 1 faunal specimen was found in Lot 3, but more than 300 were found in Lot 4. Chicken and chicken-sized bone contributed less than 5 percent of the faunal collection from Block 252, Lots 11 and 12, and Block 254, Lot 5, but more than 30 percent of Block 252, Lots 5 and 6, and Block 254, Lot 6. Project-wide, about 15 percent of all chicken bones belonged to subadult birds and about 65 percent were adult; the rest were indeterminate. In general, the highest proportion of young chicken bone was found in features on John Brown's property (see Chapters 9 and 19, Volume 3 of this series) and in Privy Pit 16500 (see Chapters 10 and 19, Volume 3 of this series).

A purely economic analysis would suggest that households that consumed more young chickens relative to middle-aged fowl might be wealthier. But, even today, many people in Tucson raise chickens in their backyards. If a family raises their own chickens, and more chickens hatch and survive than are needed for egg production, then the remains of spring chickens may represent the yearly consumption of surplus young birds. Archaeological evidence

Table 40. Summary of Faunal Remains Recovered from the Postcemetery Component

Block and Lot	Taxa or Size Class														Total
	Chicken		Chicken-sized Bird		Pig		Sheep/Goat		Sheep/Goat-Sized Mammal		Cow		Elk, Cow, or Horse-Sized Mammal		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Block 252 Lot 2	2	1	7	3	3	1.5	1	0.5	79	39	7	3	102	51	201
Block 252 Lot 3	—	0.0	—	0.0	—	0.0	—	0.0	—	0.0	1	100	—	0.0	1
Block 252 Lot 4	—	0.0	—	0.0	—	0.0	1	0.3	35	11	5	2	279	87	320
Block 252 Lot 4a	301	9	333	10	15	0.5	207	6.3	1,086	33	763	23	602	18	3,307
Block 252 Lot 5	74	15	131	26	2	0.4	13	2.6	76	15	7	1	199	40	502
Block 252 Lot 10	22	8	27	10	—	0.0	3	1.1	55	21	11	4	147	55	265
Block 252 Lot 6	263	16	266	16	4	0.2	24	1.4	171	10	53	3	879	53	1,660
Block 252 Lot 11	2	0.0	9	2	1	0.2	3	0.6	87	18	4	1	368	78	474
Block 252 Lot 12	—	0.0	2	2	—	0.0	—	0.0	8	8	2	2	85	88	97
Block 252 Lot 13	37	3	63	6	23	2.1	10	0.9	183	16	57	5	739	66	1,112
Block 254 Lot 2	4	5	13	16	—	0.0	3	3.6	26	31	2	2	35	42	83
Block 254 Lot 4	1	1	10	11	3	3.3	1	1.1	51	55	—	0.0	26	28	92
Block 254 Lot 5	33	2	30	2	56	3.0	7	0.4	175	10	104	6	1,437	78	1,842
Block 254 Lot 6	484	13	813	22	42	1.1	51	1.4	413	11	684	18	1,255	34	3,742
Block 254 Lot 7	83	4	333	16	53	2.6	22	1.1	568	27	105	5	903	44	2,067
Block 255 Lot 1	13	1	49	5	11	1.0	3	0.3	417	39	10	1	573	53	1,076
Total	1,319	8	2,086	12	213	1.265	349	2.1	3,430	20	1,815	11	7,629	45	16,841

demonstrated the presence of both roosters and laying hens in the collection. Chicken heads and feet were recovered in several features, but their presence in archaeological deposits does not guarantee that those chickens were either home raised or home butchered. Consumers often wished to examine the texture of the skin on the feet, the appearance of the eyes, and color of the skin to determine the age and quality of a bird before purchasing it, and so commercial chicken processors left heads and feet on birds (Horowitz 2006). Chickens were sold without heads, feet, and innards at least part of the time though, or consumers may have had the heads and feet removed by the butcher before bringing their birds home. Furthermore, not only were whole chickens sold in groceries, but in Tucson, the Adams and Company Grocers also sold ready-cooked meals. An advertisement in the Saturday morning *Arizona Daily Star* (3 September 1910:8) announced the availability of meals "Ready to Serve for Sunday Dinner." It would be difficult, if not impossible to identify whether bones recovered in privies or other features represented birds that were bought precooked or were purchased as raw meat.

There was some evidence for raising chickens on-site. A concentration of young birds found in Cesspit 3040, including articulated skeletons, certainly suggested an episode of yard death. Milk-glass nest egg fragments were noted during excavations (D. Ohman, personal communication 2009), but were not included in the sampled features. These objects were used to convince chickens to lay their own eggs in desired locations, and their recovery strongly suggests that at least some households had laying chickens.

Turkey bones were recovered in small quantities in several features, and bones from turkey-sized birds were found in several others. Goose bones were also deposited in a few features, and some bones from unidentified turkey-sized birds may have been from geese rather than turkeys. Turkey bones and bones of unidentified turkey-sized birds were recovered from Cesspit 10099, associated with the Stewards. As noted in Chapters 8 and 9, Volume 3 of this series, the Steward family seemed to enjoy eating wild game, and the turkeys could have been domesticated or wild birds. Comparing the bones from the Steward and Brown features, there was evidence for food sharing in terms of a lopsided distribution of elements. Given the family relationship, it is probable that the households ate together and perhaps took home leftovers or favorite portions, especially for holiday meals. An unusual butchering technique found on bones from two features associated with the Mahoney family suggested that they may have raised turkeys (see Chapter 16, Volume 3 of this series). Eleven turkey tibiotarsi, out of a total of 27, featured saw cuts that severed portions of the distal condyle, separating the lower leg/foot from the upper leg. Cuts of this nature to turkey or other birds' legs have not been reported in regional archaeological literature. A minimum number of individuals (MNI) of at least eight turkeys was determined for the possible Mahoney occupations, more than the average household in the project area, but the MNI would average approximately one turkey per year and could have simply reflected the family's holiday meals.

The cost of turkey compared to chicken seems to have varied geographically. Turkey was a relatively inexpensive meat when purchased in an eastern, urban setting, costing only 10 cents a pound (Richards 1901), although, of course, the size of a turkey compared to a chicken requires a larger monetary expenditure up-front than a more expensive spring chicken. On the other hand, in 1910–1912, Oehl's Market of San Bernardino, California, offered live turkeys for 25 cents a pound, and dressed for 25–30 cents, similar prices as those charged for young chickens (Swope et al. 1997:150). In Pima County in the mid-1930s, turkeys sold for 20–35 cents per pound wholesale in the fall and winter, but it is not clear if these wholesale prices were for live turkeys or ones that had been killed and cleaned (County Immigration Commissioner Agricultural Bureau and Tucson Chamber of Commerce 1937:8). The additional size and weight would mean that even a small turkey at wholesale would cost considerably more than a day laborer's daily earnings, and in the present project, the households with the most turkey bones were those that were relatively affluent. Turkey bones are relatively uncommon in historical-era Tucson sites. Only seven specimens (less than 1 percent of all fauna) were recovered in excavations of Block 180 (Jones 1997:474), located near the present project area. A few turkey bones were found at the Hotel Catalina site (n = 3) (Thiel 1993:88), and in the Block 138 excavations (n = 1) (Thiel and Desruisseaux 1993). Similar low numbers were found in Block 192 (Thiel and Faught 1995), the Barrio Libre excavations (Cameron 2003), and the Lewis-Weber site (Hamblin 1981). Only a few turkey bones were found in the 1890s Chinese well at the Clearwater site (Cameron et al. 2006), and no turkey bones were recovered from either the Hispanic or Chinese occupations at the Chinese Gardener's household (Diehl et al. 1997). Only one specimen was recovered from the León farmstead (Diehl et al. 2005).

Duck and goose bones were irregularly distributed across the project area but were found mainly in the features associated with the Steward and Brown families. Some of the bones represented wild taxa, such as green-winged teal and northern pintail, but other bones could have been from either wild or domesticated individuals. Mallard bones were identified, but wild mallards and domesticated ducks are the same species and not easily distinguishable by bones alone. None of the goose bone could be identified to a level below genus, and therefore these bones could have belonged to either wild or domesticated taxa.

Henry (1983) found that residents of the original Phoenix townsite processed birds in a way that resulted in the sternum being discarded separately from wings and legs. She suggested that this was a result of the cook removing meaty portions and perhaps discarding the rest of the carcass. Alternatively, loss of dove, pigeon, or quail sternae could

have resulted from a cooking practice called spatchcocking, in which the cook split and flattened whole birds to cook evenly when broiled (Farmer 1896:218–229; Rombauer 1931:147) or grilled, or simply from being cut in half. Butchering patterns across the project area suggested that similar cooking or processing methods to those employed by cooks in Phoenix may have taken place in some, but not all households. Sternae from small birds were found in greatest numbers from features associated with the Brown and Steward families (see Chapters 8–9 and 19, Volume 3 of this series). On the other hand, sternae and vertebrae from chickens were underrepresented at the Brown household relative to limb bones. Finally, no cranial bones from small birds were found in Cesspit 10099, associated with the Steward family, although postcranial bones were abundant. This was not the case in the Brown household, where the remains included heads and postcranial portions. This suggests some difference in game procurement or processing between the households. The younger household consumed a wider variety of wild fauna, and cranial bones were found from ducks. Additional discussion of the use of game birds can be found later in the discussion of wild game, hunting, and ammunition.

Chickens have been present in the Tucson area since at least the 1820s (Diehl et al. 2005) but supply was not always adequate to meet demand. A survey of newspaper advertisements illustrated the changing availability of various foods. Poultry and eggs appear to have been difficult to come by in 1879, when the Exchange Restaurant advertised to the public that they wished to buy butter, eggs, and all types of vegetables (*Arizona Daily Star*, 12 January 1879a:1:3). The same year, proprietors of Barnum's Restaurant in Tucson evidently felt it was worthwhile to advertise that they were able to serve chicken and eggs 3 days a week (*Arizona Daily Star*, 9 February 1879b:23:3). By 1899, settings of eggs from purebred chickens shipped from Massachusetts were being advertised locally (*Arizona Daily Star*, 15 March 1899e:2). At that time, an egg setting cost $2 or $3, depending on the breed. The U.S. Bureau of Markets estimated that in January 1925 there were an estimated 600,000 chickens (at $1.00 per chicken) in the state of Arizona (Santa Fe Railroad 1925:17). Wholesale eggs sold for 20–50 cents per dozen in Pima County in 1937, and live poultry (excluding turkeys) cost between 15 and 40 cents per pound (County Immigration Commissioner Agricultural Bureau and Tucson Chamber of Commerce 1937:8). To give an idea of relative cost in 1937, the Tucson Chamber of Commerce reported that a day laborer in Pima County was paid $2–$3 per day without board (County Immigration Commissioner Agricultural Bureau and Tucson Chamber of Commerce 1937:4). Even at wholesale prices, a 4-pound chicken could potentially take a significant portion of a day's wages.

Excavations in the Joint Courts Complex project area generally seemed to have produced higher frequencies of chicken than in some other parts of downtown Tucson. It may be that the inhabitants occupied a somewhat higher socioeconomic class than those in neighboring areas. Neither income nor ethnicity alone should be considered the sole determining factors, however. Temporal period could have been a factor, as well as idiosyncratic choices.

Pork

Horowitz (2006:12–15) suggested that in the early twentieth century, pork was commonly associated with rural living, especially in the southern states. He found a negative correspondence between rates of chicken and pork consumption, and he noted that chicken was an expensive, special meal in the 1940s, and pork was much less costly. However, a few cautionary notes are necessary. Some pig bones may be hidden within the general sheep/goat-sized mammal category. Pig bones may also be underrepresented relative to the amount of pork consumed because some very popular forms, such as bacon and salt pork, are prepared after removing the meat from the bone, and so the bones are discarded long before the meat reaches the consumer. It is worth noting that during the latter part of the nineteenth century preserved pork was thought by some to be easier to digest and a more healthy food than fresh pork (Farmer 1896:209), and this view may have influenced purchasing decisions.

Pig shanks, hocks, and feet tended to be cheaper than portions from higher up the leg or the trunk. Oehl's 1910–1912 price list (Swope et al. 1997) indicated that fresh feet sold for 10–12.5 cents per pound, pickled were 12.5–15 cents, and boiled and spiced were 15 cents, or half again the cost of fresh feet. Pork shoulders cost twice as much, at 20 cents per pound, and loin and center leg cuts were 25 cents. Spareribs were 20 cents per pound but rib chops were 25 cents. Oddly, neither hocks nor shanks were mentioned in Oehl's price list.

Pig's feet and shanks are used in a variety of dishes (see ethnicity discussion below). Hocks or shanks, smoked or fresh, can be added to beans or greens to add flavor and richness. The earliest Fanny Farmer cookbook states that pork "hocks are corned and much used by Germans" (Farmer 1896:208). Although lower in price, pigs' feet were not necessarily something considered to be low class or mundane. On November 3, 1899, Julius Goldbaum (who owned property in the project area) thought it worthwhile to advertise in the *Arizona Daily Star* that his liquor store and delicatessen had received that week: "Emmenthaler Swiss, French, Limburger, and New York State Cheese, Pig's Feet, Lamb's Tongues. Pickled Tripe, Boiled Ham, Dried Smoked Beef" as well as herring and mackerel (*Arizona Daily Star*, 24 November 1899f:6).

Henry (1983) examined materials from Phoenix and found little difference between consumption of beef and mutton among Euroamerican and Hispanic, and middle-

class and lower-class households, but she noted that there were differences in chicken and pork consumption. More chicken and fewer pigs were found in middle-class households, and more pig and fewer chickens were recovered in households belonging to lower socioeconomic strata. As discussed in the poultry section, chicken was not an inexpensive meat option.

On the whole, far less pork than chicken was consumed in the Joint Courts Complex project area based on the recovered bones (see Table 40). Chickens and chicken-sized birds made up less than 15 percent of the total faunal collection, and pigs made up slightly less than 1 percent. They contributed slightly over 1 percent of the fauna when comparing only cattle, sheep/goat, chickens, and pigs. As with chickens, pigs were distributed unequally across the project area. More pig bones were found in Blocks 254 and 255 than in 252, and the ratios of pig to chicken bones were higher in Block 254 than in Block 252. Six features in Block 252 and two from Block 254 had no pork bone, and fewer than 50 pieces of pig bone were identified in all of Block 252. More than three times that amount was found in Blocks 254 and 255. This was still only a fraction of the total bone from Blocks 254 and 255, but may nonetheless hint at some possible differences in food choice. Although John Brown's household appeared to have largely eschewed pigs, his daughter did not do so. Only a very few pig bones were discarded on Brown's property, but more than a dozen were identified in his daughter's cesspit. The Stewards did not seem to have an overwhelming preference for meat from any one region of the pig but consumed pork from most, with the exception of the head. The nearly complete lack of pork in the Brown's features, their family associations, close proximity, and the more plentiful pig bones in the Steward privy also suggest the possibility that the two pig bones found on the Brown's property could have been discarded by the Stewards rather than the Browns. The Stewards also consumed much lower proportions of chicken than the Browns, and as noted elsewhere, the individual chickens may have been older than those consumed in the parents' household.

Inhabitants of Block 252, Lot 13 (see Chapter 11, Volume 3 of this series), seemed to have favored pigs' feet and ham hocks. Chickens made up a much smaller percentage of the four major economic taxa in this lot, and the ratios of chicken and chicken-sized bone to pig bone were more nearly equal. The higher frequency of pig, in the form of inexpensive cuts, combined with the lower proportions of chicken, suggests that residents of this lot may have chosen to spend their food budget money on less-expensive meats.

Several residents of Blocks 254 and 255 chose pork or ham more frequently than those of Block 252, but ratios of pork to other taxa remained low overall. In Block 254, Lot 5, most were foot bones, followed in number by bones of the lower front and hind limbs. Once again, this suggests a preference for pigs' feet and hocks. Over 40 pig bones were found in Block 254, Lot 6, Cesspit 3042, and they generally represented portions of the femur or the innominate, indicating consumption as pork loin, roasts, or chops. In general, most of the cuts from this feature appear to have run more towards the higher end of pork prices. In Cesspit 3040 (Block 254, Lot 7), pork cuts were generally larger and represented more expensive cuts than in Cesspit 3042.

Faunal remains recovered from other Tucson archaeological investigations were generally consistent in the lower ratios of pig to chicken bones (Ayres 1990:99; Cameron 2003; Thiel 1993:88; Thiel et al. 1995). When proportions of chicken to pig bones in the current project are compared to those from Phoenix examined by Henry (1983), it appears that the Phoenix project recovered higher proportions of pig bone relative to major economic taxa than found here. Henry (1996) found that higher proportions of pork were recovered from Mexican American than Anglo-American households in turn-of-the-century Phoenix. Excavations of Tucson Block 83 recovered very little pig bone (Mabry et al. 1994:181), which was identified as an upper-income Mexican American household. Excavations of a Chinese gardener's household in Tucson found only small proportions of pork eaten by Hispanic (4 percent) and Chinese households (6 percent), but even less chicken (0.1 percent for Chinese residents, 0.3 percent for Hispanic features) (Diehl et al. 1997). It was suggested that pork may have been an expensive meat in Tucson.

Swine, like fowl, may be raised in a backyard; therefore, it is possible that some of the pigs found in the project area may have been raised at home. At least some Tucsonans chose to raise their own swine in the nineteenth century, as the Village Council found it necessary to pass an ordinance in 1878 mandating that any pigs found running loose in the streets, alleys, or other public areas would be impounded at the cost of 50 cents per day (*Arizona Weekly Star*, 3 October 1878:3:2). Most of the pig bones appeared to have been sawn into relatively standardized units, suggesting commercial butchery. It is possible, of course, that yard-raised pigs were taken to the local butcher to be processed and packaged. In such cases, the home-raised animal would be nearly indistinguishable from those raised commercially and purchased as isolated parts. Although most of the pig bones identified belonged to subadult individuals, a set of pig phalanges was found that not only belonged to an adult, but an arthritic adult. The fact that this individual lived long enough to become arthritic suggests that he or she may have been someone's backyard pig, perhaps kept as a breeding sow to produce a litter a year. One bone from Cesspit 3040, associated with the Fairbanks family which possessed a corral, exhibited unusual butchering that may have been done at home.

Overall, pigs appear to have been far less important in the Arizona economy than other domesticated artiodactyls. In 1925, the U.S. Bureau of Markets estimated that there were about 48,000 swine in Arizona (at $11 each) (Santa

Fe Railroad 1925:8). Pigs sold for more than sheep and goats ($8.80 and $4 respectively), but the latter two taxa were able to graze the uplands of the northern portion of the state.

Beef, Veal, Mutton, and Lamb

Beef and mutton provided the main animal protein in many sites in southern Arizona, and the Joint Courts Complex project area was no exception. Bones identified as cow and cow-sized taxa made up the largest proportion of the faunal collection and contributed nearly 40 percent of all fauna and more than 50 percent of the major economic taxa (see Table 40). Bones of sheep, sheep/goat, and sheep/goat-sized mammals were the second most common, contributing just over 15 percent of the total bone or over 20 percent of the major economic taxa. Residents of the project area consumed beef and mutton from all parts of the animals.

Turn-of-the-century cookbooks refer to cuts of beef—the "sticking piece," "rattlerand," aitch bone, and vein are examples—unfamiliar to modern consumers (Allen 1924:372; Farmer 1896). Horowitz (2006:40) described how in the early twentieth century meat cuts in New York, Chicago, Philadelphia, and Boston varied between each other. In New York, for example, flank, rump, and brisket were cut larger than they were in Chicago. New York butchers also included a cut—"short hip"—that was not found in other regions (Horowitz 2006:40). To complicate matters yet further, the same names were given to different meat cuts in different regions and various times (Schultz and Gust 1983). For example, the sirloin shown on Allen's 1924 chart appeared to cover approximately the same area as the porterhouse on a meat cut chart found in a 1916 U.S. Army quartermaster's manual (U.S. Army 1917), and the sirloin on the latter chart was largely included in the rump on the former, although the two overlapped slightly. This confusing situation was clarified in 1973 when the National Cattlemen's Beef Association established voluntary Uniform Retail Meat Identity Standards (URMIS) to standardize retail meat cuts.

Schulz and Gust (1983) have created rankings of beef cuts for different regions in the United States between the 1850s and 1910. They noted the difficulty of ranking historical-period meat cuts using modern units of meat cuts, but for ease of analysis they applied their rankings to modern beef portions in approximately the same location as the older cuts. Most archaeologists in southern Arizona rely on Schulz and Gust's work, and to ensure comparability with other research, we also, for the most part, employed this ranking, but like Schultz and Gust, we acknowledge the differences between meat cuts past and present. It is also not always easy to interpret older price charts. For example, the price card from Oehl's market lists flanks at 12.5 cents per pound but flank steak at 20 cents (Swope et al. 1997:149–151). One is a stewing meat, the other a steak, but it is unclear how these cuts relate to modern flank cuts. The card also lists short ribs and short rib steaks, the former for 12.5 cents and the latter for a whopping 27.5 cents per pound. The arm is a particularly problematic cut, as it is a relatively recent cut designation. Mapping the modern arm cut onto earlier cuts likely produces unrealistic results, and we therefore avoided doing so. Instead, our analysis used a combination of methods. Following Stiner (1994) and Waters (2002), we sorted bones by general body region: head, axial, upper leg, lower leg, and feet (Table 41). This simplified approach helped us look for overall general patterns, corresponding to larger butchering units and price distinctions. For example, axial cuts are generally more expensive than those of lower legs. We also examined specific areas within the region (e.g., looking for cross sections of femurs that would indicate round steaks).

Several researchers have noted the difficulty of finding advertised prices for meat in historical-era Tucson, and we echo their frustration. A search through microfilm copies of the *Arizona Daily Star* revealed that in 1899 the Union Market advertised wholesale prices for beef at 6.5 cents per pound, 9 cents per pound for mutton, and 8 cents per pound for pork and veal. Not surprisingly, retail prices were higher. Porterhouse steak was the most costly at 15 cents per pound, followed by sirloin and prime rib roast, both 12.5 cents per pound. Corned beef and beef chuck were 8 cents. Pork and mutton chops both cost 12.5 cents a pound, sausage was 10 cents, and head cheese 8 cents (*Arizona Daily Star*, 14 December 1899g:4). For the most part, though, it was necessary to rely on contemporary prices from other regions, in particular from San Bernardino, California, where the price list for Oehl's Market listed cuts for beef, lamb, pork, preserved meat, and fowl from 1910–1912 (Swope et al. 1997:149–151). In addition to the Oehl's price list, we had the good fortune to recover a number of legible receipts for the Mose Kelley family from Cesspit 3040 (see Chapter 16, Volume 3 of this series), a few of which provided prices for beef, veal, chicken, and other foods. Four pounds of rump roast from Fulton's Market cost 65 cents on June 6, 1911 (16.25 cents per pound) and 55 cents on June 13 (13.75 cents per pound). The Oehl's Market price card (Swope et al. 1997:149–151) listed rump roasts from 16 to 17.5 cents per pound at the same time, so the higher-priced rump roast from June is consistent with prices in California, although the price on June 13 was considerably lower. Oehl's Market sold empty lard cans for 10–50 cents, depending on size. One medium lard can was listed on an undated Pacific Market receipt from the cesspit for 25 cents, in line with the California price.

As with any other meat, the types of beef or mutton/lamb cuts chosen by a cook or a consumer do not always simply reflect purely economical decisions. Cooking methods and skill vary from household to household and can influence purchasing decisions. Generally, there is an inverse

Table 41. Identifiable Body Regions for Beef, by Block and Lot

Block and Lot	Beef Body Region																		Total of Inventory Count	
	Head		Neck		Axial		Axial Indeterminate		Appendicular Indeterminate		Upper Front		Upper Hind		Lower Front		Lower Hind		Feet			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Block 252 Lot 2	—	0.0	—	0.0	21	44.7	7	14.9	5	10.6	4	8.5	8	17.0	2	4.3	—	0.0	—	0.0	47	1.1
Block 252 Lot 3	—	0.0	—	0.0	—	0.0	—	0.0	—	0.0	—	0.0	—	0.0	1	100.0	—	0.0	—	0.0	1	0.0
Block 252 Lot 4a	3	0.4	6	0.7	311	37.8	185	22.5	16	1.9	166	20.2	56	6.8	29	3.5	15	1.8	36	4.4	823	20.1
Block 252 Lot 4	3	2.3	8	6.2	44	34.1	34	26.4	19	14.7	13	10.1	3	2.3	1	0.8	4	3.1	—	0.0	129	3.1
Block 252 Lot 5	2	1.8	2	1.8	36	31.6	37	32.5	15	13.2	8	7.0	7	6.1	6	5.3	1	0.9	—	0.0	114	2.8
Block 252 Lot 6	1	0.4	8	3.1	79	30.6	43	16.7	54	20.9	41	15.9	17	6.6	3	1.2	8	3.1	4	1.6	258	6.3
Block 252 Lot 10	—	0.0	—	0.0	53	57.6	1	1.1	28	30.4	4	4.3	5	5.4	—	0.0	—	0.0	1	1.1	92	2.2
Block 252 Lot 11	—	0.0	—	0.0	44	37.0	7	5.9	41	34.5	10	8.4	1	0.8	13	10.9	3	2.5	—	0.0	119	2.9
Block 252 Lot 12	—	0.0	—	0.0	8	32.0	6	24.0	1	4.0	9	36.0	1	4.0	—	0.0	—	0.0	—	0.0	25	0.6
Block 252 Lot 13	—	0.0	4	1.9	91	44.2	28	13.6	33	16.0	12	5.8	8	3.9	19	9.2	10	4.9	1	0.5	206	5.0
Block 254 Lot 2	—	0.0	—	0.0	3	12.0	4	16.0	5	20.0	5	20.0	2	8.0	2	8.0	4	16.0	—	0.0	25	0.6
Block 254 Lot 4	—	0.0	—	0.0	1	12.5	5	62.5	—	0.0	1	12.5	1	12.5	—	0.0	—	0.0	—	0.0	8	0.2
Block 254 Lot 5	4	0.9	4	0.9	201	46.2	102	23.4	66	15.2	25	5.7	16	3.7	8	1.8	2	0.5	7	1.6	435	10.6
Block 254 Lot 6	1	0.1	10	0.9	663	60.4	161	14.7	56	5.1	45	4.1	72	6.6	49	4.5	41	3.7	—	0.0	1,098	26.8
Block 254 Lot 7	4	0.7	16	3.0	235	43.5	123	22.8	62	11.5	36	6.7	30	5.6	12	2.2	22	4.1	—	0.0	540	13.2
Block 255 Lot 1	1	0.6	6	3.3	53	29.4	17	9.4	70	38.9	7	3.9	9	5.0	3	1.7	13	7.2	1	0.6	180	4.4
Total	19	0.5	64	1.6	1,843	45.0	760	18.5	471	11.5	386	9.4	236	5.8	148	3.6	123	3.0	50	1.2	4,100	100.0

relationship between the cost of a meat cut and the degree of planning and cooking required; the more naturally tender cuts have more cooking options and are more costly, the less tender cuts require more work and are cheaper. As a result, we use "high cost" and "low cost" rather than "high quality" and "low quality" to describe differences in meat cuts. Quality itself is a very relative term and is based on a variety of factors. If nothing but meat is desired, or only fast-cooking meat is wanted, then bones of the lower legs and feet might be considered to be low quality, but if the cook needs to enrich her broths or stew with gelatin, or to make an aspic for a fancy dinner, then the more expensive meats will be much less useful. Any general cookbook will state that the meat on less-expensive meat cuts is as nutritious as that on more expensive cuts, and less expensive meats actually produce very tasty and high-quality food if prepared properly. Simply ascribing quality based on cost ignores cooking methods suited for particular cuts. Additionally, statements that people in a particular household ate low-quality food tend to carry connotations of poor people eating less nutritious or bad food, rather than simply inexpensive food.

For this project, we dealt with the enormous amounts of data recovered for butchered bone from cow-sized taxa in the following manner. The data were first grouped together into larger regions similar to those used by Stiner (1994). Elements were organized into head, neck, axial, upper front, lower front, and so forth. The larger groupings were then examined to look for overall patterns. Most bones were saw-cut, and the meat cuts appeared to have been more-or-less standardized, although not necessarily the same as are current today. Only a few bones had wear suggesting they were cut using other methods.

If not counting teeth, elements from cow heads appeared only in a few features, with more than half recovered from the Brown/Steward lots; all of the latter could have been part of a single skull. Three cranial bones were found in Stratum II of Feature 3040 (see Chapter 16, Volume 3 of this series), the level in which the Mose Kelley receipts were found. Chapin-Pyritz and Mabry (1994) suggested that remains of a cow skull recovered in Block 83 may have represented a traditional Mexican meal that includes roasted cow head, and the cranial bones in our project could have been the remains of similar meals. However, their presence should not necessarily be taken as an ethnic marker; recipes for beef and calf brains, tongue, and other dishes derived from the head, although not a mainstay in today's mainstream Euroamerican diets, are found in many old cookbooks (St. Ann's Society 1909; Williams Public Library Association 1911). Although unfamiliar now, meats derived from cow or veal crania do not always appear to have been bargain, low-cost meats. Oehl's Market (Swope et al. 1997:149) sold beef brains for 15 cents a pound, placing them in the middle range of beef parts, and the same price as shoulder steaks, porterhouse flank, and rolled plate. Beef tongues sold for even more, at 20–22 cents per pound.

More neck bones were found than cranial bones, but cranial bones and neck bones each contributed less than 1 percent of all cow and cow-sized taxa. Neck meat is often used for stews. Again, using the Oehl's meat card as a guide, bone-in neck meat cost 11 cents a pound, and so was considerably cheaper than tongue or brains, and comparable to brisket or plate (Swope et al. 1997).

Axial bones (other than the neck) include the thoracic and lumbar vertebrae, sternum, ribs, innominate, and sacrum. Cuts, which vary widely in price, include a variety of roasts and steaks such as chuck, prime rib, porterhouse, sirloin, loin, short loin, brisket, and rump. Short ribs were less than half the price of short rib steaks in San Bernardino (Swope et al. 1997), but 1½ cents more per pound than the plate, another cut containing ribs. In general, the greatest proportion of bone from most Joint Courts Complex features appeared to represent cuts from the axial region: ribs, vertebrae, and pelvic bones. The largest proportion of axial cuts were recovered Cesspits 3040 and 3042 in Block 254, Lots 6 and 7 (see Chapter 16, Volume 3 of this series). No clear patterns were found by comparing the Brown/Steward collection (Block 252, Lots 3–5, 8–10) with these features. All of these properties contained a mix of expensive and inexpensive cuts.

Most of the appendicular indeterminate bones were broken cross-sectional slices from long bones, primarily upper leg bones from the hind limbs. Nearly equal proportions of femur cuts were recovered throughout the project area, contributing just over 5 percent of the identifiable beef bone. The cuts represented by these bones included round steak and a portion of the rump, cuts that tend to be less expensive than many of the vertebral cuts, but more costly than the ribs, lower legs, and upper forelimb. The upper forelimb includes the humerus and scapula, bones that today are part of the arm and the chuck, but in the past represented other meat cuts, including the shoulder clod, the foreshank, and the chuck.

Shank, knuckle, and foot bones include metapodials, carpals, tarsals, and phalanges, and cuts from these bones were less expensive. Just over 200 beef or veal tibia, radius, and ulnae were recovered from a number of features in the project area. They appeared in features associated with both rental properties and higher-income households but varied in percentages. Slightly less than 20 percent were recovered from the Brown property, but less than 5 percent were found in features on the Steward lots. Metapodials, carpals, and tarsals were considered to be lower legs so as to be consistent with other researchers (Stiner 1994).

Beef phalanges were recovered from several lots, but the vast majority was recovered from Cesspit 10099, which serviced the Steward household. Seven foot bones were found in Block 254, Lot 5. Lots in Blocks 254 and 255, where beef phalanges were recovered, also contained sheep or sheep-sized and pig phalanges. Carpals and tarsals

were recovered from Cesspit 10099 in larger quantities than from features associated with the Brown household. Recipes calling for knuckle bones likely refer to these small bones, which were used for jellied broths and savory vegetable gelatin dishes (Williams Public Library Association 1911:373). A soup recipe in Elsie Siewert's handwritten cookbook, housed at the Arizona Historical Society, called for a knuckle of veal and a beef shank, cooked for 5 hours. The Siewerts owned rental property in the project area and were not impoverished. Beef feet are often thought to indicate lower income, or in the Southwest, as possibly indicating Mexican ancestry, because menudo and other dishes are often made with calves' feet to add gelatin. As with the Siewerts, the Stewards were economically comfortable, and it is unlikely that they consumed beef feet because of financial constraints. Although Mrs. Steward's mother was born in Mexico, cow phalanges were not found in the Brown features, so the bones do not seem to reflect a meal that Amelia Steward's parents often ate. It could be that the Stewards enjoyed menudo, or any of the many other soups and stews made with beef feet.

Tail bones were scarce, making up less than 1 percent of the project collection. Half of the caudal vertebrae were found in Cesspit 3042 (one each from strata associated with the Wills and the Mahoney families, the remainder from strata not identified to particular residents), but a very few were found in other lots, including the Steward's. Oxtails were inexpensive in California in 1910 and sold for 10 cents per tail (Swope et al. 1997:149). The recovered vertebrae cannot indicate a heavy reliance on this inexpensive meat; nonetheless, the tail was usually removed from the carcass and caudal bones were unlikely to have entered features as riders on rump roasts. Therefore, it is likely that the tail, or portions of the tail, was purchased by at least a few households.

Only one feature contained bones from all regions of the cow, from head to feet to tail. This was Cesspit 10099, associated with the Steward household. The Brown household had bones from all regions but the feet and tail. Bones from all regions but the tail were found in Privy Pit 16500 (see Chapter 10, Volume 3 of this series) as well. Contrary to expectations, the wealthier households did not have higher concentrations of more costly beef cuts, and the rental properties did not contain more low-cost cuts. Instead, the Brown and Steward lots contained bone from throughout the animal carcass, and the Steward's cesspit contained much larger numbers of beef foot bones than any other property.

Beef appears to have been the animal protein of choice (or necessity) in late-nineteenth and early-twentieth-century southern Arizona, including the project area. Beef made up the bulk of animal protein across economic and ethnic groups (Henry 1996), but the proportions of sheep bone seemed to vary. Sheep bone was restricted to higher-income, Euroamerican households in Block 83 (Mabry et al. 1994), and sheep-sized bones made up less than 1 percent of the total faunal collection from the Barrio Libre excavations (Cameron 2003), and only a small portion of the fauna from the Hotel Catalina (Thiel 1993). Henry (1996) found that Euroamerican households were more likely to consume mutton than pork. Other studies have found that higher-cost meat cuts appear to have been correlated with higher incomes (Henry 1987; Thiel 1993), but this was not seen in the present study. Well-to-do residents such as the Browns and Stewards consumed expensive and inexpensive meat cuts and, in fact, had higher proportions of inexpensive foot bones than the rental properties.

Cattle have played an important part in the Arizona economy for many years, and numbers of cows are recorded for Pima County and for Arizona. In 1920, approximately 65,000 head of cattle resided in Pima County (County Immigration Commissioner Agricultural Bureau, Tucson Chamber of Commerce 1926:2). The U.S. Bureau of Markets estimated that in 1925 the number of dairy cattle in Arizona was 47,000 head (at $70 each), and that there were 1,027,000 beef cattle (at $24.70 each) (Santa Fe Railway 1925:8). A decade later, 418,000 Arizona cattle were brought to market in 1938 (Writers' Program of the Work Projects Administration in the State of Arizona 1989:80). Although the thousands of beef and beef-sized bone recovered during the Joint Courts Complex Archaeological Project attest to the importance of cattle as a meat source, cattle were the source of other important products that are less visible archaeologically. Hides were made into leather or rawhide, and of course, dairy cattle provided milk, butter, and cheese. The dairy industry was said to be in a fledgling state in 1926 (County Immigration Commissioner Agricultural Bureau, Tucson Chamber of Commerce 1926:5), at which time milk sold for 15–17 cents per quart retail.

In some cases, local production was important, and in others the exotic and distant origin was emphasized. An advertisement for Fulton Market nicely illustrated this by extolling the virtues of local and exotic products in a single advertisement. It was advertised that their beef was "Phoenix beef, the juiciest, most tasteful beef in the country. We have the best herd of steers in the Salt River Valley" (*Arizona Daily Star*, 19 February 1911a:7). In the same ad, it was promised that their oysters were "sealshipt oysters, the epicures delight, fresh, sea-flavored, pure, received daily from the famous eastern oyster beds in sanitary refrigerated cases."

Sheep, sheep/goat, and sheep/goat-sized mammal bone made up the second most common taxa, at more than 20 percent of the major economic taxa. Although this section generally refers to sheep or sheep/goat as sheep, some of the bones may have represented goat rather than sheep. Many elements are difficult to differentiate between the two taxa, and both were and are raised and eaten in the Southwest. Over 30 percent of the economic bone from Block 252, Lots 2 and 4a; Block 254, Lot 2; and Block 255, Lot 1; and more than half of the bone from

Block 254, Lot 4, were identified as sheep, sheep/goat, or similarly sized mammals (see Table 40).

The greatest number of cranial bones from sheep and sheep-sized mammals was recovered from features associated with John Brown, the retired cattle rancher, and his household. The raw counts are deceptive, however, because they probably represented a single complete (or nearly complete) sheep skull. Neck bones were found in seven features, representing up to 5 percent of the sheep or sheep-sized bone.

Axial bones from sheep-sized animals were present, but in lower proportions relative to the appendicular bone that was seen in beef and cow-sized mammal bone. Mutton and lamb cuts listed on the Oehl's meat charts tended to be more expensive than beef cuts (Swope et al. 1997). Lamb ribs and loin cost 27.5–30 cents per pound, and mutton rib and loin chops cost 25–27.5 cents as did pork loin and rib chops, more expensive than all but the most costly beef steaks. Pork and mutton cost the same amount per pound in Tucson in 1899 (*Arizona Daily Star*, 14 December 1899g:4), but residents of the project area appear to have preferred mutton and lamb to pork and ham, at least to the latter sold on the bone.

The Brown property included sheep bone from all body regions but the feet; the Stewards had no sheep bone from the head, but did have a single foot bone. More bones from the upper hind limb were found on the Brown lots than in the Steward's cesspit (Feature 10099), suggesting that a leg of lamb was a more common meal in the parents' household than the daughter's, and sheep made up a larger proportion of the overall economic taxa in the Brown features than in Cesspit 10099. Upper limb bones were slightly more common in Block 254, Lots 6 and 7 than in the Brown and Steward properties, and upper front limbs were more common in Block 252, Lots 6 and 11. One other observation concerning the Steward household is worth noting. In addition to the presence of younger chickens and evidence for different preparation methods for quails, we also saw differences in sheep-sized bone between Levels 1 and 2 of Cesspit 10099 and the lower levels. More sheep-sized bones were recovered in these two levels than in the lower levels, and both Level 1 and 2 contained cranial bones. No cranial bones were found in the lower levels.

When Fulton Cold Storage Market added Oracle spring lamb to their stocks in July 1901 they advertised that it was sold by the quarter only (*Arizona Daily Star,* 27 July 1901a:5), so a person purchasing their lamb from this establishment would bring home a full or nearly full set of bones from a forelimb or hind limb. Forequarters were cheaper than hindquarters in San Bernardino (Swope et al. 1997). It is possible that some of the meat in the project area could have been bought as forequarters or hindquarters, rather than as individual cuts. Among the features, the sheep bone from Cesspit 3040 (Block 254, Lot 7) may have been the most likely to have been purchased by quarter; it included large bones from complete or nearly complete sections (e.g., femur, tibia, patella, tarsals, scapula, and humerus sections). Cesspit 3042 (Block 254, Lot 6) included a complete scapula, humerus sections, a nearly complete radius and ulna, and a carpal, and this could also have represented a front quarter.

Although sheep and their various products were less important than cattle in the economy of the state as a whole, they were and remain significant resources to many. In 1925, the U.S. Bureau of Markets estimated 1,155,000 sheep in Arizona (at $8.80 each) and 170,000 goats (at $4 each) (Santa Fe Railroad 1925:8). At that time, about 900,000 sheep were said to be in Coconino County. In all, about 6,000,000 pounds of wool were reportedly shipped from Arizona in 1925. Arizona lambs fattened earlier than in other areas of the United States and so they were shipped to eastern markets, mainly Kansas City, in the springtime where they fetched high prices (Santa Fe Railroad 1925:8). At least one Tucson market felt it to be worthwhile to advertise that their mutton was from Arizona. Fulton's Market stated that their mutton was from Oracle (*Arizona Daily Star*, 27 July 1901a:5).

By 1938, Arizona sheep were estimated at only about 811,000, about half of which were residents of the Navajo Reservation (Writers' Program of the Work Projects Administration in the State of Arizona 1989:81); the remainder were moved from summer grazing lands in the north to warmer areas in the winter where they grazed in the Salt River and Casa Grande valleys, and in Yuma. *The W.P.A. Guide to Arizona* (Writers' Program of the Work Projects Administration in the State of Arizona 1989:81) reported that Arizona sheep produced over 5 million pounds of wool in 1938, with 1.3 million of that total derived from Navajo sheep.

As Tucson moved further into the twentieth century, Arizona became more and more a part of regional and national food systems. Cattle and sheep were produced in sufficient numbers to not only supply local tastes but to be shipped outside the area. Local beef and mutton were held in sufficient esteem that advertisers made an effort to inform consumers that they were buying meat from locales within the territory or state. Cookbooks provide some clues to the availability of certain items. Some recipes obviously assumed local origins for at least part of the ingredients, such as the recipe for stewed kid that directed the cook to first "kill a kid" (St. Ann's Society 1909:15).

There appears to have been little difficulty acquiring Arizona-grown cattle, although some beef was brought into Tucson from a distance within the territory or state. Chickens, on the other hand, were scarcer, as were turkeys, as discussed previously. Tucson markets brought in both chickens and turkeys from outside the area. By 1911, advertisers found it worthwhile to proclaim that their fruits and vegetables were from California, their potatoes from Colorado, their eggs from Mesa and Tempe, and their beef from the Salt River valley as consumers in the territory/

state became firmly embedded in local, regional, and national systems.

Wild Game

Although domesticated mammals and birds accounted for the bulk of the meat consumed by the residents of this neighborhood during the late nineteenth and early twentieth centuries, wide varieties of wild birds and mammals were also consumed. A few reptiles and amphibians were recovered, but they were unlikely to have contributed heavily to the residents' foodways. They more likely represent commensal taxa and not food remains. The wild animals identified here consisted mainly of rabbit, quail, and dove species, with smaller numbers of waterbirds. Many species of waterfowl migrate through or winter in southern Arizona (Phillips and Comus 2000:373–376). Osteologically, it is difficult to tease apart several wild taxa from their domesticated relatives, especially in the case of rabbits and larger gallinaceous birds. Adding to the problem, rabbits were evidently raised in Tucson during this period (Thiel 1993:86). In addition to large numbers of rabbit and dove bones, we identified four pronghorn elements and a single piece of deer antler. However, many bones fall into the general size range of sheep, goats, deer, and pronghorn, so it is possible that more elements of undomesticated even-toed grazing animals were in the collection than we were able to specifically identify. Hunting wild game—especially bighorn sheep, deer, and pronghorn antelope—to sell in city meat markets was a flourishing trade in Arizona by the 1880s. Schumacher's Market was one of the most frequently mentioned establishments in wild-game advertisements, and Zelweger's butcher shop was mentioned at least once by name (*AC* advertisement, reprinted in Brown 2008:198).

Period records make it clear that rabbits were not only slaughtered as pests and to collect bounties, but also were shipped to markets all over the state and to the West Coast by the tens of thousands (*Arizona Daily Star* 1909, excerpted in Brown 2008:205). Various dove species, as well as Gambel's Quail, appeared in feature deposits in relatively high numbers, second only to rabbits and hares. As late as 1889, at least one restaurant in Tucson, the Maison Dorée, advertised "Game Birds–Game Meats!" (*Arizona Daily Star*, 24 November 1889c:6). If the exclamation was for attention or because of the fare's exclusiveness, we can only guess. By the early 1890s, there was a growing feeling throughout the state that wild game was being slaughtered without regard to their ability to cope with the hunting pressure, and a series of laws to restrict hunting were passed, starting in 1893. Market hunting was outlawed in 1901, but there was no mechanism for the law's enforcement until 1913 (Brown 2008:x). Game was still sold in Tucson after this time, as shown by an advertisement for Don Chin Wo's store, announcing that the establishment sold fish, game, and oysters (*Tucson City Directory* 1923:465). The game was not specified; it may be that the taxa sold were legal to harvest and sell, like rabbits or domestic pigeons, or that some or even all of the game came from farmed sources as do venison and bison meat today.

We also recovered an interesting, if small, collection of birds not normally hunted for food. These species included a shorebird, birds of prey, and several perching birds. The birds of prey, a Red-tailed Hawk and possibly another hawk species, may have been shot because they are predators often considered to be threats to domestic poultry. If correct, this may mean that at least one resident raised and therefore protected chickens and/or doves from such predators. All bird-of-prey elements were found in the same privy, Feature 16500 (see Chapter 10, Volume 3 of this series). The perching birds (a grackle, raven, and meadowlark, and possibly other unidentified species) may have been captured for sale as aviary birds—a popular pastime of the late nineteenth century (Brown 2008:160, 186). On the other hand, some species of birds were hunted neither as nuisances nor for food, but for their feathers; by the last decade of the nineteenth century, feathers of wading and other birds were in demand for use as women's hat decorations (Brown 2008:188). It is possible that the killdeer, a relatively small bird but with striking black flight feathers, came to be deposited in the Steward family cesspit (Feature 10099) for such a purpose. However, we should not assume that songbirds were always considered to be nonfood species. A recipe in *The Arizona Cook Book* (Williams Public Library Association 1911:94) described preparing "reed birds" by stewing them in a chafing dish with rich stock, butter, and vinegar. Whatever species these birds belonged to, they were tiny, with two birds fitting on a single slice of toast. Finally, another possibility is that the songbirds and birds of prey were simply accidental deaths and the carcasses were disposed of in project area features or were simply hunted for sport.

The relative abundance of wild fauna differed considerably between the different contexts in the project area. For instance, Privy Pit 16500 situated on Lot 6 of Block 252, at 250 N. Stone, contained a relatively high proportion of wild fauna (13 percent). This property was first owned and occupied by James Finley, a Civil War veteran and—perhaps relevant to the amount of wild-animal bones found in his privy—a member of the Tucson Rod and Gun Club. Species included both black-tailed and antelope jackrabbits, as well as cottontails. It seems likely that Finley participated in some of the late-nineteenth century-rabbit drives of southern Arizona, and he also seems to have hunted in areas frequented by antelope jackrabbits as well as areas preferred by the more common leporids. The remains of geese and ducks were also recovered. Shotgun shells were found in association, including 8- and 12-gauge shells, both of which were used for hunting small game until legislation prohibiting use of 8-gauge and larger shotguns for sport hunting was passed in the Arizona territory in 1897 (1897

Legislative Assembly of the Territory of Arizona Title XVI amendment, reprinted in Brown 2008:375). The United States enacted similar laws in 1918 (Barnes 2006:402).

A different profile of game use or shooting habits was demonstrated in features associated with the Brown/Steward families. Wild game was an important dietary component for both the father's family, who lived on Block 252, Lot 5, and his daughter, Amelia Steward, to whom he gave adjacent property. The wild-fauna collection associated the Browns consisted primarily of cottontails and Gambel's Quail, along with unidentified doves and ducks. The Stewards demonstrated a more diverse taste for wild game, including a larger variety of ducks and doves, in addition to large numbers of quail and rabbits. Brown was a cattle rancher who spent much of his time on his ranch, perhaps affording him many opportunities to hunt, had he been interested. Steward was a bookkeeper and banker, and he was a member of the Blue Rock Gun Club (*Arizona Daily Star*, 23 February 1911b:6). As a rancher, Brown may well have participated in rabbit drives, and certainly some strata had fairly high counts of leporid bones. However, most of the identifiable leporids in Cesspit 10095 on Brown's property were cottontails. In Steward's Cesspit 10099, jackrabbits, associated with open country, outnumbered cottontails. A 30-30 cartridge, suitable for large-game hunting (Barnes 2006:56) was recovered from Cesspit 10095. No large wild game was recovered from this privy, but pronghorn remains were found in another feature, and other pronghorn bones could easily have been hidden within the general category of sheep-or-goat-sized bone. Over a dozen 16-gauge shotgun shells were also recovered in Cesspit 10095; these shells would have been suitable for hunting the various ducks or smaller birds found in the various features. Interestingly, although large counts of wild-game bone were found in Cesspit 10099, only one shotgun shell and a revolver cartridge were recovered. The lack of ammunition in Cesspit 10099 indicates some difference in behavior between the two households. As a rancher, Brown may have been accustomed to gathering his shells, perhaps because he did not want his cattle to ingest them, or perhaps simply to keep his property clean, or he may have brought them home to reload and the ones that were discarded were those that were too used to reload.

The only other contexts containing similar proportions of wild fauna to those found in Finley's privy were located within Block 252, Lot 2. The property was rented out over several decades by the Siewert family from the house's construction to its demolition. The economic status of the renters generally seems to have been middle class—a succession of shopkeepers and store clerks. Stratum I, associated with the second greatest amount of wild taxa, dated to around 1907, and coincided with the period during which Mr. William Hendry, chief engineer for the Tucson Ice & Cold Storage Co., occupied the house. Therefore, although a rental property, there was a period of considerable consumption of wild fauna associated with a family of upper- to middle-class standing. The range of wild species in this lot was much narrower, consisting of pigeons and doves, mainly mourning doves, with only small numbers of other game taxa. Privy Pit 22355 contained more than half of all ammunition recovered during the project. No wild artiodactyl remains were identified, but buckshot pellets were present, and deer, bighorn sheep, or pronghorn remains may well have been hidden within the general sheep/goat-sized class. Many shotgun shells were recovered, including 10- and 12-gauge shells, either of which could have been used for bird hunting.

Dove hunting was restricted by game laws from 1897 on, with the establishment of a season, a (generous) daily bag limit, and penalties for various food-business professionals if caught with bird carcasses (reprinted in Brown 2008:374–392). It is therefore interesting that such large numbers of dove bones appeared in many of the features in the project area and not just on those few properties whose faunal samples produced large numbers of wild-fauna remains. Is it possible that hunters, who could legally shoot up to 35 doves per day, sold some birds directly to consumers? Lacking reliable home freezers, enthusiastic sport hunters may well have harvested more than they could consume immediately, and chose to share with friends or family. Rock pigeons, also known as domestic pigeons, are not native and birds raised in cotes would not have been subject to the same game laws as the wild native birds. Some of the bones may have represented birds kept by residents or raised outside the project area. It is also possible that the domesticated birds were purchased simply as another type of poultry.

In general, it appears that, with the exceptions of the Brown, Finley, and some of the families renting from William and Elsie Siewert, project area residents did not consume the meat of hunted or trapped animals very often. It was only within Block 252 that we found relatively large numbers of such bones and, for two households, a high diversity of these taxa. We also found that the presence of wild fauna and ammunition did not always correspond.

Did the majority of the residents in the project area, who rarely purchased or hunted wild game, follow a period or regional norm, or were the more diverse diets of the Brown, Steward, and Finley families more typical? Further, was interest in and ability to hunt or purchase wild game something that was restricted by economic level, an aversion or orientation encouraged by social class, or perhaps a demarcation along ethnic lines? A survey of 13 faunal reports from archaeological excavations of contemporary communities in Tucson, Phoenix, and San Bernardino, California (Table 42), allowed us an opportunity to address these questions. We were able to derive estimates of relative numbers of taxa for 10 of the collections gathered for comparison. The estimated relative abundance of wild fauna in the collections varied from a low of none at a location in San Bernardino (Langenwalter 1997) to

over half of all animal bones from certain features at a site in Phoenix, to 16 percent for the entire excavation area (Waters et al. 1998). Generally, all the other reports contained the same percentage range as most of the households in the Joint Courts Complex project area, between 1 and 6 percent. Relative abundances of faunal remains did not appear to cluster according to ethnic group. A range of people, of European, Mexican, and Chinese descent, occupied the sites.

The survey of reports showed that residents of the various sites generally ranged across all economic levels. In the Joint Courts Complex Archaeological Project area, only persons of higher-economic levels seemed to have eaten wild game fairly often; residents of rental properties, with the exception of William Hendry, rarely ate wild game. When they did do so, they chose the most popular, or the most available, animals—rabbits and quail. According to Brown (2008), just before the close of the nineteenth century, small-game hunting was beginning to be a leisure activity in Arizona, rather than for commercial or simple nutritional purposes. Rather than being based on ethnicity or economics, perhaps the drive to incorporate wild game into meals was influenced by social status. Therefore, it may follow that sport hunters were primarily members of the middle or upper class, who could travel to various locations to hunt. Lower classes, living and working in an era before the concept of weekends and leisure time existed, may have had less opportunities to hunt wild game than their better-endowed counterparts. Those who did not themselves hunt, but instead purchased what game was available for sale at meat markets, may have been restricted to the more popular species. We cannot show, in the absence of contemporary price lists for wild game in this area, that wild game was priced at a prohibitively high level. However, by the time the project area was developed as a neighborhood, gun clubs were already pushing for the end of market hunting, which indeed occurred shortly thereafter. The end of market hunting might well have immediately driven up prices for unprotected wild-game species, and even made any such animals hard to come by. Penalties for store owners caught handling native species' carcasses were written into the earliest anti-market hunting laws of the state (reprinted in Brown 2008:371–392).

If diversity, in addition to quantity, can be used to differentiate upscale households who consumed a variety of meats as a component of their social identity, then a simple measure of richness, the number of wild species within a household's trash deposits, might be a useful way to differentiate households according to social class. Interestingly, assessing faunal remains in this manner returns a slightly different grouping of households. Although the Browns and Finleys consumed, or at least collected, the highest number of wild species (14 and 19, respectively), two other tiers were illuminated according to this analysis. Faunal remains from three rental properties—belonging to William Siewert, Benjamin Fairbanks, and Charles Rasmussen—contained between 7 and 9 wild species. Meals prepared on those lots apparently included more-diverse meats than those of the remaining five households in the project area, whose trash held remains representing only between 1 and 3 wild animals.

The answer to the larger question of what the consumption and/or pursuit of wild game meant to the population of Tucson around 1900 appears to have had little to do with ethnicity, but something to do with social status and economic class—the cost that people were willing and/or able to bear in order to enjoy certain sports and a certain diet (Reitz 1987:105). There may have been considerable

Table 42. Relative Abundance of Wild-Fauna Species at Contemporary Sites in Tucson and Phoenix, Arizona, and San Bernardino, California

Citation	Site	Wild Fauna %
Ayres 1990	Community Center, Tucson	0.0
Diehl et al. 2005	León Farmstead, Tucson	1
Thiel 1993	Catalina Hotel, Tucson	9
Jones 1997	Block 180, Tucson	4
Hamblin 1981	Lewis-Weber Site, Tucson	1
Thiel and Desruisseaux 1993	Historic Block 138, Tucson	1
Thiel and Faught 1994	Block 192, Tucson	6
Waters et al. 1998	Blocks 72 and 73, Phoenix	16
Smith et al. 1995	Heritage Square, Phoenix	5
Thiel 1997	Chinese Gardener's Household, Tucson	2
Langenwalter 1987	Riverside Chinatown, CA	3
Shaffer and Baker 1997	Superblock Site, San Bernardino, CA	1
Langenwalter 1997	Santa Fe Yards, San Bernardino, CA	0.0

cost involved in hunting, not only in terms of equipment, but also transportation, time away from work, a yearly hunting license and, if desired and obtainable, membership in a sporting club (Brown 2008:ix–x). Although material costs for equipment and a license may not have been formidable, it is apparent that hunting transitioned from a necessity of frontier life to a sport frequented by city leaders and businessmen (Brown 2008:344–345). In essence, we believe that at least a portion of the difference visible in the distribution of these animal bones across the project area was attributable to the social mores of Arizona's new urban elite class.

Just as domesticated animals vary in status and popularity, so, too, may hunted ones. A meal, no matter how carefully prepared, made from a species considered to be a nuisance, like jackrabbit, will probably have a different status than one made from quails or doves, but it is also important to bear in mind that status can shift over time. The economic cost of small birds likely changed considerably after market hunting ceased. The social standing of rabbits probably varied over time as well, and there may have been perceived differences between the leporid taxa relating to status. Nevertheless, certain patterns remain unexplained. Considerable quantities of jackrabbit bone were recovered in Finley's privy. As an important member of Tucson's society, he would surely not have been a recipient of charity, which often benefited from the rabbit drives of the early twentieth century. Finley died in 1899 (*Arizona Daily Citizen*, 17 November 1899), and the collection of jackrabbits may have accumulated prior to the time when the species became a charitable contribution. Or, he may simply have preferred to eat his catch regardless of social status.

Fish

The remains of several taxa of fish were recovered from the residential features of the project area. Fish spoil rapidly and require either preservation or rapid transportation; consequently, incorporating these taxa into the diet of the neighborhood would have entailed different costs to the residents. Just over 200 bones of nonlocal, bony fish species were examined by Dr. Kenneth Gobalet of the Department of Biology, California State University-Bakersfield. The fish bones constituted neither a large proportion of the total number of bones identified (1 percent of the total collection), nor did they represent a wide range of species. Remains identifiable beyond the class level accounted for somewhat less than half of the collection, with the remainder unidentifiable beyond class designation. Identifiable bones came from both freshwater (catfish and minnow) species and marine species, listed below.

There are few catfish species native to the southwestern United States, and only the Yaqui catfish is found in Arizona, in the extreme southeastern corner (Page and Burr 1991:191–192). On the other hand, a number of freshwater catfish are native to the eastern United States. Several of these species, including white catfish and brown bullhead catfish, were imported into California and presumably elsewhere in the western United States during the latter half of the nineteenth century (Walford 1931:54–55). Identifiable catfish bones from the project area were classified as black bullhead catfish. The black bullhead is not mentioned in Walford's handbook of commercial and game fishes of California, but the species is a close relative of the brown bullhead catfish. Brown (2008:402) reported that the black bullhead catfish was introduced to Arizona in 1878.

A pair of minnow bones presented a quandary: although a number of minnow species are native to the rivers of the Southwest, an imported Old World domesticated minnow, the carp, may also have been present (James 1993). Although native minnows are mostly small, they were nonetheless heavily exploited by Native Americans. Some native species, such as the pikeminnow, were taken in large numbers by Euroamerican settlers into the twentieth century (James 2004:33–36). Other minnows do grow large, but they were mostly held in disdain by European settlers, who thought them too bony, their flesh was too soft, or they tasted like mud (Brown 2008:211). The minnow bones from the project area appeared to be from one of the larger native minnows or a small imported carp. Unfortunately, no real conclusions about the bones could be made without specific identification.

Saltwater fish elements were from both marine and anadramous species, most likely from the West Coast, and comprised only major commercial species: herring, Coho salmon, cod, rockfish, jack mackerel, barracuda, Pacific mackerel, flounder, California halibut, and lingcod. A commercial fishing industry was well established in California and Alaska by the early twentieth century. Although most fish was consumed locally, both the rise of canning and refrigerated railcar technologies made it possible to ship seafood inland (Bureau of Commercial Fisheries 1929). The fisheries publication reported that only salmon, sardines, Pacific mackerel, and various species of tuna were canned, although by the late 1920s, canned salmon was less common than shipping it fresh on ice, a result of the species' decline from overfishing (Bureau of Commercial Fisheries 1929:46–47). In 1910, an Adams & Co. Grocers advertisement in the *Arizona Daily Star* reported salmon and canned sardines were in stock (*Arizona Daily Star*, 3 September 1910:8).

If we assume that species such as herring, salmon, cod, and mackerel arrived in Tucson either canned or preserved in some other fashion, whereas all other species arrived fresh or frozen, then we may have evidence of a visible imbalance in terms of how residents obtained their fish. An overwhelming number of the identifiable bones came from fish species that would most likely have been imported fresh in refrigerated railcars from California ports. This may mean that residents preferred to eat fresh fish and that

this was an affordable commodity, not made exorbitantly expensive by costs imposed by the railroad companies. However, bones of processed fish were often removed either on ship or on shore, and processed-fish consumption may have been underrepresented in the faunal collection (Oliver 2001).

The fish remains from saltwater and introduced freshwater species in the project area were perhaps most of all a testament to the cultural impact of the railroad. The Santa Fe Railroad's introduction of refrigerated railcars into San Bernadino, California, made possible the establishment of fresh-fish markets there, and no doubt explains the presence of various saltwater fish species at archaeological sites dating to the early twentieth century (Swope et al. 1997:153–154). Without the Southern Pacific Railroad's presence in Tucson, fish could not have been shipped in quantity from West Coast packing plants. As well, the introduction of live freshwater fish destined for the rivers and lakes of the Southwest would have been unimaginable without the arrival of the railroad.

The largest number of fish bones was recovered from Privy Pit 734 on Block 255, Lot 1 (n = 62, 30.5 percent of the project area collection). However, 52 of these could only be classified as bony fish. Cesspit 3040 contained 53 fish bones, but, interestingly, adjacent Cesspit 3042 only contained 12 fish bones. Eleven lingcod bones were recovered from Privy Pit 16500, and Privy Pit 650 produced 12 bones of copper rockfish.

Invertebrate Taxa

Analyzed invertebrates from postcemetery features consisted mostly of Pacific giant oyster, with a relatively low frequency of eastern oyster. In general, oysters are found on every continent except Antarctica, and both archaeological evidence and the written record document their use as a human food source (Conlin 1980). By the mid-nineteenth century, consumption of oysters was common in all socioeconomic groups in America, commercial oyster industries were established all along the eastern coast (Ingersoll 1881), and English traveler Charles Mackay wrote that the "rich consume oysters and Champagne; the poorer classes consume oysters and large bier…" (Mackay 1999 [1859]:115). In 1862, P. de Broca, sent by the French government to study the American oyster industry, wrote,

> This delicious article of food has become so necessary with every class of the population that scarcely a town in the whole country can be found without a regular supply. By means of railroads and water channels, oysters in the shell, or out of the shell, preserved on ice, in pickle, or canned, are carried to the remotest parts of the United States….where it is considered to be one of the most common and cheap means of subsistence [De Broca 1876:284].

During the California gold rush, efforts to establish commercial native oyster beds were unsuccessful, as were attempts to establish sustainable Guaymas Bay (Mexico) oyster beds along the Pacific Coast (Ingersoll 1881:201, 204–205; McMillin and Bonnet 1931:246). By 1870, eastern oysters were being shipped across the country to establish commercial Pacific oyster beds (Hector 2002:106). With the invention of manufactured ice in 1875, special refrigerated railroad cars were designed to ship fresh oysters and oyster seed as far west as California (Nuwer 2006; Saltus et al. 2000:39). Between 1875 and 1880, approximately 40,000 barrels of transplanted eastern oyster larvae or seed (each barrel containing 3,000–5,000 seeds) were shipped from New York to San Francisco (Ingersoll 1881:204), and eastern oysters harvested in California were shipped to towns along the West Coast and into the interior West (Barrett 1963:91).

The Pacific giant oyster was introduced to the West Coast around 1902 (Kincaid 1951). The West Coast commercial harvest of eastern oysters continued until the 1920s, when the oyster beds were wiped out by disease (Goode 1887:539). With the decline of the West Coast eastern oyster industry, commercial harvest of the Pacific giant oyster intensified, and today it is the predominant oyster harvested on the western coast of the United States (Kincaid 1951).

In 1881, the value of oysters sold in the United States was estimated to be approximately $13.5 million, with nearly $10.6 million invested in oyster industry capital (Ingersoll 1881:Table 64). In general, fresh oysters were considered to be of finer quality than steamed oysters and carried a higher market value (Ingersoll 1881). According to the *Oxford Encyclopedia of Food and Drink in America* (Smith 2004:224–225), during the latter half of the nineteenth century, Americans spent more on oysters than on meat. During the early 1880s, Massachusetts oysters sold for the following amounts: common shell oysters, 90 cents per bushel (equal to 32 dry quarts); select shell oysters, $1.20 per bushel; common opened oysters (i.e., shell removed), $1 per gallon; and select opened oysters, $1.20 per gallon (Ingersoll 1881:31). By today's standards, shell oysters would have cost between approximately $18.80 and $20.90 per bushel, whereas shucked oysters cost between $20.90 and $25.00 per gallon.

Although oysters were shipped and sold in their shells, most were shucked, and then shipped canned or fresh (Barrett 1963:91). In the case of fresh shucked oysters, they were placed in airtight containers and transported in crates or barrels packed with ice (Ingersoll 1881:167–168). Once at market, fresh oysters were sold individually or by weight. For example, in 1910, *The Evening Standard* of Ogden, Utah, advertised "Sealshipt Oysters"—fresh, shucked oysters dispensed to the buyer in wax-lined paper

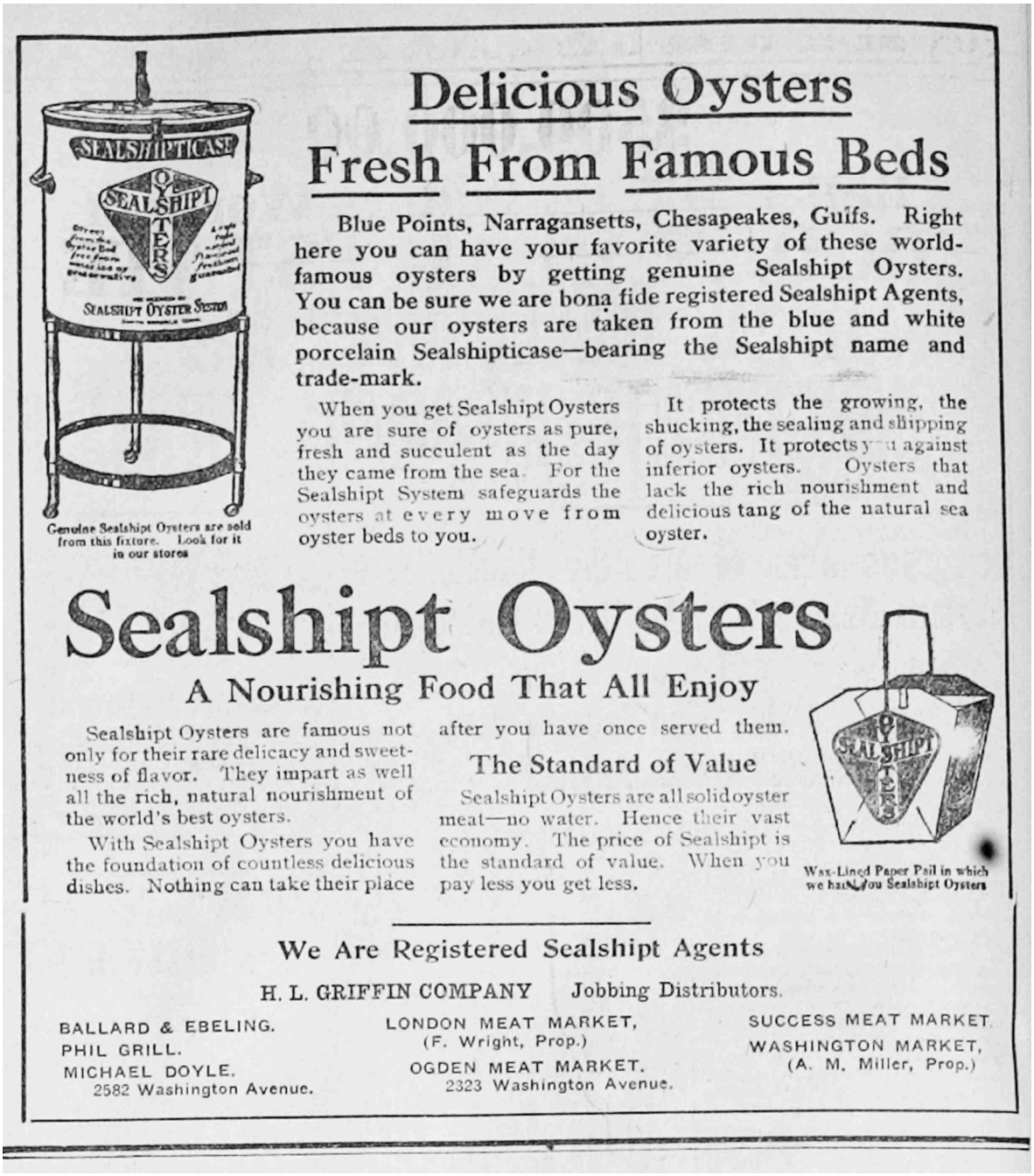

Figure 147. Sealshipt Oyster Advertisement, *The Evening Standard*, Ogden Utah, Thursday, November 3, 1910. Similar advertisements would have appeared in the Tucson area.

containers with a wire handle (*The Evening Standard*, 3 November 1910) (Figure 147).

Oysters were eaten raw on the half shell and cooked in every form imaginable. Household cookbooks from the period contained recipes for escalloped, deviled, grilled, and pâté oysters (Allen 1924). Additionally, there were recipes for oyster soups, stews, and croquettes. A local Tucson cookbook (St. Ann's Society 1909) contained recipes for "Oyster Chile Sauce," which called for a solid pint of oysters, and "Oysters con Chili," which required an entire quart.

Oyster shells were valuable commodities as well. They were used as lime; fill for railway embankments, lowlands, and wharves; ballast for vessels; a component of fertilizer; and as a supplement for poultry (Ingersoll 1881:205).

After the railroad arrived, Tucson newspapers advertised the local availability of fresh oysters (*Arizona Daily Citizen*, 9 April 1880). An 1882 advertisement stated that

fresh oysters from Guaymas Bay arrived in Tucson daily (*Arizona Daily Citizen*, 23 November 1882:3). It is unknown whether these arrived directly from Mexico or were from transplanted oyster beds in California. In 1889, shipments of fresh Berwick Bay oysters from Louisiana and Baltimore, both shucked and in the half shell, were advertised for sale (*Arizona Daily Citizen*, 3 October 1889c:4; *Arizona Daily Star*, 24 November 1889c:6). Fresh oysters at McDowell K. Price's market were advertised for 50 cents a can (*Arizona Daily Citizen*, 13 April 1889d). Shell oysters (i.e., in the half shell) were served at the Maison Doree and The French Restaurant (*Arizona Daily Citizen*, 23 November 1882:3:5; *Arizona Daily Star*, 24 November 1889c:6).

In addition to oysters, varieties of other mollusks, including types recovered from Joint Courts Complex postcemetery features, were harvested for human consumption during the nineteenth and early twentieth centuries. Unlike oysters, other shellfish varieties were never seeded; consequently, harvesting efforts focused on types that were particularly abundant, especially along the western coast. These varieties included littleneck and venus clams, as well as the Pismo clam, which was ranked third in importance in commercial shellfish along the West Coast during the early twentieth century (Hector 2002:106). Abalone, also commercially harvested, was generally exported to Asia, as it was not commonly used in American cuisine. Abalone shell, however, was extensively used for mother-of-pearl button and jewelry manufacture (Hector 2002:107).

The analyzed invertebrate collection from postcemetery features was relatively small, particularly when compared to vertebrate remains. Despite low frequencies, however, a variety of identifiable taxa was recovered, indicating ties with the Pacific Ocean, Atlantic Ocean, Gulf of California, and West Indies. In addition to shellfish remains, a few fragments of crab and barnacle were recovered. Shell fragments were mostly from edible varieties, as well as a few taxa that were not likely consumed. The latter may have been inadvertently brought to the site—attached to other shells such as oyster—or were part of beachcombing or natural history seashell collections, which was a popular pastime during the nineteenth and early twentieth centuries. This is discussed later.

Invertebrate density by weight never exceeded 40 g per cubic foot of feature fill and for most contexts, did not exceed 1 g per cubic foot. The highest density by weight (nearly 36 g per cubic foot) was recovered from Stratum II of Privy Pit 22355, associated with the rental property owned by the Siewert family (see Chapter 7, Volume 3 of this series), but Privy Pit 16500, associated with James Finley (see Chapter 10, Volume 3 of this series), contained the highest frequency of analyzed invertebrate remains, with respect to overall MNI, NISP, and weight. Privy pits contained nearly 80 percent of the total weight of analyzed invertebrate remains, nearly 65 percent of the total NISP, and just over 45 percent of the total MNI. Privy pits may have been preferred locations for disposal of invertebrate remains; however, considering the relatively small sample, it is difficult to draw definite conclusions.

It is difficult to gauge the extent that oysters were consumed by residents of the project area, as the invertebrate collection contained only the remains of oysters in the half shell. During the nineteenth and early twentieth centuries, Tucson inhabitants had access to fresh and canned shucked oysters as well. Other than the presence of an identifiable can, evidence for consumption of these types of oysters would not be visible in the archaeological record. Based on the popularity of oysters during the period, oyster consumption was likely much higher than represented by the evidence preserved in the archaeological record.

According to available information regarding prices in other cities, shell oysters were more expensive than canned (Ingersoll 1881). Local advertisements rarely listed the prices of shell or shucked oysters. Considering that oyster shell was not ubiquitous throughout Joint Courts Complex postcemetery contexts, it is possible shell oysters were somewhat of a luxury item compared to shucked oysters, perhaps, in part, because of higher shipping costs. However, it is interesting to note that low frequencies of oyster shell were found in contexts associated with the neighborhood's wealthiest families. The cesspit associated with John Brown contained evidence for only one oyster, one crab, and a Pacific cockle, and the Steward family cesspit contained no invertebrate remains. Levels in Cesspit 3040 associated with the Fairbanks family had remains of only one crab and possibly one oyster. This could be evidence that these families disliked oysters or it could be that they primarily consumed shucked oysters.

Vegetables and Fruit

Macrobotanical and pollen data recovered from the project area showed that a variety of plants, both native and nonnative, were grown and consumed in the area. Native foods included cactus fruits and flesh, mesquite pods, and cultivars such as beans, corn, cucurbits, and chilies. Livia Leon Montiel (Martin 1992), raised on a ranch outside Tucson, reported that her family supplemented their diet with wild foods, including fruit from saguaro, cholla, and barrel cacti, and mesquite pods. Her mother also had a vineyard and grew peaches. Fig, date, quince, and other fruit trees arrived early in southern Arizona. The Kino Heritage Fruit Project places the first successful planting of European fruit in the Sonoran Desert at 1687 (Arizona-Sonoran Desert Museum 2009). As the Spanish traveled northward, they planted familiar fruit—peaches, apricots, pears, quinces, figs, pomegranates, olives, grapes, and citrus—at many of their missions. By the late nineteenth and early twentieth centuries, fruit trees grew in gardens and commercial orchards. Socorro Félix Delgado (Martin

1992:60) reminisced how her grandparents grew figs, pomegranates, elderberries, mulberries, apricots, grapes, prickly pear, and mesquite on their ranch in Suahuarita. Even when her grandmother lived on Meyer Street in Tucson she maintained grape vines and a fig tree.

By the turn of the twentieth century, commercial orchards were planted in the Tucson Basin. One Pima County brochure (County Immigration Commissioner Agricultural Bureau, Tucson Chamber of Commerce 1926) reported success with growing plums, grapes, peaches, figs, apricots, and pears, but a brochure reported that although grapes and citrus did well, apricots, peaches, and plums were subject to late frosts in the valleys (County Immigration Commissioner Agricultural Bureau, Tucson Chamber of Commerce 1937).

A group of school children made the trip from Reddington to Tucson in 1932 where they watched the Armistice Day parade and were vaccinated at the courthouse. One fourth grader, Carlota Valdez, wrote about the fruit she saw in the Tucson market in an essay written for the "Little Cow Puncher," a mimeographed newspaper written by and for rural schools in southern Arizona: "We saw a market, xxx yum, yum, there were Pomegranets [*sic*], Pineapples, lemons, great big oranges, persimmons, graps [*sic*], figs, sugar cane, cherrys [*sic*], peaches, grapefruits, apples, and lots of things I can't remember of, and some I have never seen before" (Valdez 1932:2). The wonder in her tone (and perhaps the fact that she chose to write about fruit rather than the vaccination) suggests that this variety of fruits was not available in Reddington.

Plant remains recovered during the Joint Courts Complex Archaeological Project did not rival the abundance reported by Ms. Valdez, but nonetheless included an impressive variety. Excavators recovered evidence for figs, grapes, dates, apples, pomegranates, raspberries, elderberry, tomatillo, peaches, cucurbits, and chile or pepper. Receipts were also found indicating that lemons, carrots, and strawberries were purchased. Saguaro cactus was also represented. Remains of at least three grains were found—maize, wheat, and barley—and receipts show that the Kelley household purchased oats. Pollen records show that cruciferous plants were likely grown on or near the site.

Figs were the best-represented fruits in the project area. A very sweet fruit, figs were used locally in a wide variety of cakes, candies, cookies, puddings, fillings, and icings, in mincemeat pies, pickles, salad, and as sandwich filling (St. Ann's Society 1909; Williams Public Library Association 1911). Figs were so popular that substitutes were developed, perhaps for off-season consumption. *The Mission Cook Book* (St. Ann's Society 1909:37) included a recipe for "Tomato Figs," in which yellow tomatoes were simmered in sugar syrup until transparent, set to dry in the sun, and then sprinkled with sugar. Although many recipes infer that figs were commonly eaten preserved, a daily menu planner suggested fresh figs with cream for breakfast (Williams Public Library Association 1911:289).

Figs also had medicinal value. Like dried plums, they can have a laxative effect if eaten in sufficient quantity, and they were sold in concentrated form for that purpose as syrup of figs (Duke Libraries Digital Collections, http://library.duke.edu/digitalcollections/eaa.A0387/pg.1). Several syrup-of-figs bottles were recovered during the excavations. However, the ubiquity of figs in the project and the abundance of local recipes calling for the fruit suggest that the fresh fruit were likely valued most for their sweetness and edibility.

It seems that the popularity of dates and figs fluctuated through time, and figs dropped in popularity a few decades into the twentieth century. The 1938 *Trinity Circle Cook Book* (Women of Trinity Presbyterian Church 1938) contained far fewer fig recipes than earlier cookbooks. Dates, on the other hand, were seemingly more popular, and the book contained many recipes using dates in puddings, cookies, cakes, breads, icings, loaves, and waffles. Fruitcake recipes often combine figs, dates, raisins, and other fruit, but far less evidence of dates was recovered in the present project compared to figs or grapes. However, date seeds are much larger than fig or grape seeds, and are therefore much less likely to be accidentally ingested in one's dessert. It is likely that if dates were purchased, they were pitted and probably dried, rather than fresh. Date seed was recovered in only one feature (Privy Pit 22355), in a stratum that also included apple, raspberry, and tomatillo, but there were no figs or grapes, ingredients often found alongside dates in old-fashioned baked goods.

Grape seeds were found in several features. These could have represented fruit consumed fresh or dried as raisins. Like figs and dates, grapes could have been shipped on the railroad from California or other locations, but they were also locally grown in Tucson. *The Arizona Cook Book* included recipes for homemade grape juice (Williams Public Library Association 1911:14), grape catsup, jello molds, conserves, marmalades, and jelly. *The Mission Cook Book* (St. Ann's Society 1909) called for grape leaves and green-grape jelly to cook quail.

By 1935, there were 21,390 acres devoted to citrus in Arizona (Writers Program of the Work Projects Administration in the State of Arizona 1989:84). It is therefore curious that no seeds or rinds were found in any of the sampled features. Citrus seeds are large enough that people may have chosen to remove them rather than swallow the complete seeds, but if they did so, they evidently discarded them in areas not analyzed, or no seeds preserved. Among the receipts from Mose Kelley's cesspit (see below) is one listing 12 lemons purchased from the Pacific Grocery. The date is illegible, but the purchase likely occurred in the spring of 1911.

Raspberries were found in several features throughout the project area, especially those associated with the Brown, Finley, and Fairbanks families. The berry seeds were identified as the domesticated Eurasian berry, rather than the smaller, wild American berries. Fresh raspberries

are very delicate and would likely have been costly to ship, but they preserve well, and it is difficult to determine whether the seeds represented fruit consumed fresh or as jam. Raspberries were cultivated in Arizona (Mesa Improvement Company 1917:4).

Elderberry seeds were found in several features, and both raspberry and elderberry seeds were ubiquitous or nearly so in Privy Pit 734 (see Chapter 17, Volume 3 of this series). Raspberry seeds were found in every stratum of the feature, and elderberries were found in all but one; their continued presence throughout the feature fill suggests that these plants may have been present in the garden. Elderberries are native to both the Old and New Worlds, and although not as popular today as other berries, in the past they had a variety of culinary and medicinal uses (Grieve 1931; Kay 1994:246–248; Niethammer 1974). The unripe berries are toxic, as are the leaves, roots, and stems (Kowalchick and Hylton 1987).

A pollen sample from Block 252, Lot 2, yielded evidence of *Ribes*, the genus that includes black currant, red currant, and gooseberries. Wild currants are found across much of the West. Uncooked berries have an emetic effect when eaten in quantity, but they can be safely eaten when cooked (Niethammer 1974). A local cookbook included recipes using currant jelly in fruitcakes and other recipes (Williams Public Library Association 1911). Pollen from roses or the rose family was found in eight features in the project area. These attractive plants often do double duty, serving primarily as landscaping plants but also providing vitamin C–rich rose hips for use in tea, wine, jellies, or baked goods (Kowalchick and Hylton 1987). Fragrant rose petals can be included in salads or other foods, or candied and added to cake decorations; however, it is not known if they were used as food in the project area.

Several cactus taxa were represented in the collections, including cholla, prickly pear, and saguaro. Pollen from cholla and prickly pear may have simply represented local landscaping rather than food sources. More than 100 seeds from saguaro fruit were found in a concentration from Cesspit 3040. They may have represented discarded fruit from a landscape plant, but the saguaro fruit is sweet and has a long history of being eaten in the Sonoran Desert. Some researchers (e.g., Thiel et al. 1995) noted the use of saguaro in Native American and Hispanic cooking and suggested that its presence could serve as an economic or ethnic indicator. However, cactus consumption was by no means limited to Native American or Hispanic families. Rosemary Taylor, daughter of Mose Drachman, wrote that her Virginia-born mother ". . .didn't know what fun was until she went out with long poles to knock down the purplish ripe fruit, the *pitahayas*, from the giant saguaros and bring them back to be made into jam" (Taylor 1944:21). On Block 254, Lot 7, it is possible that a resident ate the seed-filled fruit, or made, purchased, or was given jam or other dried or candied saguaro products. Interestingly, the strata surrounding the area in which the saguaro seeds were found also included high numbers of other fruit residues, including over 100 raspberry seeds, more than 100 fig seeds, more than 100 grape skin fragments, and 30 grape seeds. It is tempting to hypothesize that someone who lived in the house might have been making jelly or otherwise preserving fruit. Other cactus dishes were also popular in southern Arizona, and *The Mission Cook Book* (St. Ann's Society 1909) included a recipe for cactus pads sautéed in olive oil with garlic, onion, chile, tomato, and dried shrimp.

Beans and cucurbit seeds were also recovered from several features. Beans can be dried and rehydrated and form the basis for many dishes, from the refried beans of Mexican and southwestern cooking to the French *cassoulet*, a sturdy dish made from white beans and several types of meat. Cucurbit seeds that may have come from watermelon were found in Cesspit 3040. The melon might have been grown on-site or could have been purchased—cantaloupes were among the produce grown and sold by Tucson's Chinese gardeners (Lister and Lister 1989). Frederico Rondstadt (1993) wrote that as a boy in the 1880s, he and his friends stole a watermelon from an angry Chinese gardener.

Cruciferae pollen from the mustard or cabbage family was collected in several features. This family includes a variety of common garden vegetables, including cabbage, broccoli, kale, horseradish, and many plants that are commonly viewed as weeds. We cannot tell if any of the latter were in fact used for cooking. *The Arizona Cook Book* (Williams Library Association 1911:393) included directions for "nice young dandelions" cooked with salt pork and served hot with vinegar. Pollen from the Boraginaceae family—which includes borage, forget-me-not, and salsify (oyster plant), among many others—was identified in Privy Pit 650 (see Chapter 11, Volume 3 of this series). Although the pollen species remains unidentified, a luncheon menu given in *The Arizona Cook Book* (Williams Library Association 1911:240) suggested serving salsify alongside steamed potatoes, lobster salad, and calf's liver with cream sauce.

Old World grains recovered from the project area included whole wheat and barley seeds. In addition, receipts associated with the Mose Kelley family (see below) also indicated that oats were purchased. Corn (maize) was recovered as stalks, cob, and cupules, as well as pollen. The presence of pollen suggests that corn was grown in the project area or nearby. According to the Ohio State University Extension service, corn pollen is large and usually does not travel far (Thomison 2007).

Three *Capsicum annuum* seeds were recovered from an otherwise-unanalyzed feature on Block 254, Lot 7. It is tempting to use these seeds as an ethnic indicator because chilies are heavily used in Mexican cooking. However, this is a large and widely variable species that includes sweet bell peppers, a variety of Hungarian paprikas, cayenne, Italian sweet peppers, Thai bird chilies, and colorful

ornamental peppers in addition to New Mexican chilies, poblanos, pasillas, and others (DeWitt and Gerlach 1990). The presence of these seeds alone would have been an unreliable ethnic indicator without the additional recovery of tomatillo seeds. Tomatillo seeds, also used in Mexican and southwestern cooking, were recovered from several features, including one on Block 254, Lot 7. Although chilies were used as an ingredient in *The Mission Cook Book* (St. Ann's Society 1909), and to a lesser extent in *The Arizona Cook Book* (Williams Library Association 1911), tomatillos were notably absent. It may be that they are a better indicator of ethnic influences than peppers, especially if found in combination with chile or pepper seeds. The tomatillos from Cesspit 3040 were associated with the Kelley receipts, and Kelley's mother was born in Mexico (see Chapter 16, Volume 3 of this series). More likely, their presence on a site should perhaps be taken more as evidence of ethnic influence, rather than ethnicity. Mose Drachman's wife, for example, learned to make several dishes from "an old Mexican lady," and in addition to serving her family Mexican food once a week, she occasionally made and sold tamales on the side (Taylor 1944:226). Mose Drachman's father was a Russian-Polish Jew, and his wife hailed from Virginia.

Kelley Household Foodways: a Month of Household Consumption

A mass of paper receipts was recovered from Stratum II of Cesspit 3040, Block 254, Lot 7 (see Chapter 16, Volume 3 of this series). Most were made out to either Mose Kelley or his wife, Neva, and they covered a relatively restricted time range during the month of June 1911 (Table 43). Most of the receipts were from grocers and meat markets, and they offer an opportunity to take a more-nuanced view of foodways in one Tucson family. Mose Kelley worked for the Southern Pacific Railroad in a variety of positions before working as a bank clerk and then teller (Figure 148). He was buried in the Masonic cemetery, and he could have been classified as middle class.

The family shopped for food nearly every day. The shopping could have been in person, but most grocers advertising in the *Arizona Daily Star* in 1911 accepted phone orders and provided delivery services. It may have been necessary to shop nearly every day in the era before refrigeration. Although ice boxes were in use by this time, Tucson spring and summer temperatures might have foiled any efforts to keep food cool at home.

Bread and butter were purchased frequently and usually together—e.g., two loaves of bread for 10 cents and two measures of butter for 65 cents at the Pacific Grocery. Nut bread was purchased at least once. Not only did Tucson residents no longer need to bake their bread at home, they did not have to make a special trip to a bakery. In fact, by 1911 bread was available at several Tucson grocery stores (*Arizona Daily Star*, 28 January 1911c:1; *Arizona Daily Star*, 27 May 1911d:8).

Although the Kelleys preferred to buy their bread, it appears that someone in the house likely baked cakes, cookies, or other sweet treats. Chocolate was purchased twice and vanilla once. One of the receipts dating to June 5 contained "Royal" for 50 cents. This entry could represent two different items: Royal baking powder, a tin of which was recovered elsewhere in the project area, or gelatin, another product of the Royal Company.

Mrs. Kelley bought coffee and tea at the Pagoda Tea and Coffee Company. She bought tea at least twice and coffee more frequently. Coffee was purchased in varying amounts, ranging from 10 cents on June 5 to a pound for 40 cents just 2 days later. Other groceries included milk, butter, and cheese. For some reason, the receipts never included the price of cheese. Crackers, salt, beans, and starch (perhaps cornstarch?) were also bought occasionally.

Meat was purchased nearly every day and must have formed the center of most meals. It was bought as cuts, not as sides or quarters that required further butchering. Rump roasts were popular, as was a slightly cryptic purchase that was probably "leg mutton" but could also have been "leg meat." The faunal remains from strata associated with the Kelleys included primarily cow/cow-sized and sheep-sized mammal bone. Stew meat was purchased, as was steak, veal chops, and possibly veal loin. "Glass beef" was obtained once, recorded on a receipt that no longer included a date. This was likely dried beef sold in a glass and would thus be invisible in the faunal record.

Four pounds of rump roast from Fulton's Market cost 65 cents on June 6, 1911 (16.25 cents per pound), and 55 cents on June 13 (13.75 cents per pound). Oehl's Market, San Bernardino, California (Swope et al. 1997:149–151) listed prices for beef and other meats from 1910–1912. Rump roasts were 16–17.5 cents per pound, so the higher-priced rump roast purchased by the Kelleys was consistent with the prices in California. Oehl's Market sold empty lard cans for 10–50 cents, depending on the size, and in the receipts, there was a record of a medium-sized lard can from the Pacific Market. The can cost 25 cents and so it was in line with California prices. Meat cuts purchased by the Kelleys ranged from inexpensive (stew meat) to medium priced (rump roast), to moderately expensive (veal loin and chops and leg mutton), according to the Oehl's Market cards.

Bacon and lard were purchased, and because these products include no bone, they were not represented in the faunal collection. No receipts for other pork or ham purchases were found, but about 1 percent of both Strata II and V in Cesspit 3040 consisted of pig bone, including foot, shank, femur, and humerus fragments.

Birds were not well represented in cesspit strata associated with the Kelleys; only one chicken and one chicken-sized bird were identified, both adult. The receipts recorded only one chicken purchase, and that purchase was

Table 43. A Month of Household Consumption by the Mose Kelley Family as Recorded in Receipts from June 1911 (from Feature 3040, Stratum II, written to Mose Kelley or Mrs. Mose Kelley)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Undated
			May 31, 1911	**June 1, 1911**	**2**	**3**	
			SL matches[a]	2 butter 0.65[a]	2 bread 0.10[a]	rump roast 0.55[c]	glass beef[a]
			1 nut (?) bread 0.10[a]	2 bread 0.10[a]	12 (ill) milk 1.35[a]	m steak 0.25[c]	strawberries[a]
				vinegar[a]	c starch 0.10[a]		m lard can 0.25[a]
				6 oz durham[a]	lard[a]		sl stk 0.35[c]
				2 gelatine[a]	beans 0.59[a]		rump roast beef[c]
					bacon[a]		2 butter[a]
					(illegible)[a]		coffee 0.40[d]
					salt 0.15[a]		kita (?) oz tea 0.36[d]
					12 lemons 0.30[a]		
					borax[a]		June (no day)
					crax (crackers?)[a]		8 oz vanilla 1.10[a]
					m stew 0.25[c]		pkg crax (crackers?)[a]
					loin v/ch 0.25[b]		dish-(illegible)[a]
4	**5**	**6**	**7**	**8**	**9**	**10**	1 d-(illegible)[b]
	coffee 0.10[d]	3 b-(illegible)ba-(illegible)[a]	1# coffee 0.40[d]	v stew 0.25[c]	1# cheese 0.10[a]		2 fly-[b]
	Ceylon tea 0.35[d]	4# rump roast beef 0.65[c]	2 butter 0.65[a]		1 bt ca (carrots?) 0.35[a]		wheat st-(straw? starch?)[b]
	sl steak 0.25[c]		2 bread 0.10[a]				durham[b]
	b-gd choc[a]		m steak 0.25[c]				3 carrots (?) 0.25[b]
	sm (loaf?soap?) 50c[a]						1-(illegible)-lace 0.25[f]
	2 bread 0.10[a]						3 yards lace 0.30[f]
	Royal 50[a]						6 yards lawn 0.90[f]
11	**12**	**13**	**14**	**15**	**16**	**17**	2 yards dimity 1.00[f]
	(?) 0.25	1 small leg mutton[b]	6 oz tobacco durham[a]	leg meat (or leg mutton) 0.65[b]	# 4 rump roast[b]		1--(illegible) 1.50[f]
		2 pillows 3.00[e]	package crackers 0.25[a]	loin mc (mutton chops?) 0.25[b]	2 bread 0.10[a]		1/2-(illegible) 1.05[f]
		1 big pitcher 1.10[e]	2 butter 0.65[a]				
		1 glass pitcher 0.40[e]	(2 receipts on 1 day)				6/7 or 6/17

continued on next page

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Undated
		4-r roast 0.55[c]					2 bread 0.10[a]
18	**19** (illegible)-0.10[a] (illegible)-1.00[a]	**20** #1 coffee 0.40[d]	**21** bread 0.10[a] shaker salt 0.15[a] 2 o (large "o") 0.25[b]	**22**	**23** 1 coffee 0.40[d] (illegible)[a]	**24**	2 e (?) milk 0.55[a] 2 butter 0.65[a] 6 durham[a]
25 chicken 0.85[b]	**26** veal chops 0.25[b] 2 bread 0.10[a] package crackers 0.35[a] #1 cheese[a] b (bakers?) gd choc 0.35[a]	**27** rump roast 0.40[b] (illegible) cut (illegible)[b] 2 leg meat (mutton?)[a] 2 bread 0.10[a] butter 0.65[a] 6 durham[a] matches 35[a] (2 receipts in 1 day for Pacific Grocery)	**28** oats 0.20[a]	**29**	**30**		

[a] Pacific Grocery.
[b] Washington Market.
[c] Fultons Market.
[d] Pagoda Tea and Coffee.
[e] (Illegible) Furniture Store.
[f] New York Store.

Figure 148. Mose Kelley, who resided at 48 E. Alameda Street between 1910 and 1912 and one of the many Kelley family receipts recovered from Cesspit 3040, Block 254, Lot 7.

the only item bought on a Sunday. It was clearly not customary for the Kelleys to shop on Sunday, and although this bird cost 85 cents, most other meat purchases ranged from 25 to 65 cents. This rather expensive item may have represented an important meal. No receipts were found for squabs or other small birds, but a few bones from wild birds (mourning dove, quail, and indeterminate Zenaida dove) were found in Stratum II. Bird shot was also recovered in Stratum II, providing good evidence that Kelley either hunted the birds or acquired them from someone who had hunted them.

The proportions of chicken, beef/veal, and sheep/goat suggested by the receipts were consistent with the faunal data. In some cases, the receipts provide complementary data, as with the very low proportions of chicken to beef/veal and sheep/goat bones. More pig bone was found than would be predicted based on the receipts, but it is important to remember that the receipts recorded only about a month of shopping. If the family tended to eat pork and ham in the winter (see Horowitz 2006 for a discussion of seasonality of fresh pork in some regions), then it would not have appeared in the receipts.

The receipts were surprising in the lack of evidence for fruit and vegetable purchases, perhaps suggesting the presence of a home garden. Strawberries were bought once, as were 12 lemons. A slightly hard-to-read undated receipt may have recorded 25 cents worth of carrots. Carrots grow well in Tucson during the winter, but a purchase in June would likely have been roots that had been harvested and stored or shipped from a cooler area. Lemons could easily have been grown locally. Strawberries are delicate and might have been difficult to ship. No newspaper advertisements for strawberries were found from 1911, but local Chinese gardeners grew and sold these fragile berries (Diehl et al. 1997). Oats were purchased at least once, and a wheat product of some kind was also bought—perhaps wheat straw or wheat starch.

The macrobotanical records supplemented the receipts and showed that the Kelley diet did not lack in vegetables as much as the receipts might suggest. Grapes, raspberries, figs, tomatillos, and cucurbits were found in varying amounts in Cesspit 3040. Corncobs showed that maize was consumed, either fresh as corn on or off the cob, or dried and shelled.

By combining the receipts, archival evidence, floral, and faunal data, we had the opportunity to partially recreate a snapshot or a moment in time in the life of one family. The Kelleys were not self-sufficient but may have grown fruits and vegetables at home. The receipts for vanilla and chocolate suggest that the Kelley household baked sweets, but not their daily bread. Kelley, or one of his friends or neighbors, hunted doves, but the main animal protein was beef and it was purchased at the Pacific Grocery, and to a lesser degree, other markets. Coffee was preferred over tea, and food purchases were made every day, probably a practical response to the heat of a Tucson summer.

Local Consumption

"Eating local," a popular phrase today, is simply a continuation of consumption patterns rooted in antiquity. Before the advent of rapid transportation, most food was consumed locally or was highly preserved. It was the railroad, and more recently air transportation, that has allowed consumption of fresh food from exotic locales or during off-season periods. Based on results of the archaeological excavations, residents of the project area likely ate very locally, as when they harvested berries, grew members of the cabbage family in their gardens, or when they removed eggs from under their backyard chickens. They ate locally, too, when sport hunters brought wild birds to their kitchens.

Plenty of vegetables were available in Tucson by 1911, and a number of products were shipped from the Phoenix area and Salt River valley, including eggs and beef. By the early twentieth century, advertisers found it worthwhile to proclaim the origins of their produce, meat, and eggs. Adams and Co. advertised that their eggs and mutton were local or semilocal, but that other goods came from elsewhere: "Mesa and Tempe guaranteed ranch eggs for 30 cents per dozen. Fresh from California cauliflower, lettuce, rhubarb, green peas, green chile, Colorado potatoes, Kansas City beef, spring chickens and hens, Phoenix mutton. All varieties of oranges, apples, and bananas" (*Arizona Daily Star*, 25 February 1911e:8).

By 1922, a Safford newspaper urged readers to "use Arizona Products" (*The Guardian Farmer,* 26 December 1922a:2). However, some resources, such as oysters, were brought from a much greater distance. Archaeological evidence, such as oyster shell and fish bones, suggests that neighborhood residents took advantage of the availability of imported foods. Overall, the use of local and nonlocal resources was variable and likely related to both cost and family preferences.

Faunal Remains, Economics, and Ethnic Identity in the Project Area

The topic of ethnicity and diet has been extensively explored in historical archaeology (e.g., Crader 1990; Landon 2005; Lev-Tov 2004; Otto 1984; Young 2001). The archaeozoology of ethnicity has, as Landon (2005:21) points out, been most successful when collections were derived from households of markedly different dietary traditions, as indicated by the documentary record. It has been less successful at separating the diets of people from similar identity groups, at least not without extensive recourse to the written record. In our analysis of the faunal collection from the Joint Courts Complex project area, we found that ethnic identity could not, with certainty, be discerned through a comparison of the bones recovered from the various lots. In fact, as was discussed previously, we found that combinations of macrobotanical remains actually seemed to provide better information about the ethnicity of some resident families. Furthermore, we found that even differences in socioeconomic status were not always clearly defined by the faunal analysis. Still, some results of the faunal analysis demanded additional discussion as they relate to questions of ethnicity and economics.

Although the neighborhood population was generally of Euroamerican background, there were also Hispanic landowners and residents. Comparisons were made between several well-documented households—the Brown, Steward, Finley, and Fairbanks families—and residents of several rental properties. The landowning families were all wealthy and prominent members of society in Tucson, and mainly of Euroamerican origin. Dolores Brown, wife of John Brown, was of Mexican origin. It is possible, however, that she was from an upper-class ranching family of the Sonora area (she was known by the titled name Doña

Lola), whose members differentiated themselves from lower-class Mexicans. The rental properties were occupied by middle-class and lower-middle-class/blue-collar tenants of both Euroamerican and Hispanic ancestry.

In terms of the frequencies of species present, all of the collections seemed to be quite similar. The principal meat, according to numbers of identified fragments, was beef, and the most common cuts were derived from the axial portion of the carcass. Even at the Steward household, despite the fact that bones from sheep and goats greatly outnumbered cattle bones, beef was still quite important. Still, the prominent role of sheep and goats in the family's meals was intriguing, especially as it was paralleled by the frequencies of sheep and goat remains associated with tenants living in the Block 255 rental homes (see Chapter 17, Volume 3 of this series). Most of the known tenants in this block were Euroamerican, but we were not able to compile a complete list of residents, and at least some of the known residents may have been of Mexican ancestry. It is not clear what the Stewards would have had in common with the Block 255 tenants other than they seemingly ate more mutton than their neighbors. Given the availability of beef, coupled with their widely divergent economic levels, the answer to the mutton question does not appear to have been socioeconomic in nature. Largely because of these two properties, the average contribution of mutton to the diet of project area residents, around 20 percent, was higher than at the Lewis-Weber site in Tucson (8 percent; Hamblin 1981) or the results from Heritage Square in Phoenix (12 percent; Waters et al. 1998).

Aside from these two properties, all the households' faunal collections looked quite similar both in rank order of animals consumed as well as the overall balance between wild and domesticated fauna. The presence of more species in the collections from the wealthier residents, which probably indicated the spoils of sport hunting, appeared to reflect class rather than ethnic identity.

We also investigated the range of meat cuts within the analyzed samples to see if they could provide information about either ethnicity or socioeconomic status. Despite the range of economic levels in the project area, differences in the relative abundance of the various meat cuts were not great. This is in contrast to Hamblin's (1981:284) findings at the site of an essentially contemporary Tucson butcher, where she noted that beef bones reflected a preponderance of lower-priced cuts as well as a large amount of what she considered scrap, suited at best for soups, stews, or the dishes of Mexicans who may have prepared their foods as domestic servants of the butcher's family. In contrast to the findings of Waters et al. (1998:198) at contemporary sites in Phoenix, the wealthy residents of the project area could not be separated from their neighbors based on their consumption of lower quantities of lower-priced meats. As well, our findings did not mimic those observed in Phoenix in the sense that upper-income families consumed higher proportions of more-expensive cuts. Only the Fairbanks family stood out in its strong preference for higher-priced steaks and roasts of both beef and mutton.

Jones (1997:495) suggested that butchering marks and general patterns of butchery could be used to identify certain ethnic groups in Tucson. In particular, he noted that bones representing low-cost meats bearing cleaver cuts, rather than saw cuts, could be expected at Chinese, Mexican, and Native American home sites, as those cuts were favored for certain of their dishes. By contrast, he stated that Euroamerican households would have used sawn cuts, but he concluded that the primary differences in butchering techniques was "based on the consumer's economic standing" (Jones 1997:497) more than on ethnicity. Cut marks are complicated though when part-time Euroamerican meat cutters are present in a community. One of the author's in-laws was a Nebraska butcher and among his tools was a large cleaver; knives and cleavers were also observed in use alongside saws at a Tucson-area commercial game processor (Griffitts, personal observation 1995). In the project area, cleaver and knife marks were rare, and cuts seemed to be largely standardized, in size and portion. This indicates that, at least for large domesticated mammals, meat was obtained from professional butchers.

Although pigs' feet are often associated with Mexican culinary traditions, a pattern called the "menudo complex" after Clonts' faunal reports from the early 1970s (Hamblin 1981:281–282), the fact is that a number of ethnic groups, including Euroamericans, consumed them during the residential period for the project area. The commonness of such dishes can be seen both from the distribution of pigs' foot bones in project area collections, as well as from period cookbooks. As discussed previously, elements of pigs' feet were found in many of the lot collections. Similarly, skeletal remains of other domesticated mammals also included foot bones. The presence or absence of animal foot bones appeared to be unrelated to either ethnicity or economic level. In fact, no household's faunal sample was without the foot bones of at least one domesticated mammal.

Calves' feet are used today in certain traditional Mexican dishes such as *Menudo estilo Norteño*, made with tripe, a calf's foot, and a variety of other ingredients (Kennedy 1972:59). The feet of pigs are used in some dishes such as *Fiambre Potosino*, a dish of cold meats in vinaigrette (Kennedy 1972:188–189), and it is likely that many such parts found in Tucson-area sites were used in Mexican dishes. However, cow and pig heads and feet were used by other groups as well. A publication from Salt Lake City used calf's head, including the skin, as the main ingredient for mock turtle soup (Ladies of St. Mark Guild 1909). Both honeycomb tripe and a calf's foot are required for a *Tripe à la mode de Caen*, a French soup, and a recipe for the Dutch *Hochepot* also contains pigs' feet, as well as ears, tails, veal, lamb or mutton, beef brisket, and sausage (Hériteau 1982:188, 208). The feet thicken stews and soups, making

broths more gelatinous. In period cookbooks, pigs' and calves' heads seemed to have been even more popular, used in such dishes as pig's head cheese or calves' head soup (Allen 1924; Farmer 1896). In short, although the feet and heads of both cows and pigs are found in Hispanic sites in the Southwest, they are also likely found in sites of other ethnicities. Many zooarchaeological reports from the region (e.g., Hamblin 1981:282) present the case that such cuts emanated from Mexican households where menudo would have been consumed, and certainly, given the traditional inclusion of such meats into Mexican cuisine, that orientation is quite warranted. At the same time, we should consider other possibilities. It is important to remember that Tucson's Euroamerican community around the turn of the twentieth century was likely far from standardized, and that the period saw a great deal of movement across the continent and between continents. We may be seeing traces of homeland foods for many first- or second-generation immigrants, or the movement of people from rural to urban settings, or from the South to the West.

Given the standardization of cuts and the meat portions selected by project area families, it is clear that these households chose both to participate in the then-recently industrialized national system of meatpacking and to adhere to contemporary standards of meat cut selection (and by extension, presumably, a certain repertoire of dishes). Although the meat that Tucson residents ate may have been locally obtained from area ranches, it was nonetheless butchered in a uniform style. McGuire (1982:165–166) argued that Euroamericans and Hispanics increased their social distance from one another over time, especially after 1880 with the arrival of the railroad. Although one would expect that Euroamerican settlers would choose to extend that separation to their choice of foods, period cookbooks and possibly the faunal remains from the project area suggest that a new hybridized cuisine was being developed quite early. In fact, as discussed previously, it was later, during the 1930s, that more evidence of separation was observed in period cookbooks.

Foodways Summary and Conclusions

By examining the faunal, botanical, and other evidence for foodways in the Joint Courts Complex project area, we sought to place food consumption in a broader context of life around the turn of the twentieth century. For instance, we not only examined the chicken bones, but we also looked at the cost of chicken, suggested cooking methods, and the availability of the birds in historical-era Tucson. We found that, although there were certain very broad similarities across the site, there were also differences. Overall, there were few differences that could be attributed solely to economics or ethnicity. The reasons for variation within the project area appeared to have been more complex. Low-cost meat cuts did not always correspond with low economic status, nor did they seem to correlate with any particular ethnicity.

Beef made up the primary animal protein across the area. This came as little surprise and was in line with observations at other comparably aged sites in southern Arizona. Mutton and lamb bones were the next most frequent, a finding also comparable with other sites. But, very little pork, at least pork on the bone, was consumed, and its distribution across the project area was uneven. Some households consumed little or no pork on the bone, and others purchased larger quantities. The Brown household, for example, appears to have relied very little on pig meat, but the Brown's daughter's household consumed more. Perhaps this was a generational difference.

Faunal bone vastly outweighed the macrobotanical evidence, and it is likely that this resulted in an overemphasis on meat in our interpretations. Unfortunately, most vegetables leave less-durable traces, and without extraordinary evidence, as was found in the receipts recovered from Cesspit 3040, we simply cannot reconstruct as much of the non-meat diet. Nor can we usually identify meats or meat products sold off the bone, such as the dried beef sold by the glass.

Faunal remains alone are not terribly informative when used to trace the development of southwestern cuisine. By the late nineteenth and early twentieth centuries, most Tucsonans relied on four basic animal taxa: cattle, sheep, pigs, and chickens, supplemented with seafood, ducks, turkeys, and wild taxa. Some researchers postulate that differences in the proportions of these taxa may correspond with ethnicity. We suggest that when examining the growth of the regional cuisine, we must look outside faunal remains. It is likely there is no single "silver bullet" food trace that will identify Mexican or Mexican-influenced food. Instead, perhaps we should look for certain foods in combination, perhaps tomatillos and chilies/peppers, or perhaps future research will discover other combinations that will be more useful.

When reading *The Mission Cook Book* (St. Ann's Society 1909), one is struck by the internationality of the cooking suggested by the recipe collection. The food ranged from Sonoran to German cuisine and even included a sprinkling of recipes from the East Indies and Japan. There was a Chinese-run restaurant in Tucson by 1876 (Thiel 1997), and by 1920, the Tucson city directory listed a range of restaurants, including Chinese (some with names in English, others in Chinese), Mexican, southwestern chile, and kosher, although German restaurants were interestingly absent in this post-World War I document. In contrast, the 1938 *Trinity Circle Cook Book* (Women of Trinity Presbyterian Church 1938) presented recipes that were much more conservative. Mexican-influenced recipes were confined to a section on Mexican and southwestern cooking, and even this section included very few chilies.

Health and Sanitation

Postcemetery residential occupants participated in common American health and hygiene trends of the time. This was evidenced by the numerous personal cleanliness and grooming artifacts and medicine bottles and paraphernalia recovered from the project area. Through an analysis of the artifacts, historical documents, and the archival record, we were able to illumine the health practices of the neighborhood residents. We also found evidence of the shift from household to public sanitation, and the adaptations that individual families made as notions of sanitation changed around the turn of the twentieth century.

Personal Hygiene

Cleanliness was one of many Victorian virtues that included hard work, thrift, self-reliance, self-respect, neighborliness, and patriotism (Himmelfarb 1995:5). To be clean was to be presentable, and to be presentable was not just a goal but a requirement among most classes. A variety of artifacts, including combs, toothbrushes, and perfume bottles, were found in the project area that corresponded to Victorian-era values of cleanliness and appearance. Of particular interest were douche-related items and razors. Researchers have hypothesized that these artifacts can be used to shed light on residents' expressions of identity in terms of gender and/or sex, ethnicity, status, and class (Morton 2010).

Douche fountain nozzles are the best indication of who, in terms of sex/gender, was using this type of equipment, although it should not be assumed that a specific type of syringe was employed exclusively by men or women. Availability and appearance may have played a role in the purchase of such goods. Douche fountain nozzles for vaginal, urethral, and rectal use were sold in local drugstores and mail-order catalogs, usually in sets with tubing and a bag (Sears, Roebuck, and Company 1906, 1927). Most sets included all three types of nozzle.

As indicated by the artifact collection, the practice of douching played an important role in the hygienic lives of men and women in the project area. Douche-related items, including fountain syringe nozzles and tubing, accounted for 55 percent (n = 166) of the total hygiene artifacts found. Most of the fountain syringes were for vaginal use, although urethral and rectal syringes were also recovered. Not surprisingly, the majority of douche-related items came from cesspit and privy pit contexts. Considering that douching is a private task performed in such places, this was not an unexpected discovery. Cesspit 3040 in Block 254, Lot 7 (see Chapter 16, Volume 3 of this series) yielded over half of the douche-related items from the project area. Later residents used these items more frequently than earlier occupants, as most of the douche-related items came from upper stratigraphic layers.

Among the douche-related items from Cesspit 3040 were three fountain syringe nozzles (two vaginal and one urethral) from Stratum II; no one particular household could be attributed to this stratum. The known occupants who used this cesspit ranged from a prominent wealthy gambler and saloon keeper turned restaurateur, a bank teller, a Southern Pacific Railroad switchman, a cashier, a clerk, a truck driver, a boardinghouse manager, and a former Tucson mayor. Although the known occupants were mostly men, who could have used the urethral nozzle, it is assumed that their female family members used the vaginal nozzles. A look at other contexts with fountain nozzles suggested their use by a range of men and women representing the lower-middle to upper-middle classes, with both Euroamerican and Hispanic heritage.

Douching requires some form of liquid, either water or a prepared solution, to be introduced internally. A complete cylindrical bottle of hydrogen peroxide was recovered from Level 2 of Cesspit 3042 in Block 254, Lot 6. According to its paper label, the "peroxide of hydrogen" was produced by French chemist Charles Marchand. Marchand published a guide to the many uses of hydrogen peroxide, including a douching solution of "1 to 4 ounces of Marchand's Peroxide of Hydrogen (medicinal) with 1 pint of lukewarm water . . . By means of either a glass or hard rubber syringe" for women's weaknesses (Marchand 1895:60). Marchand claimed that douching could treat gonorrhea, cystitis, and ulceration of the rectum. Douche-related items, including one vaginal fountain nozzle, were recovered from within the same pit and stratum as the hydrogen peroxide bottle, suggesting that, among other home-care applications, a resident may have used "peroxide of hydrogen" as a douching solution. Based on the level in which these articles were found, and the relationship between Cesspits 3040 and 3042 (there was a tunnel linking the two), it is possible that these artifacts may have been deposited by a member of the Fairbanks family.

In this neighborhood, douching was a practice that crossed not just sex/gender boundaries but ethnic and class lines as well. Artifacts associated with douching were found in contexts related to households of Euroamericans and Hispanics and having varied economic means, indicating a general acceptance of the practice during the turn of the twentieth century.

Around the same time that germ theory and heightened personal hygiene were being promoted, at the turn of the twentieth century, trends in men's facial hair began to reflect similar ideas. More and more men were minimizing the amount of facial hair they wore. As will be discussed below, the decline in facial hair among early-twentieth-century American males also reflected changing social attitudes about masculinity.

Shaving razors provided another example of this ethnically and economically mixed neighborhood participating

in Victorian goals of cleanliness. The majority of razors observed were safety razors and most were recovered from the lower stratigraphic levels of cesspits. This suggests that early male residents were more likely to have used razors than later male residents. Cesspit 3042 produced the majority of razors in the collection. At least three households of Euroamerican ethnicity (the Fairbanks, Mahoney, and Willis families) contributed to the trash in this pit and each of these were middle- to high-income earners.

Although razors were the least prevalent grooming and hygiene artifact (n = 12) in the collection, the act of shaving seems to have been an important part of the male residents' hidden reflexive identity with regard to cleanliness and masculinity. Although the popularity of shaving among women increased during the decades following the residential period of the project area, it is unlikely that razors from this neighborhood were used by women. All of the recovered razors were characteristic of those advertised for men in mail-order catalogs like Sears, Roebuck, and Company (1906) and Butler's Brothers (Butler's Brothers 1921). Research in Sears, Roebuck catalogs from 1920 to 1930 revealed that women's razors were first available in 1927 (Sears, Roebuck, and Company 1927:367, 522). Women's razors between 1927 and 1930 were advertised specifically with underarm shaving in mind as the razor head was curved rather than straight (Sears, Roebuck, and Company, 1927, Spring-Fall 1928/Spring 1929, Fall 1929/Spring 1930). It is acknowledged that women in the project area may have taken advantage of their male relatives' razors or simply purchased men's safety razors for their own use. However, without more substantial evidence for female shaving, the razors observed in the collection were assumed to have belonged to male residents.

Historical photographs of male residents in the project area (see Figures 35, 42–44, 79, 83, 86, and 112 in Volume 3 of this series) show that most sported a mustache while others were clean shaven. Both looks would have required use of a razor. Resident Fred Steward was mustached both as a young man in his twenties in the early 1900s (Figure 149) and in his later years as a bank president (Figure 150), although his later mustache was more heavily trimmed. A mustache mug (Figure 151) was recovered from contexts attributed to Steward's earlier years.

The mug itself is an interesting representation of masculinity in early-twentieth-century America, because such delicate and decorative objects are not typically associated with men. The nineteenth-century beard movement reflected American society's association of facial hair with manliness, specifically the societal value of man as the family patriarch. Indeed, Presidents Abraham Lincoln, Ulysses Grant, Rutherford Hayes, and James Garfield each sported facial hair and likely furthered the association of manliness with beards. Reynolds (1949:8) defined historical attitudes regarding beards as an "aggressive portent of male domination." Posing the question, "Did our Victorian forefathers trouble their minds over Women's Rights," Reynolds replied "They did not. Their beards were answer to all such flapdoodle and finookery . . . M.Voltaire . . .could say that ideas are like beards: children and women never have them." As the twentieth century approached, younger generations of men discarded the bearded patriarchal image for what historians (Tosh 2005, Oldstone-Moore 2010)

Figure 149. Fred Steward (*far left*), his uncle Henry (*center*), and an unidentified man (*far right*) (photograph courtesy of the Arizona Historical Society, Tucson, Accession No. 22152).

Figure 150. Fred Steward (photograph courtesy of the Arizona Historical Society, Tucson, Accession No. 22152).

have called "a retreat from domesticity," by wearing a mustache, goatee, or no facial hair at all. This "retreat" is visible in the photograph of Steward as compared to his uncle Henry.

Attitudes towards the mustache have changed over time. In light of some religious and political taboos, it is a wonder the mustache was ever popular at all. At one time, mustaches were prohibited by the Roman Catholic Church, which considered the mustache sinful and a violation of the Eucharist if worn by priests, and by Protestants during the nineteenth century who referred to them as the "mark of the beast" (Reynolds 1949:126, 120). They were banned from the British Navy by Queen Victoria's government. Oldstone-Moore (2010) suggested that the shift from beards to mustaches and no facial hair had roots in a newly emerging masculinity, which emphasized a sense of belonging rather than individualism. In early-twentieth-century America, more and more men were enjoying increased opportunity in work, education, and leisure. Hence, more men were identifying themselves with their coworkers, schoolmates, sports teams, and youth groups. Oldstone-Moore (2010) provided an excellent example of the clean-shaven man— a conductor for the Burlington Railroad company. Burlington conductors were required by the company to have no facial hair so they were "less likely to spread germs and contagion" and provide a sense of tidiness. Perhaps male residents of the project area who worked for the Southern Pacific Railroad, like Daniel Mahoney (see Chapter 16, Volume 3 of this series) were also clean shaven, and for similar reasons.

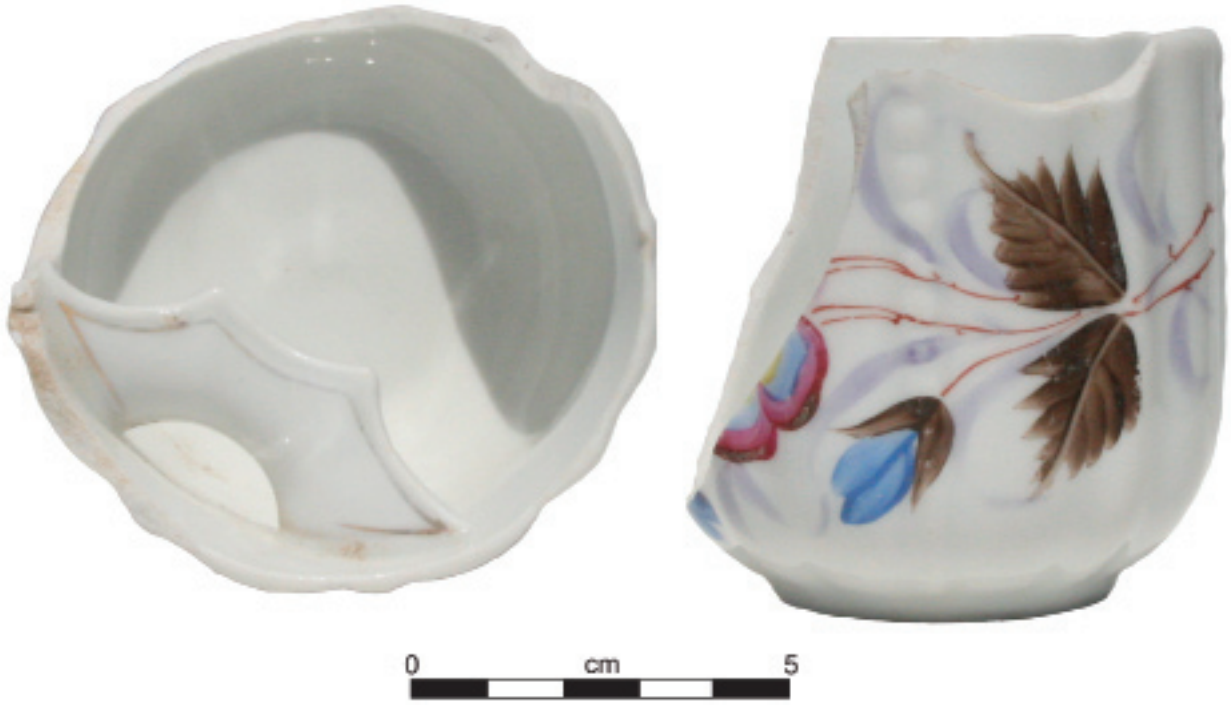

Figure 151. Mustache mug belonging to Fred Steward (Inventory No. 080006343).

Soon after the turn of the twentieth century, facial hair of any kind fell out of favor as changing concepts of personal hygiene and public sanitation developed. A prevailing sentiment was that it was important to be clean for the sake of one's health, but also for pride, respect, virtue, nationalism, and moral superiority. The advancement of germ theory in particular aided the social trend of the clean-shaven face. In fact, newspapers and magazines of the period reported a connection between germs and facial hair (Bowers 1916; *The New York Times* 1909).

Other personal hygiene articles were recovered from across the project area and are more fully described in Volume 3. These included dressing combs and nit/lice combs, toothbrushes, tooth powder and toothpaste containers, and shampoo and hair tonic bottles.

Medicines and Medical Paraphernalia

As reported in Volume 3, a variety of medicine containers and health-related artifacts were recovered from features across the project area. Our investigations allowed a glimpse into the types of medicines used by project area residents, and the ailments from which they suffered. Archival evidence and parasite analyses provided additional information in this regard.

Not surprisingly, the majority of the roughly 800 medicine containers recovered from postcemetery residential contexts contained proprietary/patent medicines (98 percent, n = 799). Across early-twentieth-century America, proprietary/patent medicines were more widely available and familiar to consumers than were prescription medicines (Dary 2008; Fike 2006; Sears, Roebuck, and Company 1897, 1902, 1906). Even individuals who lacked access to primary health care could obtain proprietary medicines through mail order or from travelling salesmen. The radical healing claims promoted for these concoctions meant that one could usually find one's ailments among those a drug was supposed to treat (Hilton 1975). Their prevalence also may have reflected a general distrust of formally trained doctors (Hilton 1975). Only a small proportion (2 percent, n = 17) of the medicine bottles recovered from the Joint Courts Complex project area were produced for professional, mostly local, pharmacists. It should be noted, however, that bottle reuse may have resulted in underrepresentation of locally prepared and bottled drugs. The assemblage from Cesspit 3040 (Block 254, Lot 7) contained a Welch's grape juice bottle that had been repurposed to hold castor oil. The presence of both mass-produced and locally formulated medicines indicated that residents of the project area not only had access, and therefore choice between the two, but were also participating in larger American health trends of the period.

Prescription bottles were found that could be tied to local druggists, as well as to druggists as far away as New York. Amongst the local collection were the remains of four bottles from the local Arcadian Pharmacy (1897–1907), and three bottles from the Fleishman Drug Store. Fred Fleishman participated in the original sale of lots in the project area but never developed his property, which he sold to John Brown (see Chapter 9, Volume 3 of this series). Fleishman's Drug Store opened at 179 W. Congress Street in the 1880s, but moved to 21 E. Congress in 1901 (*Tucson Citizen*, 25 September 1924), where it operated until 1935. Fleishman served as a president of the Arizona State Board of Pharmacy (Figure 152).

Common proprietary and patent medicines recovered from the project area included Pitcher's Castoria, Bromo-Seltzer, Vaseline, California Fig Syrup, and Dr. King's New Discovery. Identification of ailments that might have been suffered by project area residents on the basis of medicine bottles in the collection (particularly proprietary and patent medicines) is difficult to accomplish, as their contents were typically advertised to treat a multitude of complaints. Nevertheless, the following ailments were suggested by the remedies: gastrointestinal, respiratory, kidney (including bladder/liver/blood/venereal), eye, neurological, endocrine, skin, headache/pain, "female complaints," and catarrh. Medicines used in the project area to treat gastrointestinal ailments (such as indigestion, heartburn, diarrhea, constipation, and flatulence) included Pepto-Magnan, California Fig Syrup, Bromo-Seltzer, and Eno's Fruit Salt.

The large numbers of medicine containers indicating respiratory treatments were represented by Mentholatum and Vick's VapoRub jars, and bottles of Dr. King's New Discovery and Ayer's Cherry Pectoral among others. It is not surprising that respiratory maladies were commonly treated in this early-twentieth-century Tucson neighborhood because, even before the neighborhood was developed, Arizona was a leading destination for patients with lung diseases such as tuberculosis (TB) (also referred to as consumption), and later they were joined by World War I veterans suffering from exposure to mustard gas (Jackson 1999:17; Stein 1988:7). The Arizona climate was thought to provide relief and possibly even a cure, and doctors across the nation recommended that "lungers," as the unfortunate sufferers were commonly known, relocate to take advantage of the dry, desert air. In a letter to R. H. Evans in the late 1890s, Mark Rodgers hailed Tucson for the consumptive patient, claiming many "undoubted recoveries" from the disease (Rodgers 1896). The reality of the situation, however, was a medical nightmare for the state of Arizona. Early reports indicated that TB was the leading medical concern for the State Board of Health as late as the 1920s and a leading cause of death as late as the 1930s (State of Arizona 1914a, 1918, 1920, 1924, 1926, 1928, 1930, 1932). Out of nearly 800 deaths from the disease in 1913, over 500 were cases that had been contracted out of state. This in turn posed a serious threat to the preexisting

Figure 152. Medicine bottle for Fred Fleishman, local pharmacist, from Block 252, Lot 13, Privy Pit 650 (Inventory No. 080000FF8).

population, as, even discounting the out-of-state cases, TB was rated among the top three causes of death. According to a 1920 State Board of Health survey, 60 percent of all TB cases in Tucson went undiagnosed, and that 40 percent of TB sufferers, even if they knew they had the disease, made no effort to avoid infecting others. Additionally, health inspections found that four restaurants and five soda-fountains employed people with active cases of TB.

At least one study (Grineski et al. 2006) has shown that TB played a considerable role in early-twentieth-century urban development and consequently contributed to class and racial discrimination. Grineski et al. (2006) found that population growth in Phoenix at the turn of the twentieth century largely consisted of health seekers of varying ethnicities and classes. They also observed that social attitudes developed around classes with TB: "A sociospatial 'sorting' began taking place in the city, as poor 'unproductive' migrants with TB were stigmatized and excluded, while the wealthy 'productive' healthseekers were integrated and seen as economically and culturally advantageous by Phoenix growth advocates" (Grineski et al. 2006:604).

The sorting was partly fueled by an assumption among city officials that wealthy Euroamericans with TB were educated about their disease and its risks and therefore would not infect others (Waslif 1996), whereas the infected poor—generally minorities—were ignorant of the risks or even careless regarding contagion. As a result, unwanted health seekers, specifically poor minorities, were segregated to the city outskirts to live in slums and tent camps. It may be safe to propose that similar socio-spatial sorting took place in Tucson with regard to those seeking relief from health problems.

Some project-area occupants came to Arizona as health seekers and some may have contracted respiratory diseases while living in the state. It is known that Fred Steward, who was born in Ohio, came to Arizona in 1895 at the age of 22 because of unspecified failing health. His uncle Henry, with whom he initially resided, died in 1901, and his death certificate was specific in stating that he died from heart disease and not from contagion. This hints at the possibility that Steward may have been suffering from TB. However, Steward survived his early ill health and died in 1961. In 1918, wife Amelia was on the board of directors of the St. Luke's in the Desert Sanitarium, which was devoted to the treatment of TB. Steward's business partner, Nathaniel Plumer, is also known to have emigrated to Arizona for health reasons; he died in 1917. The owner of an early plumbing-and-heating business in the project area, Frank Craycroft, who arrived in Arizona in 1904 from Kentucky, died of TB in 1929 (*Arizona Daily Star*, 10 May 1929b) (see Chapter 9, Volume 3 of this series). John

Swain Ayers and R. H. Swain resided in the project area in 1928. Ayers had at least two adult children who died of TB, one in 1928, and the other 10 years later. Annabella Snyder lived in the project area in 1919; her son died of TB at the Maricopa Sanitarium in 1913. Additional examples can be found in Table 44.

How many sanitariums were in Tucson? We know that the Fort Lowell officers' quarters and their kitchens, about 8 miles from the project area, were used as a sanitarium from 1900 to 1934 (Arizona Tourism 2005–2009). Called the "Isolation Cottage," Saint Mary's Hospital, roughly 2 miles from the project area, built a separate sanitarium annex sometime between 1893 and 1900 (Bryne and Cammack n.d.). There was even a sanitarium in the project area; in 1926, Mary Norris converted the former Brown family home at 270 N. Stone into a sanitarium (see Chapter 9, Volume 3 of this series). Unfortunately, no artifactual evidence could be attributed to the home during its short-lived term as a sanitarium.

Two containers were recovered that actually still held medicinal contents; both were subjected to mass spectrometry analysis in an attempt to determine their therapeutic purpose. A bottle contained a liquid that could have been used either internally or as a topical liniment (see Chapter 14, Volume 3 of this series). The active ingredients were identified as camphor, phenol, and palmitic acid, and the medicine could have been used as an antibacterial or an antiseptic. A bottle containing around 30 blue pills was recovered from Block 254, Lot 6 (see Chapter 16, Volume 3 of this series) (Figure 153). Unfortunately, over 500 compounds were identified during analysis, so the pharmacological purpose for these pills was unidentified. Finally, medical paraphernalia consisting of fragments of ampoules, hypodermic syringes, iodine droppers, dose cups, eyedroppers, and thermometers were found across the project area.

A review of features yielding both medicine bottles with identifiable ailments and hygiene artifacts revealed that residents with health concerns from minor skin irritations to major maladies like typhoid and TB were also concerned for their own cleanliness. It is difficult to say if people thought that personal hygiene practices would aid their health concerns or problems but it is a viable connection. Keeping clean would undoubtedly have helped to prevent worsening of internal or external infections.

Medicinal Plant Use

Several of the identified plants from project area excavations potentially had medicinal use in addition to their culinary or decorative value, but it was very difficult, if not

Figure 153. Rectangular medicine bottle with pills from Block 254, Lot 6, Cesspit 3042 (Inventory No. 08000308F).

Table 44. Mortality Table for Project Area Residents

Resident	Birth Record	Death Record	Comments	Reference	Cause as Written on Death Certificate
Avina, Baby Solomon	1933	1935	Infant son of Solomon Avina.	ASBH BVS 1935a	Streptococous empy (illegible) and pneumonia. Bronch. (bronchial pneumonia?).
Ayers, J. Swain	1880	1945	John Swain Ayers, divorced, realtor at time of death.	ASBH BVS 1945	Coronary thrombosis.
Ayers, R. H.	1908	1928	Ralph H. Ayers, Son of John Swain Ayers and Mary Baker.	ASBH BVS 1928	Laryngeal and pulmonary tuberculosis.
Ayers, Ruth	1913	1938	Daughter of John Swain Ayers and Mary Baker.	ASBH BVS 1938	Pulmonary tuberculosis.
Belton, R. E. (Richard Edward)	1872	1936		ASBH BVS 1936a	Duodenal ulcer with perforation.
Bravo, Alejandro R.	1875	1940		ASBH BVS 1940a	Diabetes and inflammation of the pancreas.
Brown, John N.	1843	1914		ASBH BVS 1914a	Acute entero (?) colitis.
Brown, Dolores Ybarra	1850	1930		ASBH BVS 1930	Aeortic regurgitation.
Breathitt, John B.	1844	1923		ASBH BVS 1923a	Cardial-vascular-renal.
Breathitt, Mary Downing	1864	1953		ASDH DVS 1953a	Multiple cerebral thromboses.
Craycroft, Frank	1872	1929		ASBH BVS 1929a	Pulmonary hemorrhage, tuberculosis.
Clyne, John	1913	1925	Son of Mead Clyne.	ASBH BVS 1925	Typhoid.
Colglazier, Edgar M.	1870	1853		ASDH DVS 1853b	Cancerous prostate with car-(illegible)-sis, arterioscleroses, mild (illegible).
Coury, Mansour	1862	1922	Lived at 208 Stone w/ other Corey and Mabarak family members.	ASBH BVS 1922a	Carcinoma stomach.
Duell, Mrs. Nancy A.	1873	1954	Nancy Ann Duell, widowed.	ASDH DVS 1954a	Bronchopneumonia, (illegible) thrombosis, arterio (illegible).
Duncan, Mrs. Ada L.	1870	1948	Adah Lee Duncan, divorced.	ASDH DVS 1948	Myocardial failure, arterioscrotic heart disease.
Elin, Errol F.	1903	1956	Errol Frank Elin, usual residence Long Beach, California, died in Tucson.	ASDH DVS 1956	Pulmonary tuberculosis.
Escobosa, Roberto	1883	1938		ASBH BVS 1938	"Natural causes probably myocardiac, was taking heart drops."
Ewing, Ernest J.	1878	1945		ASDH DVS 1901	Coronary—usion, hypertension.
Fairbanks, Benjamin D.	1839	1901		Count of Pima, Territory of Arizona 1901	Fracture base of skull.

continued on next page

Resident	Birth Record	Death Record	Comments	Reference	Cause as Written on Death Certificate
Fuller, Webster M.	1871	1946		ASDH DVS 1946	Aortic aneurysm.
Franks, Robert Lee	1885	1949	Conductor.	ASDH DVS 1949	Heart disease, generalized arteriosclerosis, S.P. Sanatorium.
Goldsmith, Ben	1865	1935	Merchant.	ASBH BVS 1935b	Hit by a boy on a bicycle on a public street, fell down and hit head, fractured skull.
Guist, Mrs. Ida/ Sines, Mrs Ida M.	1874	1931	Ida M. Guist, wife of Grant E Guist—crossed out and Sines added.	ASBH BVS 1931	Brain abscess, left parietal region.
Johnson, Roy J.	1906	1952		ASDH DVS 1952	Auto-Truck collision Highway 60-70, passing through Quartzite, Yuma County, head mutilated.
Kelley, Mose	1879	1914		ASBH BVS 1914b	Apoplexy.
Kelley, Neva Stone	1882	1954		ASDH DVS 1954b	Coronary occlusion, 1 hour, St Mary's Hospital.
Harding, Mrs. Lorena G.	1865	1934	No Lorena G. found but Lorena F. died in Tucson in 1934, widow of Charles Harding.	ASBH BVS 1934	Uterine cancer.
Hartin, James F.	1885	1950	J.F. Hartin, Arkansas.	ASDH DVS 1950	Pulmonary tuberculosis.
Holloway, George	ca. 1879	1922		ASBH BVS 1922b	Haemoragic smallpox.
Hendry, Kenneth Seaton	1906	1911		ATBH BVS 1911	Extensive burns of the body.
Hubbard, Henry M.	1890	1940	Henry Middlebrook Hubbard, truck driver, divorced from Florence Hubbard.	ASBH BVS 1940b	Cardiac failure, Coronary sclerosis and something, marked? masked? arteriosclerosis, advanced nephrosclerosis.
Jaus, Walter M.	1930	1939	Listed as retired, but only 38 years old.	ASBH BVS 1939a	Pulmonary hemorrhage, pneumonia, bronchitis.
Lohse male	1912	1912		ATBH BVS 1912	Stillborn.
Leonard, Mrs. C. L.		1958	Clara L. Leonard, Maricopa County, widowed, hotel owner.	ASDH DVS 1958a	Bronchial pneumonia.
Mahoney, Daniel R.	1863	1929		ASBH BVS 1929b	Myocardiac failure, occurred at Wilson House, Yuma, AZ.
Mahoney, Margaret		1944a		ASDH DVS 1944	Senile dementia.
Marney, Joseph F.	1884	1957		ASDH DVS 1957	Coronary occlusion, hypertensive arterio-sclerotic hear disease, compressive fracture of vertebrae.
Mabarak, Marta	1923	1923	Lived 1 month, pneumonia.	ASBH BVS 1923b	Pneumonia.

Resident	Birth Record	Death Record	Comments	Reference	Cause as Written on Death Certificate
Martinez, Mrs. Maria S.	ca 1857	1937	Widowed Maria Martinez, So Meyer St, born San Miguel Mexico, White.	ASBH BVS 1937	Natural causes, sudden death had right side crushed paralysis 17 years (illegible) broken, (illegible),acute cerebral hemorrhage.
Meyer, Adolph	1862	1910	Yuma, had been in Yuma 3 days at time of death, regular residence Tucson.	ATBH BVS 1910	Tuberculosis and (illegible) throat, contracted in California.
Oviedo, Felix D.	1890	1936		ASBH BVS 1936b	Bronchial pneumonia.
Price, Frederick E.	1885	1958	Frederick Everett Price, married, wife J. Elizabeth Price.	ASDH DVS 1958b	Hypertensive heart disease, generalized arteriosclerosis.
Pyatt, Richard L.	1867	1933		ASBH BVS 1933a	Fibroid tuberculosis.
Rasmessen, Mary Osgood	1877	1940		ASBH BVS 1940c	Surgical shock, U--?-io-Hydro-nephrosis, nephrestomy?
Sanchez, Prudencio	1853	1944b	Widowed, wife Carmon.	ASDH DVS 1944	Hypertensive heart disease and artior-sclerosis.
Slaughter, John T. Jr.	1895	1933	John Terrel Slaughter, in state 10 years.	ASBH BVS 1933b	Acute myocardial disease, bronchial asthma.
Snyder, Mrs. S. Annabelle: Annabelle Snyder's husband, Sheldon Snyder	1896	1913		ASBH 1913	Pulmonary tuberculosis.
Shibell, Charles	1841	1908		County of Pima, Territory of Arizona 1908	Dengue fever and (illegible).
Snyder, Oakley A.	1893	1922		ASBH BVS 1922c	Concussion of brain, received in auto wreck, accidental.
Tanner, Mrs. Fannie	1865	1946	Divorced from Breckenridge C. Layne, Mrs. L.A. Gotto was the informant on death certificate, lived at the same address as Mrs. Tanner, Lorenzo A. Gotto lived in the same rooming house in the project area as Mrs. Tanner.	ASBH BVS 1946	Ch. myre(illegible) dites and hypertension.
Towne, Mrs. Alice: Charles Arnett Towne	1858	1928	Alice Towne 's husband, lawyer.	ASBH BVS 1928	Lobar pneumonia of lower left lung, asthma.
Wharton, Maude: Fred Wharton	1856	1924	Mrs Maude P Wharton's husband, Fred Wharton.	ASBH 1924	Septicemia from an abscess tooth.
Wills, Thomas N.	1866	1940		ASBH 1940	Coronary thrombosis, hypertension, duration = 1 hour.

Note: ASBH = Arizona State Board of Health; ASBH BVS = Arizona State Board of Health, Bureau of Vital Statistics; ASDH DVS = Arizona State Division of Health, Division of Vital Statistics; ATBH BVS = Arizona Territorial Board of Health, Bureau of Vital Statistics.

impossible, to separate their various uses. For example, pollen from roses or members of the rose family was found in eight features. We usually think of roses as fragrant ornamentals, but petals, roots, and hips have been used for various medicinal and cosmetic purposes. Rose hips are high in vitamin C (Kowalchick and Hylton 1987), and rose petals were added to medicines to make them more palatable in the early twentieth century (Grieve 1971:688). This garden flower traditionally has been used to treat TB, diarrhea, hemorrhage, pulmonary catarrh, and other ailments (Physicians Desk Reference 2004:689).

Elderberry seeds were found on Block 252, Lots 2, 6, and 10, and Block 255, Lot 1. The unripe berries, leaves, stems, and roots are toxic, but the flowers and berries have a variety of medicinal uses (Kowalchick and Hylton 1987). Today, elderberries are included in cough drops and medicinal teas, and in the past, the flowers were used in teas and topical treatments to treat a variety of ailments, including sore throats, diabetes, scarlet fever, measles, tumors, syphilis, constipation, diarrhea, and eczema (Grieve 1971). Elderberry wine was used medicinally for influenza (Grieve 1971), and clinical studies have found that that elder has some effect in decreasing duration of fever and flu. Although many of the traditional uses emphasized the respiratory tract, the plant has also been used to treat gastrointestinal ailments. Elderberry has been found to inhibit *Salmonella typhi* (the typhoid-causing bacterium) and *Shigella dysenteriae* (another diarrhea-causing bacterium that spreads in contaminated food and water), but not *Escherichia coli* and *Salmonella enteridis* (PDR 2004:298). Unfortunately, it also has a variety of potentially serious adverse side effects.

Raspberry seeds recovered in the project area certainly represented remains of the sweet fruit, but raspberry leaf has high tannin content and astringent properties. Raspberry tea was used to treat diarrhea (Grieve 1971). It is a smooth-muscle stimulant and is traditionally used for "female trouble," to reduce or initiate uterine contractions, or to purify blood (PDR 2004:676).

Figs are eaten as fruit, but they also can have a laxative effect and were sold in concentrated form for that purpose. In addition to their use as laxatives, figs or other parts of the fig tree were employed in treating dental abscesses, removing warts, and treating catarrh (Grieve 1971). Several "California Fig Syrup" bottles were recovered from the project area.

Hot chilies also have medicinal uses. Cayenne was used in the early twentieth century to relieve chronic congestion (Grieve 1971). Chilies continue to be used medicinally—when an employee of a Mexican restaurant in Colorado arrived at work with a respiratory ailment in the 1970s, that employee was given a shot of tequila with honey and a bowl of extremely hot yellow chile. The tequila and honey were supposed to soothe the throat, and the chile was intended to cause the person to sweat out what ailed them (J. Griffitts, personal communication 2010).

Household and Public Sanitation

Historical archaeologists have long understood that the interpretation of privies and other subsurface sewage-disposal features is central to an archaeological understanding of lifeways. Behaviors associated with their use and abandonment provide insight into diet, disease, and trash disposal practices of site occupants, and, by extension, can shed light on material culture, lifestyles, and socioeconomic status. Six privy pits and seven cesspits were excavated in the Joint Courts Complex project area. A thorough discussion of the characteristics of the two types of features, their history in Tucson, and a comparative look at the excavation of such features in Tucson is included in Chapter 3, Volume 3 of this series. For the purposes of this project, we differentiated between privy pits and cesspits based on the presence of pipes which transported effluent from water closets into the latter. Septic tanks, which were absent in the project area, would have been characterized by additional pipes running from the tank to the leach field. It is probable that some of the cesspits identified for the project area began as privy pits, but their repurposing led to changes in disposal patterns that required them to be classified differently (see Ogle 1996 for a discussion of sanitary adaptations to changing technologies).

Although some historians (e.g., Ogle 1996) argue that changing social values sped the development of public sanitation systems, others (e.g., Melosi 1980, 1981, 2000; Tarr 1984) have linked the development of utilities such as water and sewer to concerns about clean water and increasing volumes of human waste. In particular, Melosi's (2000) *The Sanitary City: Urban Infrastructure in America from Colonial Times to the Present* provides an excellent overview of the development of modern urban sanitary systems from a health perspective. According to Tarr (1996:181–183) and Melosi (2000:110), by 1880 about one-quarter of urban households nationwide had abandoned their wells, privies, and cesspools for piped water and flush toilets. However, it should be noted that development of urban sanitary systems occurred later in the West than in the East.

Tucson, for its own part, mirrored in many ways sanitation developments in other parts of the country. Similar to other early attempts at the sanitary control of human waste, most early Tucson ordinances on the subject appeared to revolve around the elimination of nuisances (City of Tucson 1926). It was the prevention of conditions that were "offensive to the public, or to any person" (City of Tucson 1910: Ordinance 211), rather than contamination of water or the spread of bacteria that drove the development of Tucson's sanitation system. In 1915, Alfred Micotti decried the storage of human waste near an economically impoverished Mexican-American neighborhood. He lamented that waste was allowed to accumulate in piles 4–6 feet high less than 100 feet from the neighborhood (Micotti

1915:7), which was located near the city farm. Thus, it appears that much of the impetus for municipal sanitation came from aesthetic concerns that could be ignored in less affluent parts of town.

Other measures adopted by the City also seemed to reflect a desire to remove unpleasant sights and odors from observation, with the assumption that this would achieve sanitation and prevent disease. The wording of ordinances is often key to understanding the motivations behind them. An 1877 ordinance, for example, banned the slaughtering of animals within city limits, and the keeping of hog pens that were "offensive or produce a disagreeable smell" (City of Tucson 1900:Ordinance 8). In 1882, the City appointed a medically certified health officer to inspect any location and to order it "cleared of filth, garbage or any other offensive matter," should it prove a source of "miasma or disease" (City of Tucson 1900:Ordinance 36). Although this ordinance clearly linked concepts of cleanliness and health, the use of the word "miasma" displayed a premodern understanding of sanitation on the part of city government. Miasma theory linked illness with bad air arising from putrid matter or other noxious sources, and this theory no doubt survived as an informal explanation for disease for some time after the introduction of modern germ theory. Thus the concern over nuisances could probably be taken to have had the connotation of harmful as well as unpleasant, as evidenced by a reference to "disease breeding odors" (*Arizona Weekly Citizen*, 17 December 1882b:3) in the debate over the abandonment of the "Old Cemetery."

In Tucson, privies became regulated in 1877. Tucson privies were subject to approval from the Board of Health, and lack of a privy was cause for a fine amounting to not more than $100 (City of Tucson 1900: Ordinance No. 6). This regulation was followed in 1879 by Ordinance No. 16, which forbade the venting of sewers, ditches, or mains onto city streets. Most privies thus far identified archaeologically in Tucson have dated to the period following enactment of these ordinances, although privies were almost certainly used locally, in an unregulated manner, before 1877. Interestingly, the *Arizona Weekly Star* reported in 1878 that "[a] great majority of the people of the city are without [vaults or earthen closets] upon their premises" (*Arizona Weekly Star*, 3 October 1878:3). Thiel (2005:79) noted that no privies have been found in Tucson predating the 1870s, although our survey of the available archaeological literature (see Table 2 in Volume 3 of this series) revealed a possible exception dating from the Mexican period (AZ BB:13:6 [ASM]; Thiel 1997).

Running water was first introduced to Tucson in 1882, allowing the adoption of indoor water closets and plumbing. However, it was almost 20 years later that the first municipal sewer system was installed. This necessitated the interim adoption of the use of cesspits. Although cesspits may have been introduced as early as 1882, they were not regulated until 1898 with the passage of Ordinance No. 119. This ordinance made it illegal to dig or maintain a cesspool, or any cistern used for the reception of unclean wastewater, without a permit from the city health officer (City of Tucson 1900). With the introduction of the sanitary sewer to parts of Tucson in 1900, privies and cesspits were gradually replaced. Three years after the passage of Ordinance No. 119, the city decreed, in Ordinance No. 154, that any property abutting the newly installed city sewer was required to connect to it; cesspits could be used if no sewer abutted the property (City of Tucson 1926). By 1906, the City was clearly encouraging use of the public sewer, and it passed Ordinance No. 210, which basically stated that, if it was at all possible for a dwelling to connect with the city sewer system, it was required to do so, whether or not the property directly abutted a sewer line (City of Tucson 1926). It has been noted that compliance with local codes was often determined by a neighborhood's wealth and dominant ethnicity. In fact, Ogle (1996) argued that development of public sanitation was a result of changes in American culture and values, rather than technological innovation.

Despite the introduction of public sewers, privies were in use in Tucson until at least the 1970s, when the *Tucson Daily Citizen* ran an article on the Model Cities Program, which had began a campaign to put people in bona fide bathrooms (Negri 1972). A survey of the Pascua Village and Kroeger Lane areas, on the southwest side of the city, identified 800 privy-like structures, with some 300 still in use. Despite a stated goal to replace all of these with premanufactured "Bathroom Modules," it was decided that rental properties were exempt from the program (Negri 1972). Therefore, it may be that even today, over 100 years after the introduction of the sewer system to Tucson, privies remain in use in specific areas of the city.

Only four septic-tank pits have been identified archaeologically in the Tucson Basin, all in Block 180, in close proximity to the project area (Ciolek-Torrello and Swanson 1997:213–224). Before the current project, only two cesspits had been identified during archaeological work in the Tucson Basin, both at the Lewis-Weber site, approximately 1 mile north of the project area (Curriden 1981). The limited number of these feature types may indicate that they have not been identified correctly when encountered as archaeological features, or that traditional archaeological sampling methods (such as subsurface testing along lot boundaries [e.g., Mabry et al. 1994]) have not been adequate to reveal their presence. The correspondence between lot boundaries and cesspits is not as strong as the correspondence between lot boundaries and privy pits. Additionally, identification criteria applied to the various feature types have not been standardized among projects. For example, according to criteria applied in this investigation, the presence of incoming sewer pipes and the lack of output pipes and a leaching field suggested that the features in Block 180 were, in fact, cesspits rather than septic tanks.

The earliest archival evidence for privies in the project area can be seen in Figure 143. This photograph dates between 1890 and 1892 and shows a number of outbuildings likely representing privies, including buildings that corresponded to Features 734 and 16500 (see Chapters 17 and 10, respectively, Volume 3 of this series). In the 1901 Sanborn map (see Figure 139), a number of small outbuildings were recorded, typically situated along the back property line of a lot and often clustered in proximity to those of adjoining lots. Many of these were probably privies, although archaeological evidence of that function was not encountered at each location. On subsequent Sanborn maps, most of these outbuildings remained consistent in size and footprint until between 1914 and 1919. The 1919 Sanborn map showed that, although most of these buildings remained extant, they had been enlarged, probably indicating remodeling into garages or sheds with the advent of sewer connections and increased automobile ownership within the project area.

An archaeoparasitology analysis conducted by Karl Reinhard (2009) on samples collected from project area privy pits and cesspits found no evidence of parasites. This absence was in keeping with the analysis of mortuary samples from the cemetery, which indicated a similarly low incidence of parasite infection. Although it would be tempting to suggest that residents of the project area, with generally good diets and access to medical care, were not afflicted by parasites, the analytical results may be suspect. It is possible that preservation of parasites in the project area was not good. Despite the lack of evidence for parasites, the quantity of recovered medicine containers that contained treatments for gastrointestinal problems indicated that residents commonly suffered from water-, milk- and food-borne illnesses.

The most complex utility system recorded during the archaeological investigation of the project area was the sewer system. Full details about the results of our utility investigations are covered in Chapter 5, Volume 3 of this series. Sewer mains were located in both Council Street and Grossetta Avenue, and many branches were recorded leading into the residential lots. The earliest sewer line in the area was built in Alameda Street in 1902, and there is archival evidence for sewer line construction within the project area as early as 1903. As households began to connect to these lines, the privy pits and cesspits were slowly abandoned and then used solely for trash disposal rather than the elimination of human wastes.

Despite public sanitation advancements in Tucson, hygienic food handling and storage practices were still rudimentary during the early twentieth century. Reports dating as late as 1940 attributed typhoid fever, dysentery, diarrhea, and enteritis to unclean conditions even though "milk and water sanitation had improved" in Arizona (Perkins 1940:2). In 1932, Tucson replaced its part-time health officer with a full-scale health department. By this time, all food-handling businesses, sewage disposal facilities, and public areas were subject to inspection. In that year, the city reported 90 percent immunization for diphtheria, smallpox, and typhoid, and that 5 percent of the city budget was dedicated to sanitation (City of Tucson 1932).

In summary, it is tempting to give sophisticated medical concepts of health and sanitation a causal role in the development of the modern city, particularly with reference to public services and utilities. However, in many cases these services developed for more subtle cultural reasons. One might even argue that the causal relationship was reversed, and that utilities represented technological factors that facilitated the acceptance and spread of modern ideas. In this way, the availability of running water made a culture of cleanliness possible outside of the upper classes. Similarly, the continuing health and growth of large cities was made possible by the construction of sewer systems capable of collecting, treating, and safely disposing vast quantities waste. This technology, however, depended on early haphazard systems aimed primarily at removing unpleasant accumulations from the sight and smell of citizens, who otherwise gave little thought to disease as a preventable condition.

Mortality of Project Area Residents

Table 44, constructed by examining birth and death certificates as well as other archival sources, provides a snapshot of the hazards of life in the project area during the late nineteenth and early twentieth centuries. Many residents lived to relatively old age, and the listed deaths were similar to those afflicting us today—heart disease, diabetes, cancer, and automobile collision (as well as overturning carriages, or being struck by bicycles). But, occasionally, an entry provides a reminder that diseases like typhoid and smallpox could sweep through communities, and some residents died of illnesses that today might be considered to be uncomfortable inconveniences. For example, Maude Wharton, who was apparently a widow by the time she lived in the project area in 1927, lost her husband, Fred, in 1924 to a septic abscessed tooth.

Current fears over swine flu are reminiscent of early-twentieth-century fears of typhoid and smallpox. Archival research showed a vague, perhaps poorly defined, fear of contagion in the first quarter of the twentieth century, such as was described earlier for the death certificate of Fred Steward's Uncle Henry. In the same year, the *Arizona Daily Star* reported that "D. Cash, Superintendent of the (illegible) railroad at Naco is here to (illegible) after one of the company's employees who is ill with typhoid at St. Mary's hospital" (*Arizona Daily Star*, 16 December 1901b: 48:7). Project area landowner Rudolph Rasmessen came to Tucson in 1898 after a surviving a bout with typhoid (see Chapter 15, Volume 3 of this series). Typhoid occurred as annual outbreaks in some areas. The water supply in

Globe, Arizona, for example, was contaminated with the first rain each summer (Quebbeman 1966:278). Typhoid immunization began during the Spanish-American War in 1909, and in Arizona in 1912 (Quebbeman 1966:279). With changes in sanitation, frequency of the disease was reduced. Nonetheless, 13 years later, one of Meade Clyne's three sons perished of the disease at age 12 in 1925.

Smallpox outbreaks occurred in several United States cities in 1901, including Boston, Cleveland, and New York City, as well as in Nebraska, Michigan, North Dakota, and Kansas. In Arizona, a quarantine barrier was established in May 1901 in the town of McCabe, Yavapai County, to prevent a local epidemic from spreading (Sherman and Sherman 1969). However, neither the *Arizona Daily Star* nor the *Tucson Citizen* mentioned it during the winter of 1901.

George Holloway lived in the project area in the early 1920s. The *Arizona Daily Star* mentioned briefly that on April 6, 1922, "Night Captain George Holloway of the Police Department is ill at his home" (*Arizona Daily Star*, 6 April 1922:3). No further information was given in the newspaper, but Holloway's death certificate reported that he died just 3 days later of hemorrhagic smallpox. On December 26, 1922, a Safford, Arizona, newspaper urged readers to

> Be vaccinated for prevention of smallpox. Owing to the prevalence of smallpox in different sections of the state and the liability of contracting the disease, the physicians are advising people to be vaccinated as the only sure way to keep from having this dread disease. To be inoculated against smallpox is a duty one owes not only to themselves but to the people with whom they associate every day [*The Guardian Farmer*, 26 December 1922b:2].

The early 1920s saw smallpox outbreaks throughout the United States. In 93 U.S. cities, the 1921 smallpox rates increased by 138 percent from the 1920 incidence, with up to 40 percent mortality (*Journal of the American Medical Association* 79[4]:304–305).

It is likely that most of the children in the project area were exempt from the strenuous labor forced upon some lower-class children during the nineteenth century. Project area children may have had some employment, but it is unlikely that any were compelled to work in mines, as chimney sweeps, in factories, or other hazardous jobs. Still, childhood mortality among project area residents was still fairly high. At least one child in the project area died from burns. Four-year-old Kenneth Seeton Hendry, son of William Hendry and Sadie Pitt, was living with his parents at 250 N. Stone when he suffered an indeterminate accident and died in 1911 "of extensive burns to the body" (ATBH BVS 1911). Open fireplaces and wood stoves meant that childhood death and injury from burning were unfortunately common in the historical-period West. Additionally, small children also spilled hot liquids on themselves (West 1989). Frederico Ronstadt recalled in his 1880s memoirs that around the same year his 5-year-old brother died of diphtheria, his 3-year-old brother pulled a pitcher of boiling milk on himself and died a few days later (Ronstadt 1993:104). Baby Solomon Avina, son of Solomon Avina, resident of 46 Miltenberg Street, was less than 2 years old when he died of pneumonia and streptococcus. Celia (Corey) and John Mabarak, who lived with an extended family at 208 N. Stone, had at least four living children by 1928, as well as Marta, a daughter who died of pneumonia at less than 2 months of age. Leslie and Jessie Lohse had two living children, but lost one male child at birth in 1912. These records provide evidence of some of the perils of childhood in the days before antibiotics.

Death certificates issued for residents of the project area were interesting for some missing causes of death. Violent deaths were restricted to accidental ones—death by car, bicycle, or carriage. No gunshots, suicides, or homicides were found for project area residents, although a glance at newspapers and death certificates from the same time elsewhere in Tucson showed that these events were occurring. Nor were there deaths of syphilis, starvation, or exposure recorded for the project area, although these, too, occurred present elsewhere in Tucson, and in fact, Arizona's syphilis rates were higher than the national average in the 1930s (Linder and Grove 1947). The residents of this neighborhood seem to have been somewhat insulated from some of these causes of mortality.

Politics and Fraternal Organizations

At the turn of the twentieth century, Arizona was a strongly democratic region made up in part by Southern sympathizers (Lamar 1965:192). Still, archival sources demonstrated that Confederate and Union veterans lived and worked side by side in the project area. As one historian said about Arizona at the time, "the evidence of deliberate [political] compromise was everywhere" (Lamar 1965:192). Fraternal orders provided a means for socializing and developing political bonds with other prominent men; those with affiliations to the project area were members of the Freemasons, Shriners, Order of Eastern Star, Knights of Pythias, Knights Templar, Grand Army of the Republic, Elks, National Union, and the Ancient Order of United Workmen. In addition to these affiliations, local politicians made use of "tough, shrewd, and powerful Tucson merchants" to further their cause (Lamar 1965:193). Arizona had become so diverse that "political unanimity was no longer possible" (Lamar 1965:202). Accordingly, many Arizonans were political activists, free thinkers, and most supported the pursuit of Arizona statehood. Locals were

also devoted to women's suffrage, Native American land issues, and water rights.

Table 45 presents the results of archival research indicating that a number of property owners and residents in the project area were active in political circles. Included were elected law-enforcement officials, appointed attorneys, and individuals with positions in city, county, state, and federal governments. The list shows that Euroamerican politicians were active in land speculation and development in the growing Tucson community. In only a few cases did politicians live on their properties within the project area.

One project-area owner/resident held particular political clout. Democrat Marcus Aurelius Smith, who owned, developed, and lived at 223 N. Stone on Block 254, Lot 1, was active in politics throughout most of his adult life (Figure 154). As one of Arizona's first two U.S. senators, Smith's political career kept him away from Tucson and in Washington, D.C., much of the time. Described by one historian (Lamar 1965:204) as "another small, almost emaciated fellow," he nevertheless was a champion of Arizona causes:

> Smith had an almost sixth sense about understanding the attitudes and prejudices of emergent Arizona, and he set out to embody them. . . . Smith represented Arizona's own interests.
>
> Smith was the miner's friend, and he defended silver with a passion. He seemed to be for labor, despite the fact that he helped get cheap Mexican contract labor for the copper mines. He was at home with the saloon element, and, at the same time, he knew and understood the old merchant oligarchy of Tucson. So long as they voted Democratic, Mormons were good citizens to him. With a practical eye he observed that railroads and mining were vital to Arizona. . .
>
> Finally, Smith reflected both the bitter anti-Indian feeling of the older Arizonans, and the states' rights views which many other Arizonans with Southern backgrounds, held. Given all his interests and connections, it was no wonder that his enemies punningly called him 'Marcus Octopus Smith.'

Smith was one of the first attorneys to practice in Cochise County, Arizona, and his firm represented Joseph "Ike" Clanton in prosecuting the Earp brothers and "Doc" Holliday for the murder of William Clanton and the McLowerys in the Tombstone gunfight at the O.K. Corral (Smith and Lisle 1877–1883). Later he moved to Tucson and built an imposing home in the project area (see Chapter 13, Volume 3 of this series). Unfortunately, later construction of the building addition for Tucson Newspapers effectively destroyed all evidence of Smith's home and lot improvements.

Arizonans had petitioned Congress without success as early as 1856 for territorial status separate from New Mexico and California. In spite of their failure, congressional delegates were regularly elected to represent Arizona and were refused seats or votes when they arrived in Congress (Ferris 1967:38). It has been said that these pioneer federal appointees were "a parasitic group somewhat like the railroad and industrial robber barons that in their contributions were negative rather than positive" (Lamar 1965:188), yet they eventually swayed Congress to support formation of the Arizona Territory. The Arizona Territory was finally created when, in 1863, a case was presented to Congress that mining interests in the regions were helping to fund Union Civil War efforts.

In 1886, Smith was elected to be one of the nonvoting congressional delegates (Chapman Publishing Co. 1901; Goff 1989). This initiated a 34-year career in politics. He actively campaigned for statehood and even participated in an extra-legal constitutional convention supported by the territorial government in 1891 (Goff 1989). Smith was one of Arizona's first senators after statehood was achieved in 1912 and served in that office until 1920. (Additional biographical details of Smith's life and political career are presented in Chapter 13, Volume 3 of this series.)

Based on archival research, several property owners and residents of the project area were officers in financial organizations, investors, businessmen, or speculators in mining companies, and many were members of fraternal organizations. Archaeological evidence of such activities included the recovery of a leather book cover bearing a Knights of Pythias emblem from Cesspit 3042 on Block 254, Lot 6. Daniel Mahoney, who lived on the lot from 1914 to 1920, was recorded as a member of that organization. Mahoney was a conductor for the Southern Pacific Railroad, and a button inscribed "CONDUCTOR" was found nearby. An elk tooth fob was recovered from an unanalyzed context; it may have been owned by someone belonging to the Elks.

Household Industry

This investigation resulted in a better understanding of a developing part of Tucson during the transition from domestic self-sufficiency to a cash-based economy at the turn of the twentieth century. The evolution was characteristic of increasingly urban areas after the Industrial Revolution, but the advent of the railroad in this community accelerated the shift to consumerism. For the first time, Tucson residents had access to a vast variety of innovations that mechanized labor and were touted as household timesavers. Still, evidence suggested that material culture was both produced at home and obtained from markets, and archival information supported that finding.

Historical photographs and archaeological evidence from the beginning of the residential period in the project area indicated that a few residents (John Brown on Block 252, Benjamin Fairbanks on Block 254) on large lots kept livestock and maintained corrals and stables; most likely, the horses were used for transportation or hauling. Cows, pigs, and chickens were likely kept to provide meat and milk to supplement the family larder—this despite the ordinances against keeping livestock within city limits that were discussed previously. As the residential zone became more crowded and lots were subdivided, it was not feasible to keep large animals on the property. At the same time, motor vehicles were replacing horse-drawn wagons and buggies, and draft animals were no longer needed.

Faunal evidence discussed earlier suggested that some homes in the project area maintained a flock of chickens or other poultry. This practice was commonplace in urban areas at the time, because it was a low-cost enterprise resulting in high yields of both eggs and meat (Storke 1859:245; Swope and Coniglio 2004:1). It is possible,

Table 45. Political Offices Held by Owners and Residents from the Project Area

Name	Project Area Affiliation	Party Affiliation	Political Role
Colonel John Breathitt	occupied 270 N. Stone	Democrat	-Missouri Railroad Commissioner -Campaigned for AZ statehood -Territorial Party Convention -Democratic Presidential Campaign Member -Dept. of Interior Special Agent
John Nelson Brown	owned Block 252, Lots 3, 4, 5, 8, 10	Democrat	-City Council Member
Joseph B. Corbett	occupied 250 N. Stone	Republican	-District Representative, 21st General Assembly of AZ
James Finley	owned 250 N. Stone	unknown	-Territorial Legislature -Pima County Supervisor
Anthony Vincent "A. V." Grossetta	Grossetta Street named for him	Republican	-24th Territorial Legislature -Pima County Central Committee -Territorial Party Convention -Tucson City Council Member
Gustav Hoff	wife owned Block 254, Lot 7	unknown	-Member, Territorial Legislature -Tucson Mayor
Rudolph Rasmessen	owned Block 254, Lots 4 and 5, Occupied 57 Miltenberg	Republican	-Tucson Common Council -Tucson Republican Committee Chairman -Tucson Mayor
Charles A. Shibell	owned Block 255, Lot 1	Democrat	-Pima County Deputy Sheriff -Pima County Sheriff -Acting Pima County Sheriff -Pima County Recorder
Marcus Aurelius Smith	owned and Occupied Block 254, Lot 1	Democrat	-Campaigned for AZ Statehood -Cochise County Attorney -Assistant U.S. Attorney -Congressional Representative -State Senator -Joint Boundary Commissioner
Herbert B. Tenney	owned Block 254, Lot 2	Republican	-Pima County Deputy Treasurer -AZ State Legislature -Republican Nat'l Convention Delegate
H. D. Underwood	owned Block 254, Lot 2	Democrat	-AZ State Assemblyman -Chief Deputy U.S. Marshal, AZ
Thomas N. Wills	wife owned Block 254, Lot 6, occupied 34 E. Alameda	Democrat	-Pinal County Board of Supervisors -Pinal County Sheriff -AZ State Senator -AZ Constitutional Convention

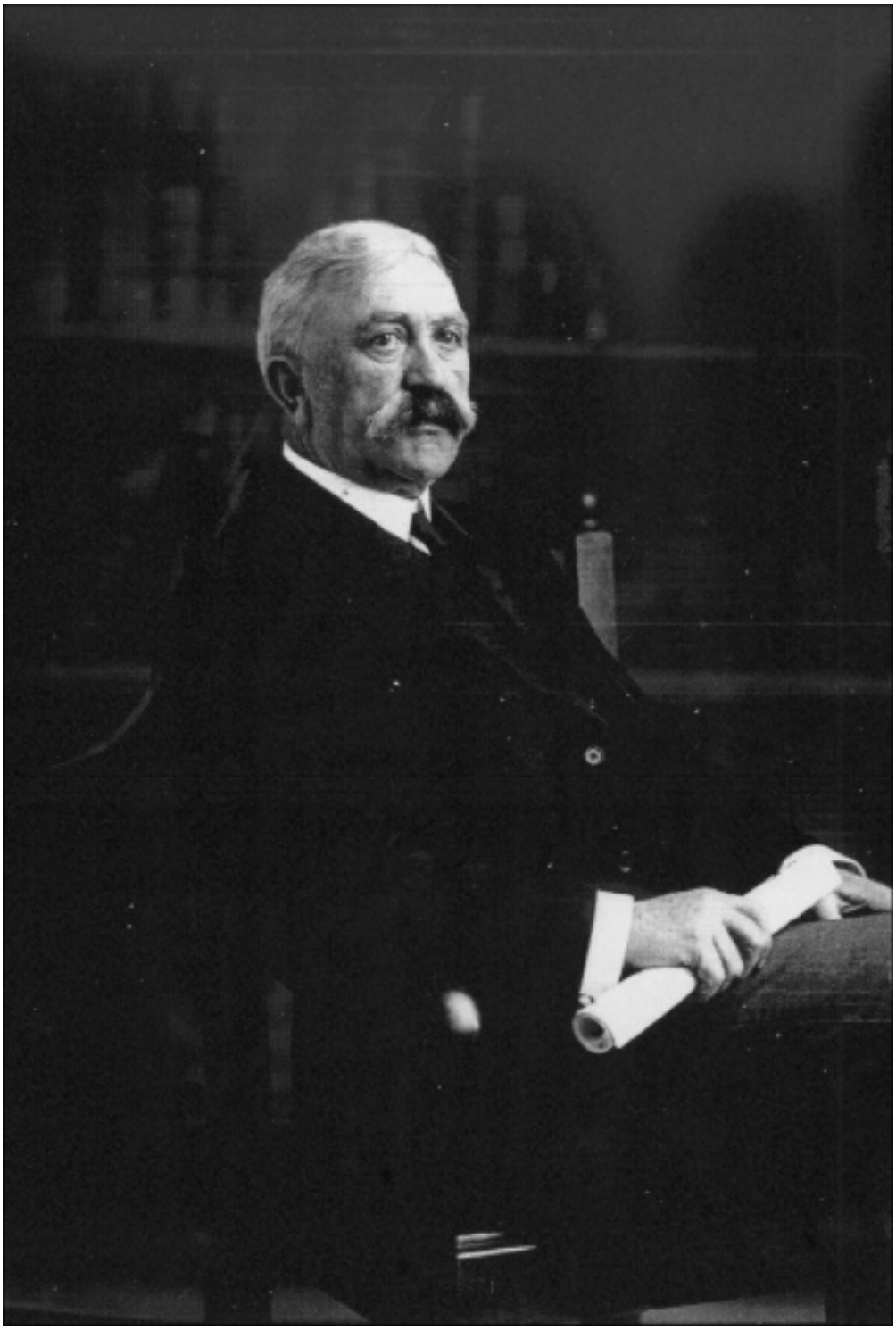

Figure 154. Marcus Aurelius Smith, who lived at 223 North Stone Avenue from ca. 1899 to 1905 (undated photograph courtesy of the Arizona Historical Society, Tucson, Accession No. B93362). Smith was one of Arizona's first two U.S. senators, serving 1912–1920.

too, that surplus meat and eggs were sold, but there was no evidence indicating that very large flocks were maintained in this neighborhood.

An undated New York Store receipt for the Kelley family revealed that they purchased lace, lawn, and dimity fabrics, indicating that clothing was either made at home or by a hired seamstress. A newspaper advertisement indicated that the New York Store ran a sale in late March 1911 that included both lawn and dimity (*Arizona Daily Star*, 26 March 1911f:2). The store sold ready-made clothing as well as yard goods (*Arizona Daily Star*, 26 February 1911g:1), suggesting that Mrs. Kelley chose to make her own clothes or have them made.

The artifact collection also revealed household chores performed in the project area. Laundry bluing balls and clothespin parts illuminated one common task; although later residents would have had a washing machine indoors or on a porch, clothes drying likely took place outdoors throughout the residential period. Several sadirons were also recovered from features in the project area.

Not surprisingly, residents of the neighborhood left ample evidence to reveal a variety of home-maintenance tasks undertaken in the project area. Among construction-related artifacts recovered were hand tools (hammers, paintbrushes, files, etc.) and raw materials (wire, nails, lumber, and hardware) that were used to maintain residences and outdoor buildings and structures. Fragments of paint cans were recovered, and paint colors included red, green, black, white, and orange. We have noted that the bulk of construction materials in the collection were accumulated at the time of building demolition; however, hardware and materials were found to represent the sequence of occupations on the site.

Leisure Activities

The residents in the project area spent their nonworking hours in a variety of leisure pursuits, as evidenced by the archaeological record. Children's toys and sport hunting have already been discussed. Other leisure activities represented in the collection included the remains of musical instruments, camera parts, and over 60 smoking-related artifacts, including smoking pipes, ashtrays, snuff jars, and pocket tobacco tins.

The drinking of alcoholic beverages was generally ubiquitous across the project area (Figures 155 and 156). The only lots on which alcoholic beverage containers were not found were Block 252, Lot 1, and Block 253 (the only solely commercial lots in the project area); Block 254, Lot 1 (destroyed by construction of the Tucson Newspapers building); and Block 255, Lot 6 (where no features were excavated). Despite the ubiquity of alcohol bottles across the project area, however, some lots exhibited much greater numbers than did others. The largest number of alcohol bottles (n = 186) was recovered from Cesspit 3042 on Block 254, Lot 6. A number of families occupied this lot, but alcohol bottles were found in two disparate strata, indicating that alcohol consumption was higher among some families than others. The largest number of beer bottles from the feature dated prior to 1929, probably from the period when Mrs. Fairbanks was renting out the house or from the Paul or Mahoney tenures. The majority

Figure 155. Taylor and Williams whiskey bottle from Block 252, Lot 13, Privy Pit 650 (Inventory No. 08000B1E2).

Figure 156. Whiskey bottle distributed by Neil and O'Keefe from Block 254, Lot 7, Cesspit 3040 (Inventory No. 08000302F).

of liquor bottles from features associated with the Brown family on Block 252 derived from the Haynes Distilling Company in Kentucky, which operated a mail-order distribution system from 1897 to 1916 (Wilson and Wilson 1971:79). Although the family may have preferred the flavor of Haynes liquor, the possibility also exists that they preferred not to purchase liquor locally or to have their liquor purchases known in the community. Their daughter, Amelia, and her husband, Fred, clearly preferred wine/champagne, although they also consumed distilled spirits and beer (Figure 157). Later renters on the Steward property clearly preferred Hiram Walker Canadian whiskey. Finally, some unusual finds from the project area included a fragment of a "black glass" wine/champagne bottle normally associated with earlier centuries than the postcemetery residential occupation, a salt-glazed stoneware English export ale bottle, and three Mexican tequila bottles from two lots. The tequila bottles were marked Cartel Vidriera Monterrey, a company which operated between 1909 and 1958.

Opium was in widespread use in a variety of forms at the turn of the twentieth century. Contrary to popular belief, only 20 percent of opium imported into the United States during that era was smoked by Chinese (Kuffner 1979:602); the remainder was used by non-Chinese in the form of laudanum-laced medicines. These remedies were readily available and often prescribed by physicians, and their use frequently led to dependency.

Overseas Chinese in the United States preferred to smoke opium; consequently, opium paraphernalia is commonly recovered from historical-period sites occupied by Chinese immigrants and first-generation Chinese Americans. The elaborate process of smoking opium required a specialized pipe and cooking lamp, a large needle, and a variety of trays and containers (Wylie and Fike 1993:255–303; Wylie and Higgins 1987:321–326).

After about 1870, the practice of smoking opium spread into non-Chinese society. At first, prostitutes, gamblers, and others relegated to the outskirts of town became smokers, but in just a few years, opium smoking became a prestigious practice in upper-class circles. It was particularly fashionable among Euroamerican women (Courtwright 1982:70–78; Wylie and Fike 1993:258), and opiates and narcotics could be purchased without a prescription until 1915 (Courtwright 1982:83; Wylie and Fike 1993:259).

The only set of opium equipment recovered from postcemetery contexts in the project area was small and was retrieved from Cesspit 3042 on Block 254, Lot 6. Included were part of a clear-glass opium cooking lamp and a fragment of a clay opium pipe bowl. The lamp part was an oil reservoir used to contain fuel to cook the opium prior to smoking. The reservoir was hexagonal and so nearly resembled a common type of opium pipe bowl that it could have been made in the same mold (Figure 158). No examples of lamp reservoirs in this shape could be found in archaeological or historical literature. The pipe bowl was made of gray clay, and it retained opium residue on its interior. These artifacts may have represented opium use by a site resident, or a curiosity that was obtained from local Chinese residents.

An interesting discovery in the project area was the presence of numerous Sterno cans in a variety of features, sometimes in large concentrations (see Chapter 16, Volume 3 of this series). Although they could have represented the use of chafing dishes or cooking in the absence of stoves, another possibility was that one or more of the residents indulged in the Prohibition-era practice of drinking Sterno fuel. Most of the cans were found in Stratum II of Cesspit 3040, which was one of the last levels to be deposited prior to abandonment of the cesspit. Unfortunately, the residence on Block 254, Lot 7, was occupied by at least nine separate rental households during Prohibition,

Figure 157. Champagne/wine-shaped "Fratelli Branca" bottle from Block 254, Lot 6, Cesspit 3042 (Inventory No. 08000D641).

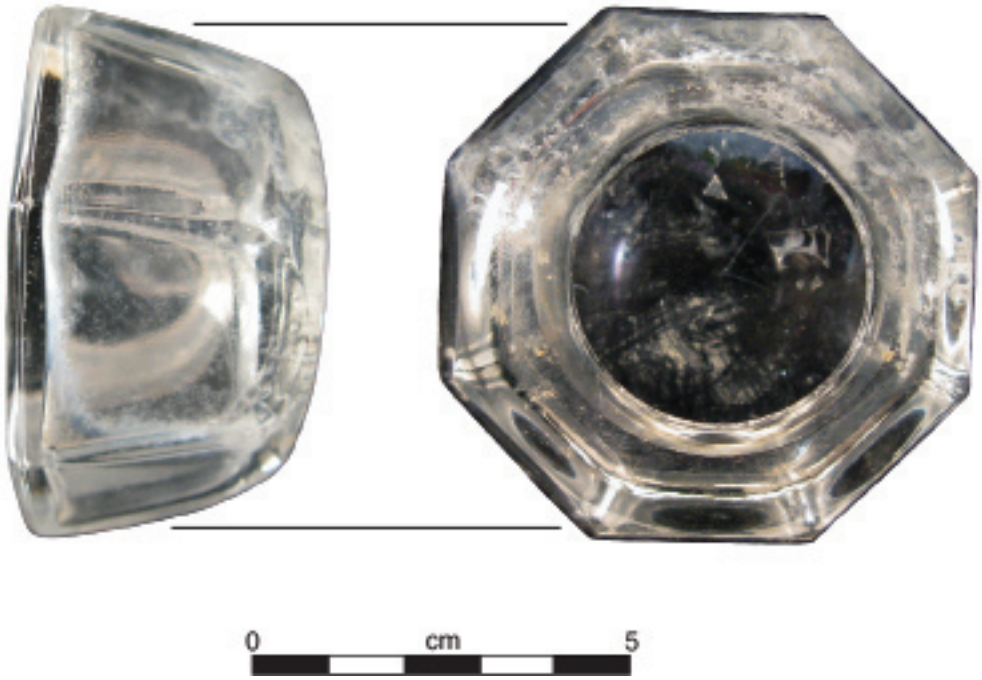

Figure 158. Glass reservoir from an opium cooking lamp, recovered from Cesspit 3042, Block 254, Lot 6.

and it was not possible to tie the artifacts with certainty to a specific residency.

This use of canned heat has not been reported locally in historical archaeological deposits, but period news items, firsthand reminiscences, and police reports describe the practice. An Arizona news article from 1929 (*Prescott Evening Courier*, 26 February 1929) described the arrest of six men who had been imbibing canned heat. It stated that "They'd used their socks to strain the stuff" which apparently served two functions: "the alcohol in the canned heat cut the dirt out of the socks and the socks separated the alcohol from the paraffine [*sic*] in the canned heat." Singer/actor Bing Crosby recounted his experience as a janitor for a workingman's club in Washington State where he encountered loggers drinking canned heat:

> Some of the loggers used to get canned heat, take it to the washroom, and put a match under it to liquefy it, since it came in a pasty or semisolid form. Then they drank it. It had a high alcoholic content. It also had a high blindness-and-madness content. If those who drank it didn't end up sightless, they were likely to fight six policemen and wind up in jail [Crosby and Martin 1993:64].

Postcemetery contexts contained several inedible invertebrate remains that may have been part of beachcombing collections. These included barnacle, four-tooth nerite, cone shell, dama dwarf olive, gray Atlantic auger, Atlantic slipper shell, and shield limpet remains. A Florida fighting conch shell was recovered, and although an edible species, it was not likely food remains because only one specimen was identified and it was in nearly pristine condition. With the arrival of the train to Tucson in 1880, transcontinental travel was made simpler, and some of the shell deposited after that date may have represented souvenirs of trips to either coast of the United States, or may have been otherwise acquired as part of personal natural history shell collections. Seashell collections were particularly popular during the nineteenth and early twentieth centuries (Dance 1966). According to Drepperd (1944:254), shell-encrusted wood or paper boxes were a late Victorian "conceit." The draw to collect shells often stemmed from a desire to possess something exotic, demonstrating the financial means to travel to or acquire something from far-off places (Conniff 2009). For those who lived in the desert, shell collections would have been a memento or reminder of excursions to the coast.

Both dog and cat remains were recovered in the project area. These may have represented beloved pets, working animals, unwanted surplus kittens or puppies, stray or feral individuals, or all of the above. Residents of the project area treated different individual cats and dogs differently. Four dogs and two kittens were buried. These may have been formal burials or simply a way to dispose of a carcass; it is difficult to tell in the absence of grave goods. Both dog and cat bones were found in trash deposits and both taxa were also deposited in privy pits, although more dog remains than cats were found in trash deposits and more cats (especially kittens) were found in the privy pits. It is likely that these different disposal methods reflected the value the animals held in life, at least to a certain extent. People were probably more likely to take the trouble to bury a pet or companion animal than to toss it in a privy, but an animal kept exclusively as a mouser or to ward off intruders might have been more likely disposed of in the trash or privy, if there was little personal attachment to the animal. Some disposal decisions, too, may have been related to more practical issues such as the size of the animal and the smell of a decaying medium-sized dog compared to that of a neonatal dog or a kitten.

Transportation

The Railroad

In 1880, the Southern Pacific Railroad came to Tucson, and its impact on the city was profound. Service facilities and warehouses associated with the import and export of goods began to congregate near it, and soon the section of railroad running through town became the focus for a thriving industrial district centered on Toole Avenue. Facilities for the manufacture or distribution of goods were built near the tracks, causing a gradual shift of the business community eastward along Congress Avenue toward the loading stations (Sonnichsen 1987:141).

The arrival of the Southern Pacific Railroad to Tucson was the culmination of decades of government advocacy for transcontinental railroads combined with capitalists' speculation. Railroad expansion required changes in the natural, legal, and sociocultural landscape, and represented the end of frontier-era politics and economics in Tucson. As mentioned in previous chapters, connecting the city with the national rail system allowed Tucson to link with the greater social, political, and economic trends of the United States. For Tucsonans, this meant increased access to cheap, mass-produced and mass-marketed goods, an increasing population, and the interference of large corporations—changes that did not benefit all Tucson residents. The arrival of the Southern Pacific resulted in tangible changes to the physical and social landscape that reverberated throughout the subsequent history of Tucson.

Construction of the Southern Pacific Railroad eastward from Yuma began in 1878 and the main line arrived in Tucson in March of 1880. Construction continued to the east until the Southern Pacific linked with the Texas and Pacific Railroad outside of El Paso, Texas, in 1881, creating the third transcontinental railroad in the United States

(Janus Associates Inc. 1989:7–9). The Southern Pacific line across southern Arizona from Yuma to Deming, New Mexico, was labeled the Tucson Division and was headquartered in the city. Tucson became the largest railroading center in southern Arizona and a number of railroad structures were built, including a depot, yard and shop facilities, a roundhouse, warehouses, section houses, and residential facilities for railroad employees (Janus Associates Inc. 1989:8–9).

In the early 1900s, the city expanded its rail service by increasing connections to nearby mining towns such as Silverbell and Twin Buttes (Luckingham 1982:38). A second rail line was added in 1911, when construction began on an extension of the El Paso Railroad (Sonnichsen 1987). The crosscutting of the southern and western parts of the city by rail lines encouraged growth in the unobstructed areas north and east, particularly around the university (Parker 1948). This pattern affected the expansion of Tucson for many decades to come.

The project area fronts Toole Avenue on its north side and is separated from the Southern Pacific tracks by a row of buildings representing the original warehouse district that developed in response to the rail line. Although the project area itself never had a large industrial presence, its proximity to the rail line meant that the neighborhood was directly impacted by the railroad. In fact, the neighborhood may have developed in part as a direct response to the arrival of the railroad. One industry was built in the project area—the Henry Till Bottling Works in Block 253, which operated between 1904 and 1916. The proximity of the railroad also affected the residential pattern of the neighborhood. The Southern Pacific was a significant employer of people living in the project area throughout the residential period, particularly prior to 1930. Several Southern Pacific uniform buttons were recovered from Cesspit 3042 on Block 254, Lot 6; these may have been associated with Daniel Mahoney, a resident of the lot who worked as a conductor for the railroad.

Streets

Prior to the arrival of the railroad, all transportation in or around Tucson was based on the movement of legs. Whether one rode in a wagon, on a horse, or walked, it was raw muscle power that formed the basis for transportation. The railroad changed this, but in a limited way. Being confined to tracks, the train could not provide access to all locations. This meant that the wagon and the stagecoach still had a role moving goods and people to places the railroad did not reach. During its development, the Tucson city street system had to accommodate first animal-powered, then motorized vehicles. The continuing modification and improvement of streets influenced the way the city was divided and settled; this included the placement of houses in a new neighborhood, which tended to an orientation parallel to the layout of major roads.

Within the project area, Council Street, formerly known as Miltenberg Street, was first opened for public use in November of 1881 (*Arizona Weekly Citizen*, 13 November 1881c:4:3), 8 years prior to the sale of the neighborhood lots. Grossetta Avenue was also built sometime between 1880 and 1889. The two streets divided the project area into quarters, which were then subdivided into lots. The effect of this road system on subsequent settlement patterns can be seen in the early Sanborn maps (see Figure 139). These show that the first houses were built facing Stone Avenue and Alameda Street, the two major roads which bounded the project area. In 1907, sidewalks appeared along both of these streets. By 1910, smaller houses had been built on the minor streets in the interior of the project area, and Stone Avenue was paved. The latter event apparently caused some distress to one of the residents, John Brown, whose home fronted Stone Avenue. He reportedly became concerned that the project would require the removal of "his beloved mulberry trees" (*Arizona Daily Star*, 23 June 1914), although his fears proved to be unfounded. In the early 1920s, Mayor Rudolph Rasmessen, a project area landowner, led a campaign to pave the remaining streets of Tucson, including Toole Avenue and Alameda Street (*Arizona Daily Star*, 15 August 1929a; *Tucson Citizen*, 7 July 1930a). Still, many smaller residential streets, such as Grossetta Avenue and Council Street (then Miltenberg), may have remained unpaved until the district became commercialized in the 1930s.

Bicycles and Cars

The mechanization of personal travel was first accomplished with the invention of the bicycle, or the "wheel." Modern Tucson touts itself as a bicycle-friendly city, but this is not a new phenomenon. By 1893, there were over 150 wheelmen in Tucson (*Arizona Weekly Citizen*, 9 September 1893: 4:1), including project resident Dr. Whomes, who lived at 208 N. Stone Avenue. That cycling was a sport as well as a mode of transportation is evidenced by an 1894 entry in the *Arizona Weekly Citizen* that read, "Fred Holmes has been debarred from the Nogales-Tucson bicycle race, being a professional on the strength of having raced on a money wage made by himself" (*Arizona Weekly Citizen*, 16 June 1894:3:2). Shortly thereafter, the City Council even proposed the idea of the police bicycle patrol:

> The question of furnishing the chief of police with a horse and buggy or a saddle horse, was considered, and it was decided that the city could not afford to do so, at the present time. Councilman

> Russell thought it would be better and cheaper for the marshal to ride a wheel, which he offered to furnish free of charge. Marshal Finley stated today, however, that he did not want a bicycle and furthermore could not ride one if he had it [*Arizona Daily Citizen*, 4 May 1897:4:3].

An interesting variation of the bicycle was found in the Joint Courts Complex project area. A nearly complete, although broken, quadracycle was recovered from Refuse Pit 7841, in Block 252, Lot 11 (Figure 159). Although popular with the public, the bicycle's impact on Tucson was nothing compared to what followed.

In 1899, Dr. Hiram W. Fenner introduced the first automobile to Tucson (Schladweiler 2004). At that time, the automobile was a luxury item; Dr. Fenner paid $600 for the vehicle and another $200 to ship it via rail from Massachusetts. Initially, the automobile was viewed with mistrust by city officials and conservative citizens; it traveled at speeds they viewed as too fast for safety within the city limits. Thus the automobile was rather predictably followed by the introduction of a strict speed limit (10 miles per hour) and the traffic ticket (*Arizona Daily Star*, 6 April 1904:4:2).

Despite initial misgivings, popularity of the automobile was on the rise, both locally and regionally. By 1920, automobiles had become the primary mode of transportation in Tucson (Luckingham 1982), and Arizona ranked ninth in the nation for per capita ownership of cars (Sonnichsen 1987). Indeed, analysis of the 1925 Pima County Assessment Rolls showed that there was approximately one automobile for every 6 residents (Pima County 1925). This compared to one automobile for every 22 residents east of the Rockies (Anonymous 1973).

With the rise in automobile ownership, complaints by car owners about the mud and dust on unpaved streets began to mount. Many street improvements and highway construction projects occurred in response, and by 1921, most major downtown streets of Tucson had been paved. This in turn caused a surge in suburban sprawl, as developers, no longer constrained by walking distances, spread out across the relatively open landscape of the Tucson Basin (Luckingham 1982).

Concurrent with the increase in numbers of automobiles, a new architectural form began to appear in the project area. As can be seen on the Sanborn maps dating to post-1914 (see Chapter 2, Volume 3 of this series), the number of garages in and around the project area increased through time. The project area never had an overabundance of garages, possibly because of a relatively low population density that allowed for ample street parking. However, on surrounding blocks, garages were sometimes stuffed into lots barely big enough for the house that sat on them.

An increase in automobiles necessitated concurrent development of a support infrastructure. Although Dr. Fenner's vehicle was purchased via mail order, the local automotive dealerships quickly gained in prominence. Besides dealerships, service facilities soon proliferated as well, especially in the project area. By 1930, the project area housed a dealership and a tire store; these were soon followed by used-car lots and service stations. Archaeological evidence for the prominence of the automotive support industry in the project area included foundations and subsurface features associated with the dealership, repair facility, and a service station, as well as numerous automotive parts that were used to fill the upper

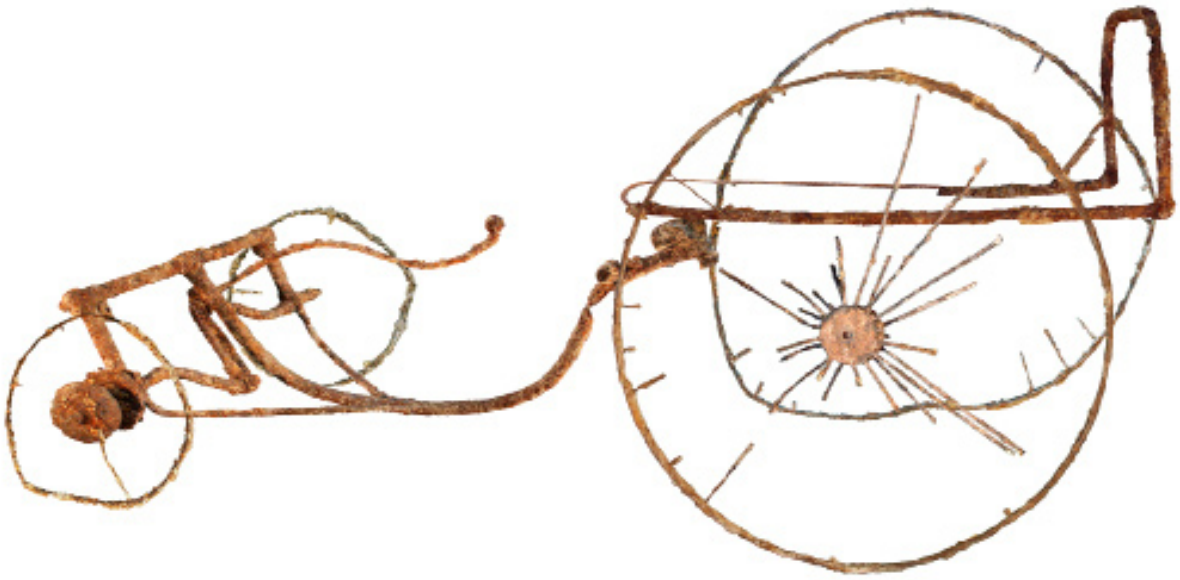

Figure 159. Possible original configuration of quadracycle parts from Block 252, Lot 11, Refuse Pit 7841 (Inventory No. 080006CBB).

levels of residential features such as privy pits and cesspits. The automobile ushered in changes in land-use patterns, both large and small, that eventually brought about an end to the residential use of the project area. Indeed, the final death knell for residences in the project area was the parking lot.

Walkability

As part of this study, research was conducted to determine the employment locations for all known residents of the project area in all years, for whom an occupation was recorded. These included people who were known to run businesses out of their own home; those who listed a specific place of employment in the city directories; and attorneys, doctors, and other professionals who listed the locations of their private offices. Excluded were instances in which no employment was listed, women listed as "widows," individuals listed as "own income" or "retired," and people whose listed employment was so general that no specific location could be reasonably inferred, such as "carpenter" or "dry goods." Lastly, people working at jobs that would have required that they live off the project area for long periods of time (such as "cattleman" and "delegate to congress") were also excluded, as the purpose of this analysis was to determine how far people living in the project area traveled to work and back on a daily basis. Sometimes multiple addresses for a single employer, combined with ambiguities in the available job description, made the location of employment unclear. In these cases, one location was often given priority over others if any reasonable inference could be made based on the available information. If not, the entry was excluded from analysis. Relative distance from the project area alone was not considered a prioritizing factor, as the purpose of the analysis was to determine how far away from home project area residents were generally willing to work. Other precautions were taken to prevent duplication or inaccuracies in addresses. The distance between work location and the employee's residence was determined by plotting both addresses into the Walking Directions feature of Google Maps™ (2009). Distance and walking time were recorded for each pair of addresses and used in the following analysis. Distances were generally given in tenths of a mile, and any distance (in feet) between 0 and 0.1 miles was given a 0.1 mile value. Time was given in minutes.

Based on the analysis, we were able to make some general comments about neighborhood walkability. The vast majority of people in any year appeared to have worked within a half mile of their home. In walking time, this translated to 10 minutes or less. Of this number, most worked within a 5-minute walk from home. Furthermore, the people who remained in the project area the longest were those who worked 5 minutes or less from home. The highest longevity of residency occurred at 0 miles from work, at an average of 3.4 years per resident. Thus, people working from home tended to remain in the project area the longest. This may partially reflect the commercial nature of homes in the project area, especially in 1920s and later. The desire to retain a firm customer base and uninterrupted service by retaining a stable location for the business may have influenced the longevity of these residents. However, longevity was high for all people walking a short distance to work. The average longevity for people working between 0.1 and 0.3 miles from home (or 1–5 minutes) was 2.4 years—and above 2.2 years in all cases. The average longevity for all people working between 0.4 and 0.6 miles from work (or 5–10 minutes) was 1.4 years. By 0.6 miles from home, longevity of residency had dropped to 1 year.

Outliers ranged between 1 mile (20 minutes walk) and 12 miles (240 minutes walk) and showed a distinctly linear relationship between calendrical time and distance. No distances over 0.6 miles were found before 1920, and the more distant outliers (those over 4 miles or 1 hour and 20 minute walks) did not appear until after 1950. Although people in the project area continued to overwhelmingly prefer working locations within close walking distance, the outliers and their increasing distance over time probably represented the increasing size of Tucson as well as the ascendance of gasoline-powered vehicles. Some of the outliers are discussed below.

In 1920, an instructor at the Tucson Golf and Country Club (2.8 miles, or about 1 hour's walk) lived in the project area. In 1920, the only public transport was the electrified streetcar system, and its runs were limited to track laid in the central area of town. At that point in time, the country club (located at present-day Broadway and Country Club) was over a mile outside of the city limits. If walking, this would have resulted in a total commute time of 2 or more hours. Although it is possible that this was acceptable to the resident, it is more likely, especially given the probable economic means of a pro golfer, that he owned a private vehicle or may have still ridden a horse.

In 1926, Russell Tower was a student at the University of Arizona (1.5 miles, or about a half hour walk). The walk may well have been considered acceptable by the student or he may have owned a bicycle or car, although the time period and his probable age made the latter less likely. On the other hand, there had been animal-drawn public transport to the university from the railroad depot (very near the project area) since 1898, and an electric streetcar ran the same route after 1906. Since 1925, there had been gas-powered bus service along the major streets circling the university; this was probably how the student got to class.

A 1932 employee of 6th Street Cleaners (1.1 miles), which was located on the bus line that circled the university, may even have had access to a direct bus route by this time. As a chauffeur, he may also have had access to a company vehicle. Two men (possibly a father and son)

living in the same house worked for the Miles School Service Station (1.4 miles) in 1932 and 1933. In 1937, two university students in the wealthy Rasmessen family may have had access to a private vehicle, although it is not known if the children were given use of the vehicle.

During the years 1940–1941, Cyrus L Winchester worked at El Conquistador Hotel (3.2 miles) as a cook while living at 49 Grossetta. The hotel, located along Broadway, was about 2 miles outside of the city limits at this point. Given that a high-end hotel represented a major employer, and given the time frame, there was almost certainly bus service to the hotel by the 1940s. An interesting note about Cyrus is that he changed jobs in 1942, switching his employment to Jones Drug Company, which was 0.3 miles from where he lived. In 1948, Elton Davis lived at 46 Grossetta while serving as a patrolman at Davis-Monthan Air Force Base, nearly 7 miles away. It is possible he drove a personal vehicle to the base, although it is equally as likely that a base-specific bus service was available as it is today (Suntran 2009).

In the early 1950s, several project-area residents also worked at Davis-Monthan and at Hughes Aircraft, whose plant was near the present-day location of Raytheon. Again, there was likely express bus service from downtown to these locations as there is today.

The evidence strongly suggests that the vast majority of people in the project area preferred to live within a short walking distance of work, regardless of time period, and those who worked closest to home also remained in the project area the longest. There were a few exceptions, with an average longevity of 1.43 years, which was somewhat less than the overall average either for those living less than half a mile (2.15 years) or those less than 5 minutes (2.56 years) from work. Outliers did not appear at all before 1920, and the most extreme distances did not occur until after 1950. This was most certainly related to the expansion of Tucson through time, resulting in increased possible distances between home and work, and increased logistical support in the form of roads, cars, and public transport. Given the types of jobs (e.g., waitress, student, service station operator) often encountered amongst residents of the project area, it is probable that many people took advantage of public transportation to get to work, particularly early on when personal vehicles were less common for those who were not wealthy.

The Commercial Period

From the beginning of the postcemetery use of the project area, only one lot (Block 253; see Chapter 6, Volume 3 of this series) was used solely for commercial purposes. The Troy Laundry was built as early as 1902 on the small triangular parcel of land that comprised Block 253. A 1903 fire destroyed the building, but it was rebuilt the next year by the Seattle Brewing and Malting Company. With passage of the Arizona prohibition amendment, which was ratified in November 1914 and went into effect in January 1915 (State of Arizona 1914b), the brewery was repurposed as The City Laundry. The latter remained at its location until 1959, when the building was razed.

General commercialization of the project area followed the marginalization and decay of the residential neighborhood. The process began with a more intensive use of the residential structures and lots, resulting in more households occupying smaller spaces. This included the conversion of two single-family buildings at 59 and 77 Miltenberg into duplexes between 1910 and 1930 (Sanborn 1910–1930), and construction of the Brewster Apartment complex in 1924. The latter occupied Lots 11–13 of Block 252, replacing two small houses at 78 Grossetta and 58 Miltenberg, along with adjacent empty lots. Several boardinghouses appeared in the area between 1925 and 1932, and in 1926 Mrs. Mary Norris, who had been living at 270 N. Stone with her husband since 1921, made a brief attempt to run a sanitarium out of that house and two others—250 N. Stone (next door) and 309 N. Stone (across the street).

Although some houses and lots were used more intensively, others went vacant, and the overall vacancy of residential structures in the project area increased through time. Before they were demolished, however, many residential buildings were converted to commercial use. In some cases, individuals ran businesses out of their homes. Charles Sewell and his brother operated a paint contracting business at his home at 48 E. Alameda between 1926 and 1929, and in 1923 Earl Reimer ran an electrical engineering business out of his residence at 220 N. Stone. Home businesses continued to pop up in the 1930s, including Dr. Thomas Smith's medical practice at 208 N. Stone, Thomas Fridena's naturopathy at 196 N. Stone, and Alice Towne's Curios at 286 N. Stone. As residents vacated the area, these former homes were converted entirely to commercial use. Motor Mart briefly acquired 250 N. Stone in 1927, and Goldberg Film operated at 208 N. Stone in 1936. Likewise, the Powder Puff Beauty Salon, which started out as a home business at 48 Grossetta in 1930, took over the structure at 46 Grossetta in 1931 and remained there for nearly 20 years. Early on, the building sometimes served as the residence for the proprietors; however, the salon changed management several times, indicating that the business itself was a relatively stable entity, independent of ownership.

Other than The City Laundry, no other commercial buildings were constructed in the project area until the early 1920s, and they did not begin to replace standing residences until the late 1920s. Construction of commercial structures started along Toole Avenue and moved steadily into the heart of the project area in the following decades. In 1923, Frank Craycroft built a structure at 40 Toole to house his plumbing business, and 2 years later Baum and

Adamson built a structure for its new tire-shop location on Lot 1 of Block 252 (Figure 160). In 1929, the latter company expanded into Lot 2, demolishing the residential building at 294 N. Stone. Continued expansion of this company culminated in 1969 with the Baum and Adamson building covering all of Lots 1–5 and most of Lots 8–10 in Block 252. Also in 1929, the residence at 250 N. Stone Avenue was demolished and replaced by two commercial structures for the Old Pueblo Bowling Alley and Bowyer Motors, at 250 and 240 N. Stone, respectively.

By 1941, all of the residential structures along Stone Avenue had been replaced by commercial buildings, including the Tucson Newspapers building at 208 N. Stone. In 1946, a building was constructed for the Hackett Whiting Motor Company at 38 E. Alameda, encompassing Lots 6 and 7 of Block 254, which had been empty since the houses at those locations were razed in 1938. Further expansion of Baum and Adamson in 1949 engulfed the Bowyer Motors Used Car lot at 280 N. Stone Avenue, and in 1954 the Tucson Newspapers expanded to replace a service station, present at 220 N. Stone Avenue since 1935. The service station moved to another portion of the project area, displacing many of the remaining houses.

The last residential holdouts were a cluster of structures centered at the intersection of Council and Grossetta in the early 1950s. This was the most internal part of the project area, away from the three major streets that bounded the neighborhood—Stone Avenue, Alameda Street, and Toole Avenue. The remaining residences on Lots 4 and 5 of Block 254 lasted until 1953. As mentioned previously, the house at 46 Grossetta, on Lot 5, had been converted into the Powder Puff Beauty Salon in 1931, changing to Martin's Beauty Studio in 1949. Starting in 1948, adjoining residences were converted to commercial purposes as well. Lloyd Laws ran his realty business from home at 55 Miltenberg Street, and Spry Appliances operated at 59 Miltenberg. Both operated for about 1 year. Russell Photography took over the structure at 50 Grossetta in 1948 and remained there, along with Martin's Beauty Studio, until all of the buildings in the quadrant were finally demolished for the construction of the Durazzo's filling station in 1953. The Brewster apartment complex, renamed Melrose Court in 1937, disappeared in 1957, to be replaced by a parking lot associated with Durazzo's. The last residences, in Lots 1 and 6 of Block 255, finally disappeared in 1960, to be replaced by empty lots.

We were able to identify some patterning in the evolution of the project area's commercial character. The automotive industry, for example, was an early presence that came to dominate the area throughout much of its development. Baum and Adamson occupied much of Block 252 until the late 1970s, and there was always some form of automotive industry represented in the project area from 1925 until demolition began for the Joint Courts Complex Archaeological Project. By the early 1940s, Stone Avenue was dominated by the automotive business.

The presence of the automotive industry waned in the 1950s, having been reduced to Baum and Adamson and Durazzo's filling station in its new location at 55 E. Council Street. Vacancies were filled by an influx of financial organizations. Phoenix Title and Trust took over the Hackett Whiting building in 1957, lasting until 1961, when U.S. Thrift and Loan occupied the building throughout the 1970s. In 1962, the First National Bank remodeled the commercial buildings at 240 N. Stone for use as a downtown branch and later built an entirely new structure at 200 N. Stone for use as a downtown office. The building at 240 N. Stone was also briefly occupied by Southern Arizona Bank and Trust between 1968 and 1970. This was the bank that Fred Steward had founded.

Eventually, however, the commercial character of the area began to undergo the same decay that the residential area had seen earlier in the century. There was a rise in vacant buildings in the late 1950s and early 1960s, followed by a spike in empty or paved lots, as the focus of the city's development moved outward. Finally, the entire area was acquired by Pima County for the intended civic use as a joint City/County courts complex.

Contextually, the initial decay of the project area began in the early 1920s. This may have been related to an economic slump following World War I and the end of the wartime economy. The recession resulted from the devaluation of war products, including copper coming out of the Tucson area (Sonnichsen 1987: 204). A rise in residential vacancy in the project area began at this time, coinciding with an increase in the housing industry in expanding areas of the city. The latter was fueled by a rise in the number of families owing automobiles. At the same time, there was an influx of people into the project area who could not afford to own or rent an entire house and there was an abandonment of single-family houses, as the people who could afford them moved on to "better" neighborhoods. The Brewster Apartments were first built in 1924, on Lots 11–13 of Block 252, and in the following years, several boardinghouses were operated out of residential structures. Both the rise in residential vacancy and the development of the housing industry were symptoms of the general drop in the economic status of the neighborhood. This, in turn, may have made the area more vulnerable to commercial development.

The rise in residential vacancy reached its peak during the Great Depression of the early 1930s. As many as 6 of the 15 existing houses were vacant during this time. The peak in residential vacancy also correlated with a falter in the overall rise of commercial development. In 1933, Craycroft Supply closed its doors permanently, and the following year Bowyer Motor Company abandoned its car lot. In the late 1930s, Depression-era government programs took up office space in the project area, in the former residential structure at 286 N. Stone.

Residential vacancies dropped again near the start of World War II. An economic boost for the nation as a whole,

Figure 160. Baum and Adamson Tire and Automotive Company (photographs courtesy of the Arizona Historical Society, Tucson, unless otherwise noted): *top*, in 1929 (PC177_B1_F19_1712); *top center*, in 1934 (BN208068); bottom center, ca. the 1940s (105249); *bottom*, in 1969 (© Copyright Tucson Citizen; reproduced with permission).

Tucson in particular benefitted from the wartime economy. The city acquired a large military presence at this time, as the U.S. Army Air Force (now the U.S. Air Force) took over the Davis-Monthan Airfield and spent millions of dollars to expand and militarize the facility (Logan 2006; Sonnichsen 1987). Tucson's climate was considered excellent for flying and combat training, as well as for the year-round outdoor repair of planes (Parker 1948). A total of the 17,500 pilots from 29 different countries trained in Tucson. In addition, there was an influx of soldiers being conditioned for desert warfare in Africa, as well as engineers testing military equipment (Sonnichsen 1987).

Commercial use of the project area rose to a near high at the start of World War II. The number of businesses in the area remained steady throughout the war, spiking in the late 1940s. The postwar spike in commercial activity dropped dramatically in the late 1950s, reaching a sub-Depression low in 1959. Activity rose briefly again in the early 1960s but remained relatively low and erratic thereafter. A peak in commercial vacancies also occurred in 1959, and the number of empty lots quadrupled during this time. Financial and legal services became the most stable and robust commercial presence in the project area. Although the influx of financial institutions was partially responsible for the area's economic stabilization, as measured in a reduction to earlier vacancy rates, this interpretation is a little misleading. As noted above, the number of vacant lots in the project area increased steadily through time, with a particular spike in the late 1950s and early 1960s. Vacancies continued to rise steadily, reaching over 50 percent in the early 1990s. Thus the drop in the number of vacant buildings after 1960 may have been related more to the demolition of structures and the creation of empty lots than it was to the influx of new commercial interests.

The general abandonment of the project area during a time of extensive growth for Tucson is best explained by suburban sprawl, which picked up pace during this period. Between 1960 and 1980, the entire Southwest was characterized by outward expansion (Luckingham 1982). In the Sun Belt, the spread of low-density residential settlements was not limited by the proximity of other communities and these proceeded at an accelerated pace. This led to a decentralization of retail trade, spreading it out in the form of large shopping malls in suburban neighborhoods (Sonnichsen 1987). Not only were people moving into satellite communities, but the businesses that relied on their business relocated as well, accelerating the general decay of downtown Tucson.

Efforts to infill the city and revitalize downtown met with only limited success; they did not stem the outgoing tide of retail. In 1980, 25 percent of land in the city limits was vacant (Luckingham 1982:115). During this period, governmental and nonprofit groups moved briefly into inexpensive abandoned office space in the project area. However, even these institutions dropped off the project area map by the late 1980s. Only a few buildings remained, occupied by the community college, a gas station, and a savings and loan office. The empty building at 240 N. Stone became occupied by a career development service run by the City of Tucson; this was followed by an educational consulting service. The old Baum and Adamson building was taken over by a series of nightclubs, culminating with the Coconuts Night Club, and the savings and loan office was demolished. Finally, the entire project area was acquired by Pima County for construction of the currently planned Joint Courts Complex building.

The Project Area's Place in the Community

At the time this report was researched, there were approximately 14 major archaeological reports available on work conducted within the inner 2 square miles of historic Tucson. These reports covered the quasi-rural area to the west of town (Thiel 2005), the southern section known as Barrio Libre (Diehl et al. 2003; Thiel 2002), as well as a number of other blocks scattered around the historic townsite (e.g., Ciolek-Torrello and Swanson 1997; Curriden 1981; Mabry et al. 1994; and Thiel 1993). Each of these reports discusses changes that occurred on the associated city blocks and lots during Tucson's transition from a frontier town to the present. In this section, we compare a selection of these reports with our findings from the Joint Courts Complex project area.

Additionally, to understand the development of the project area in the context of those city blocks to which it was most closely related, we compared each study area using the Sanborn fire insurance maps for 1904, 1914, 1922, 1930, and 1957. An assay of the Sanborn maps quickly revealed that Tucson's developmental history could be termed "conservative," a judgment that was supported by the other archaeological reports. Although there were large-scale changes during the transition of the inner city from residential to commercial use, within each of those periods, very little change occurred. Generally, once a residence was constructed it was unlikely to be replaced prior to construction of a large-scale commercial enterprise. The same trend was observed for commercial buildings, although they were usually replaced by civic structures, the Joint Courts Complex being a prime example of this trend.

The Immediate Neighborhood

The easiest areas to characterize were the two that lay adjacent to the project area along Toole Avenue, to the northeast and the northwest. Initial occupation of both areas was dominated by commercial interests, including the

Eagle Milling Company, the Tucson Ice and Cold Storage Company, and a number of smaller retail emporiums. The preponderance of commercial enterprises to the north of the project area was a direct result of the Southern Pacific Railroad, which parallels Toole Avenue. The railroad undoubtedly had two effects. First, any commercial enterprise situated next to it would have had easy access to train cars for the loading or unloading of goods, which would have biased selection of these lots toward businesses requiring this type of access. Secondly, despite the fact that some project area homes were located near the railroad, the general pattern of domestic and commercial development suggested that areas nearest the railroad were not highly esteemed for residential use. Indeed, land in the project area that fronted on Toole Avenue was not developed until the beginning of the commercial period in the late 1920s.

The area directly to the east of the project area was developed simultaneously with the project area. Initial sale dates were the same and the trends that were evident in the project area were largely duplicated in its eastern neighbor.

Early Sanborn maps showed that the area directly to the south of the project area (e.g., Historic Block 194) was largely composed of small residences, with more than one single-family dwelling on a lot or clearly subdivided lots, and duplexes, although some large residences (a single-family dwelling on an undivided lot) were recorded. The density of residential occupation was heaviest along Stone Avenue. There was almost no commercial presence, except two doctor's offices. However, a little farther south was the commercial district of Stone Avenue and Congress Street, which extended northward through time, slowly at first then more quickly after 1930. Between 1904 and 1930, the area immediately south of the project area saw an increase in office space and an increase in small residences and multiple-residency dwellings (e.g., duplexes, triplexes, and Sonoran-style row houses). This pattern was similar to that experienced by the project area. However, the project area started with a much higher proportion of large residences than the area to the south and never reached the level of duplexes and other multiple-residency dwellings that the southern area contained. It also appeared that the commercial nature of the two areas was slightly divergent, with more office space developed in the south and more automotive and other working-class businesses appearing in the project area. One other difference between the two areas was in the number of buildings that were set back from the street. Buildings that were set back from the street has been put forward as an Anglo-American trait that replaced the earlier Sonoran tradition of building to the edge of the street (Ayres 1990; Diehl et al. 2003; Thiel 2002). The blocks to the south of the project area evidenced a greater Sonoran tendency than the project area, where few residences were constructed at street edge, and none was constructed by resident-owners.

The area directly to the west of the project area (Historic Blocks 174 and 180) was generally residential in character, with no commercial enterprises during the early period. The residential composition was mixed, with large and small residences predominating, but there were also a substantial number of multiple-residency dwellings. The distribution of residential types was slightly biased toward the placement of large residences along the major north-south corridors of Church and Stone Avenues, and most of the multiple-residency dwellings occupied the east-west streets. This basic residential pattern on the blocks to the west of the project area remained intact until the early 1920s when there was an increase in commercial presence. Commercial structures were largely built on preexisting empty lots, rather than razing any of the extant dwellings. At this time, there was also an increase in the number of multiple-residency dwellings, which included both new construction as well as the remodeling of existing buildings. By 1957, all of the lots immediately adjacent to the project area were entirely devoted to commercial enterprises, mostly shops. The only remaining residences were on the far western edge of the adjacent blocks. Development of the city blocks to the west of the project area showed a marked similarity to development in the project area itself. The latter had a slightly higher proportion of large residences and, until construction of the Brewster Apartments, a general lack of multiple-residency dwellings. There was also a slightly lower number of houses abutting the streets but not enough to be significant.

Comparison with Historic Block 180

In 1989–1990, Statistical Research excavated significant portions of Historic Block 180, located immediately to the southwest of the Joint Courts Complex project area (Ciolek-Torrello and Swanson 1997). Comparison between Block 180 and the project area revealed that residential development of Block 180 began much earlier than in the project area; the first dwellings were constructed around 1872 in the former. However, early development of Block 180 was not widespread and most of the residential construction occurred sometime around the mid-1890s, consistent with the initial development of the project area. In Block 180, the earliest buildings were constructed adjacent to the streets, and later buildings were generally set back. These later buildings were more often made of brick, as opposed to the more-vernacular adobe blocks used in much of Tucson. Interestingly, although project area residences were constructed at around the same time as these brick buildings, a high percentage of the residences in the project area were still constructed with adobe.

Attempts have been made to interpret lot placement and building-material choices through the lens of ethnicity (e.g., Ayres 1990; Thiel 2002), ascribing house placement

close to street and the use of more-colloquial materials to the local Hispanic population. However, in the case adobe dwellings in the project area, the ethnicity of the owners-builders was largely Euroamerican. This illustrates the hazard of ascribing too much weight to architectural markers of ethnicity in Tucson and may indicate a need to develop a model for a broader southwestern building tradition that transcends the Hispanic and Euroamerican groupings.

Residential patterns within Block 180 and the project area were generally similar. The late 1890s and early 1900s were the height of the owner-occupant phase, followed by an increase in renters and businesses operating out of residential buildings. However, Block 180 managed to maintain its residential character for a much longer time, with most of the block still residential as late as 1954. There was an increase in commercialization of Block 180 during the 1950s, and by 1960, there was little to no residential presence.

The archaeology of Block 180 and the project area were also markedly similar. Block 180 contained a number of privy pits, but also a fair number of cesspits, suggesting that the residents, like those in the project area, had access to running water and indoor sanitation facilities at around the turn of the century. A similar number and pattern of trash features also existed, including discrete trash pits as well as larger, trash-filled borrow pits that were probably originally used in the making of adobe. Interestingly, both blocks contained historical-period human burials. As the project area residences were built on top of a cemetery, this was not too surprising, but Block 180 contained two burials, apparently related, that were not associated with any historical-period cemetery.

Comparison with the León Family Farmstead and the Semirural West of Tucson

During the early settlement of Tucson, the area to the west of the modern city center, now dominated by the I-10 interstate corridor, was divided into agricultural fields with their related residences. One such house was owned by the León family (Thiel 2005). The quasi-rural nature of this homestead and the urban nature of the project area presented us with an interesting comparison.

Mechanical stripping of the area related to the León farmstead was relatively complete, which allowed for a good comparison. Of course, the most obvious difference was the initially semirural nature of farmstead. Despite being close to the road, the farmhouse did not abut it. Given a construction date between the 1840s and 1862, it should be noted that although the row house may have been the hallmark of urban Sonoran architectural style, it was not the only style available within the Hispanic repertoire.

A number of interesting correspondences existed between the León farmstead and the residential addresses associated with the project area. First, there was a single privy pit associated with the León house, as there was with the project area dwellings. This was despite the fact that the León family had access to a much greater expanse of land, and therefore could have more easily moved their privy once a pit was full. Considering the difficulty of digging through the local caliche soil, it appears that the cleaning of privy pits was considered to be the more desirable response. This is counter to rural practices and the expectations developed in more easterly portions of the United States (Stottman 2000). Second, given its length of occupation, somewhere between 80 and 100 years, there were surprisingly few trash features discovered at the farmstead (n = 5, only 2 of which were pits). Likewise, the project area had surprisingly few trash features per dwelling (approximately 18 dwellings and 29 trash features, of which 24 were pits). This lack of accumulated domestic refuse was somewhat surprising. Citywide trash collection would explain the relatively low number of trash deposits in the project area, but it would not explain the farmstead's low number of trash features. Interestingly, the household associated with the largest number of the trash features in the project area (the Brown family) was also one of the wealthiest. This suggests that, at least in respect to these two sites, there was no strong pattern between domestic-waste disposal either by location or according to wealth.

Comparison with Barrio Libre and the South of Tucson

The Barrio Libre, and its association with a largely Hispanic population, has been discussed in a number of books, most prominently *Los Tucsonenses: the Mexican Community in Tucson, 1854–1941* (Sheridan 1986). The archaeology of this area has been conducted almost exclusively by Desert Archaeology, Inc., and we draw information from two of their volumes (Diehl et al. 2003; Thiel 2002) for the following comparison.

Our expectation when comparing the project area with the barrio was that the latter would conform more closely to Sonoran styles, given the predominantly Hispanic nature of its population. However, although there were a number of buildings in the barrio that might be defined as "row houses" (Ayres 1990; Diehl et al. 2003; Thiel 2002), there were also a fair number of large and small residences. Further, there was no greater preponderance of buildings abutting the street than was recorded within the project area; indeed, one particular "row house" was situated in the center of its associated lot. Another area in which there was less contrast than expected was in the choice of building material. Both the project area and the Barrio Libre blocks contained dwellings built of both brick and adobe, with no

obvious divisions based on ethnicity. Indeed, if there was a noticeable difference between the two areas, it was in the size of the dwellings and the general lack of development in the southern neighborhood. This sort of difference may have been attributable to economics, but a direct correlation should not necessarily be made between ethnicity and wealth. The economics of the barrio were difficult to quantify, but there were instances of owner-occupancy indicating that at least some residents were economically within the top 10–13 percent of the population.

Within Blocks 136, 139, and 159 in the barrio the presence of large residences was minimal, and most single-family homes fell into the category of small residences, many of which were built or converted into duplexes. Multiple-residency dwellings (e.g., row houses) contained much smaller apartments than those associated with the project area, or the northern areas of Tucson generally. However, density of development was not particularly high, and there was a great deal of open land in the barrio, including empty lots. It may be that the low density of development and some of the deviations from the Sonoran norm could be attributed to the barrio's relatively late period of development. Development of Blocks 139 and 159 did not start until the 1910s, despite an ownership record that began in the 1870s (Diehl et al. 2003). Likewise, Block 136 may have seen its first period of development in the late 1890s. Although development may have begun earlier, but went unrecorded (Thiel 2002), ultimately the area was never developed to the extent of the northern neighborhoods. Indeed, beyond the rental nature of many of the residences, not one of these three blocks ever entered into a commercial period. The original residences are either still standing or have been replaced by low-cost housing.

The extent of excavation at Barrio Libre was not complete enough to directly compare the density of refuse features to those in the project area; however, there was no evidence to indicate that they were any more or less common than in the rest of Tucson. Likewise, there were privy pits, at around one per lot, whether that lot held a large residence, several small residences, or a multiple-residency dwelling. Although not recorded as such, it is also possible that a number of the privy pits associated with Block 139 (Diehl et al. 2003) were, in fact, cesspits; this was based on analysis of their depths and the average depths of privy pits and cesspits as discussed in Chapter 3, Volume 3 of this series. This would indicate that despite potential differences in ethnicity and economics, the barrio had similar access to a range of early sewerage options as the rest of Tucson, including our project area. However, one of the largest potential differences between the project area and the Barrio Libre blocks was the time frame within which these sewerage features were used. By and large, the privy pits and cesspits in the project area fell out of use as repositories for effluent by the early 1900s or the mid-1910s. In Barrio Libre, these features may have been used for another one to two decades, before they were finally replaced by city sewer connections.

Comparison with Historic Block 83

The last of the areas to be compared is Block 83, which was excavated by Desert Archaeology in May of 1990 (Mabry et al. 1994). Block 83 is relatively close to the project area, but because of its position relative to the commercial district along Congress Street and the lack of other impediments to development, it was initially developed a decade earlier than the project area. Like the project area, the buildings on Block 83 were constructed of both adobe and brick; however, unlike the project area, it also included some entirely wood-framed buildings. Similarly, Block 83 had a mix of owner-occupied and rental properties that were distributed in the same sort of pattern as was seen in the project area. This pattern was typified by small residences toward the interior of the block and large residences along the major streets. Its earlier initial development and its proximity to Congress Street led to a slightly faster commercialization of Block 83. However, Block 83 followed the same basic trajectory from owner-occupancy to rental to commercial to civic that typified most of downtown Tucson.

Interestingly, of all the blocks that were compared, Block 83 may have had the highest percentage of buildings that abutted the streets. Two residences were set far back on their lots, and two others were set back a few feet. However, virtually every other building noted on the project map (Mabry et al. 1994:Figure 2.2) had at least one side abutting the street. This includes buildings of brick, wood, and adobe, and buildings attributed to Euroamericans as well as Hispanics. One explanation for this could be that this was perhaps the most "urban" of the blocks that were examined. It was closer to the heart of Tucson that led to a denser use of the land, and an aesthetic that argued against the presence of front yards. It may be that ideas about dwelling placement and setback existed in the tension between the suburban/rural and the urban experiences, rather than in ethnicity. Certainly, this tension was apparent in the development of suburban neighborhoods, and one might argue that Tucson was, and is, essentially a suburban city.

Archaeologically, there were a few notable differences between Block 83 and the project area, although differences in testing and excavation strategies may account for some of the discrepancies. The density of trash features and borrow pits was much lower on Block 83 than in the project area, and conversely, the number of wells was higher. However, most of Block 83 was not stripped, and features were discovered strictly through trenching. As the trenching was heavily biased toward lot boundaries, it was less likely to discover features that did not share

that bias. As excavations associated with the Joint Courts Complex Archaeological Project showed, neither borrow pits, cesspits, nor trash features were heavily biased toward lot boundaries. It is, therefore, more likely that they would have been missed by such a strategy. It is uncertain whether the placement of wells would have had any bias, although it seems likely that wells would have been placed for convenience but not near privy pits or cesspits. As stated earlier, no wells were discovered in the Joint Courts Complex project area.

Summary

Archaeological and archival investigations of the post-cemetery component of the Joint Courts Complex Archaeological Project yielded information on the transition from cemetery to residential neighborhood; the demographic changes that occurred in that neighborhood through time; its evolution into a commercial district; and its ultimate decline into a largely abandoned area, poised for redevelopment into civic use. Along the way, we examined a number of more-specific topics, including the motivating factors that allowed the cemetery land to be repurposed as a residential neighborhood, subsequent responses to the cemetery's rediscovery, the ratios of owner-occupants vs. tenants, and the role of ethnicity and gender in the neighborhood's formation. The foodways of neighborhood occupants were investigated, along with evidence for their attitudes towards health and hygiene. The role of community infrastructure was also examined, especially as it pertained to public sanitation and transportation. As the neighborhood transitioned from residential to commercial use, then commercial decline, we looked at the underlying causes of the transformation. Finally, we compared our findings with those derived from other archaeological projects in Tucson in an effort to illuminate similarities and differences on a citywide scale.

There appear to have been several underlying motivations that drove the abandonment of the cemetery and reuse of the land. An influx of immigrants to Tucson following the arrival of the Southern Pacific Railroad resulted in a new generation of residents with no ties to former inhabitants. This was coupled with an economic depression in the 1880s and 1890s that left the City hungering for increased tax revenues that could be generated from property taxes. Thus, any open land was viewed as an opportunity for expanding the revenue base. As we discovered both through the excavations and during the archival research, by the first decade of the twentieth century, the cemetery had for all intents and purposes been "forgotten," as responses to accidental discoveries of human remains were cause for public notice in the newspapers. Individual responses to those accidental discoveries varied from near disrespect to attempts at minimizing damage. However, the wheels of progress never stopped, and the cemetery was never allowed to stand in the way of development.

Although there were certainly owner-occupants in the project area, some of whom were quite wealthy and influential, the general nature of the neighborhood was transient, with rental houses, boardinghouses, and apartment complexes scattered throughout. This led to difficulties in the assignment of archaeological deposits to specific households, even though we had a generally complete archival record for the neighborhood. Generally speaking, the neighborhood began as a middle-class enclave of professionals, clerks, and workers with some responsibility, but it evolved through time to a mixed group of students, retirees, professionals, service operators and employees, and blue-collar workers.

We discovered that the best ethnic data were retrieved from archival sources; acculturation, mass-marketing, and consumption, as well as the adoption of "other-ethnic" foodways and traditions, blurred the focus of ethnic fingerprints in the archaeological record. Our investigations were more reliable with regard to determinations of socioeconomic status. Archival data allowed us to analyze the socioeconomic standing of property owners, and the analysis of food remains and artifacts assisted in an interpretation of the socioeconomic standing of residents in the project area.

The archaeological data provided insights into the role that personal hygiene played in the lives of residents. We discovered a preoccupation with cleanliness and health, but project area occupants seem to have relied on mass-produced remedies rather than those prescribed by physicians or distributed by pharmacists. Mortality records for residents revealed a situation not too dissimilar from modern causes of death, with the exception of the prevalence of diseases that are thankfully not common today, such as typhoid, smallpox, and TB. Childhood mortality was sadly higher in the early twentieth century, but the neighborhood was remarkedly free of violent crime.

We were able to make some observations about household industry in the neighborhood, and evidence of leisure-time activities was noted. However, the latter were not well represented among adults, except in the consumption of mood-altering substances such as alcoholic beverages, including the probable drinking of "canned heat" (Sterno), and a single example of smoking opium.

The role of transportation improvements in the post-cemetery evolution of the project area cannot be stressed enough—especially the arrival of the Southern Pacific Railroad and the introduction of the automobile. The former allowed the introduction into Tucson of a new population base, which required new land on which to settle, and also introduced easy and inexpensive access to mass-marketed commodities. In addition, because of the proximity of the project area to the railroad, the neighborhood was home to a number of railroad employees. The rise in

popularity and affordability of the automobile seemed to hasten the demise of the residential neighborhood as the city transitioned into suburbia.

As the project area evolved from a residential to a commercial focus, some residences were repurposed as offices and businesses, and eventually, residential structures were razed and commercial buildings erected in their stead. The first major commercial enterprise to monopolize the project area was the automotive industry, and the neighborhood was home to both automotive service and sales businesses. Gradually, those operations gave way to financial establishments such as banks. Other businesses operated in the project area as well, primarily servicing nearby residential areas and downtown workers. Finally, it was with its decline in value as a commercial district that the value of the project area rose as a potential location for governmental expansion.

Comparison of the Joint Courts Complex Archaeological Project area with other archaeological investigations within downtown Tucson revealed many similarities but some interesting differences. Probably the most fascinating conclusion revealed by the comparative analysis was that ideas about ethnic markers in the archaeological record formerly held to be true are perhaps not always reliable. Rather, around the turn of the twentieth century, there appeared to be the development of a nascent urban southwestern tradition in Tucson's development that transcended ethnic boundaries, a concept that merits further evaluation as additional investigations are conducted in the area.

CHAPTER 13

Conclusions

Michael Heilen

> The past remains integral to us all, individually and collectively. We must concede the ancients their place, as I have argued. But their place is not simply back there in a separate and foreign country; it is assimilated in ourselves, and resurrected into an ever-changing present.
>
> David Lowenthal, *The Past Is a Foreign Country*

The Joint Courts Complex Archaeological Project intensively investigated (1) one of the largest and most unique cemetery components ever investigated in North America, (2) a large residential and commercial urban component postdating the cemetery, (3) and a small but informative prehistoric component dating to the Middle Archaic, Late Archaic/Early Agricultural, and Middle Formative periods. The project was also one of the largest mitigation projects ever conducted in southern Arizona. Due to the need to recover all human remains within the project area, including fragmentary remains in secondary deposits, the entire 4.3-acre parcel was excavated to culturally sterile soil, and all excavated sediments, including vast quantities of overburden, were screened. Successful completion of the project required the application and integration of advanced technologies; a broad array of methodological advances; thorough archival research; large staffing; an incredible amount of planning, coordination, and constant communication; a great deal of attention to culturally sensitive issues; and sincere and respectful dedication to the project on the part of all parties involved.

The implementation of advanced database, cartography, and geographic information systems technologies was critical to every aspect of the project, including mobilization, fieldwork, laboratory analysis, reporting, and repatriation and reburial. Although requiring substantial investment in equipment and staff with specialized skills, the advanced mapping and database technologies applied for the project actually sped up the fieldwork. The amount of time necessary to complete infield recording of burial features was decreased by more than 50 percent with the project approach. The savings in time and money resulting from this investment allowed Statistical Research to complete the fieldwork more expediently—and to progress to analysis and reporting earlier—than would have been accomplished under normal circumstances. Despite the enormity of the task, the project was completed from start to finish in just over 4 years.

The extraordinary level of planning, coordination, and communication was absolutely essential to the successful completion of the project according to schedule, the respectful treatment of human remains, the cultural affinity assessments, and to repatriation and reburial. For the cemetery component, the consultation efforts and cultural affinity assessments were exceptionally innovative, forward-thinking, and culturally sensitive approaches that should serve as models for future cemetery investigations. It was especially fortunate that the County's technical representative, Roger Anyon, and a primary consultant for the project, Lynne Goldstein, have an unparalleled depth of experience and knowledge about repatriation and reburial efforts. Their expert insight and tireless efforts were of primary importance in ensuring the success of these aspects of the project. Undertaken in the midst of a thriving city, the project was conducted with the utmost respect not for only the individuals interred in the Alameda-Stone cemetery, but also for those individuals' possible descendants.

What is Important About the Past and How is it Relevant to Today?

In *The Past is a Foreign Country*, David Lowenthal addressed the question: How do we know the past and why is it important? How do we manipulate or change the past, or at least our understanding of it? According to Lowenthal, the past is known through the intertwining of

information derived from history, memory, and relics, but our understanding of the past is very much influenced by the needs of the present and by the kinds of information that we have or that we choose to use in building models of past events, processes, and conditions. The past, as we know it, is not a concrete entity that is directly accessed through scientific inquiry. Rather, the past is continuously created and recreated through acts of discovery, interpretation, and omission; our knowledge of the past is leveraged to shape the present.

Earlier in the history of archaeology, archaeologists excavated graves simply to answer questions they had about the past. These archaeologists sought to determine how people in the past buried their dead and how burial practices informed on how people constructed their view of the world. They wanted to know how people were differentiated in death according to status, gender, and cultural affiliation and how the conditions in which people lived affected their health. What, for instance, were the effects of aggregation or the adoption of maize on the incidence of disease or nutritional deficiencies? What were the effects of political complexity on status differentiation and health? These remain valid and important questions, but in the past, the reasons for asking them were purely academic. The way descendants felt about archaeologists digging up and poring over the graves of their ancestors was not always of major concern. Today, archaeologists show a much greater interest in the public implications of their research and the effects their research has on living communities.

Sometimes, descendants share interest in the same kinds of questions as archaeologists, but this is not often the case. Descendants typically share a closer social and biological connection to the people under study than archaeologists do, and they have a genuine concern that their ancestors are treated properly with respect. The disturbance of an ancestor's grave is not a welcomed event.

Descendants often want to know why the burials of their ancestors need to be dug up and moved to a new location, and rightly so. Why is it that the dead cannot be left where they were originally placed, and why cannot another piece of land be used to suit the needs of development? If removing burials from a parcel of land becomes inevitable and necessary, descendants want to ensure that the dead are treated respectfully according to their own particular cultural understandings, not those of archaeologists, land managers, or developers. Descendants may also have strong feelings about what can and cannot be done to document, manipulate, or store the burials when they are moved (Baugher 2005; Ferguson 1996; McCarthy 1996; McDavid 1997).

In the case of the Alameda-Stone cemetery, the presence of a large cemetery containing burials of people from multiple cultural groups required that the County ensure a much greater depth of planning and cultural sensitivity than is normally the case. Descendant groups had a variety of different perspectives regarding what they felt needed to be done. Native American tribes generally felt that burials should be left in place. In the case that burials absolutely had to be moved, they wanted to ensure that photographs of the dead would not be released. Los Descendientes del Presido del Tucson, who represented the interests of Hispanic burials, had an entirely different perspective. They felt that the current location and condition of the cemetery—an urban lot where graves could not be visited, maintained, or memorialized—was no longer a suitable place of burial. Moving the cemetery was welcomed. Los Descendientes del Presidio del Tucson also were interested in having scientific studies performed, as they wanted to learn as much as they could about their ancestors buried in the cemetery. The exceptional level of detail and care used in documenting and analyzing the mortuary context was essential to discerning which remains could be repatriated to which groups as well as which remains could be subjected to different levels of analysis and reporting. Thus, the cultural affinity assessments served not only the purpose of guiding the study of the cemetery and the burial population but also served the individual needs of descendant groups.

In addition to descendant groups and archaeologists, the other major stakeholder in the project was Pima County. The County needed to move the cemetery to make way for a new City/County Joint Courts facility to accommodate the growing needs of County administration. To do this, the County needed to ensure that all applicable cultural resource laws were complied with and that the needs and concerns of other stakeholders were appropriately addressed. Failure to meet these requirements has met with disastrous consequences in the past (Blakey 2009a, 2009b); the County needed to ensure that every step required by law and by the burial agreements was taken and that the work was conducted according to the highest professional standards. Based on the requirements of this vast undertaking, Statistical Research implemented several advanced technologies and methods, ensuring that (1) the data were as accurate, reliable, and detailed as possible; (2) all collected materials could be tracked at any point throughout the project; (3) daily reporting on the discovery of burials could be accomplished as required by the burial agreements; and (4) flexibly integrated analysis could be performed using a wide variety of data categories and statistical approaches. This last capability facilitated a truly bioarchaeological approach to research and allowed researchers to handle vast quantities of related data. The major findings that arose from this research and significance of the project components—one of the largest and most unique cemetery components ever investigated in North America, a large residential and commercial urban component postdating the cemetery, and a small but informative prehistoric component dating to the Middle Archaic, Late Archaic/Early Agricultural, and Middle Formative periods—are presented here.

Significance and Representativeness of the Alameda-Stone Cemetery

As discussed in previous chapters in this volume, a cemetery like the Alameda-Stone cemetery has never been excavated in North America, although a few equally large cemetery excavations have taken place, and several Hispanic Catholic cemeteries and burial spaces have been excavated in the American Southwest. What is particularly unique about the Alameda-Stone cemetery excavation is not only the large, majority Hispanic component, but also the fact that the cemetery represents an entire, multiethnic community, and the excavations themselves are unusually representative of the original burial population.

The representativeness of a cemetery excavation can be evaluated in a number of ways, including the absolute number of burials investigated, the percentage of a cemetery that was investigated archaeologically, the level of preservation, the degree of archaeological and osteological documentation, and the number of burials investigated per year of cemetery use. The number of grave pit and burial features investigated during this project was very large in comparison to most cemetery excavations conducted previously in the United States. Of more than 130 previous archaeological cemetery investigations consulted for comparison with the excavation of the Alameda-Stone cemetery (see Chapter 10, this volume, and Chapter 5, Volume 2 of this series)—most of them dating to the nineteenth and early twentieth centuries—almost 9 of every 10 excavations investigated fewer than 100 burial features, with the median being 15. Eleven projects investigated between 100 and burials (Table 46). Only five excavations investigated more than 500 burial features: Elmbank Roman Catholic Cemetery in Ontario, Canada; Voegtly Cemetery in Pennsylvania; Freedman's Cemetery in Texas; Milwaukee County Poor Farm Cemetery in Wisconsin; and Potter's Field in Secaucus, New Jersey. Two of these investigations—Milwaukee County Poor Farm Cemetery (n = 1,649) and Freedman's Cemetery (n = 1,150)—were of comparable size to the current project. Only one was substantially larger: the Potter's Field in Secaucus, New Jersey (n = 4,571), but only around 10 percent of individuals were intensively investigated osteologically for Potter's Field project.

The Joint Courts Complex Archaeological Project was also unusual in terms of the affinities of the burial population. Of the more than 130 projects compared with the current excavation (see Chapter 9, this volume, and Volume 2 of this series), more than 80 percent contained burials affiliated with non-Hispanic Euroamericans, and most of the remainder contained burials affiliated with African Americans. Only a handful of excavations investigated burials affiliated with Hispanic individuals—Dove Cemetery (Sewell and Stanton 2008); Las Vegas Gravel Pit Cemetery, New Mexico (Mills 1979); Seven Rivers Cemetery (Ferguson et al. 1993); Nuestra Señora del Refugio, New Mexico (Tennis 2002); Tucson Presidio (Thiel et al. 1995); San Agustín de Tucson (Hard and Doelle 1978); and Guevavi Mission in southeastern Arizona (Di Peso 1958). All of these investigations were comparatively small. To date, the Alameda-Stone cemetery is by far the largest excavation of a predominantly Hispanic cemetery in the United States. Only around a quarter of the compared investigations occurred in the western United States, so the project is somewhat unusual geographically as well.

Goldstein noted in Chapter 10 of this volume that a particularly unique aspect this project is the ethnic, religious, and socioeconomic diversity of the burial population. Most cemeteries from this time period that have been excavated were used by relatively homogeneous groups or pertain to a particular segment of a community. They do not correspond to an entire community, particularly one as diverse as Tucson. The excavation of the Alameda-Stone cemetery has also been unusual in its representativeness of both the community and the burial population.

The cemetery represents a cross section of the community during a relatively brief span of time—about 2 decades. Many cemetery excavations have investigated burial spaces used for longer periods and have investigated fewer burials overall. Cemeteries with the most burials excavated also had the largest samples per year of cemetery use (investigated burials/duration of use): Milwaukee County Poor Farm Cemetery, Freedman's Cemetery, Voegtly Cemetery, Secaucus Potter's Field, and Alameda-Stone cemetery. The size of the burial sample relative to the duration of cemetery use was an order of magnitude lower for most other excavations. Secaucus Potter's Field and Alameda-Stone cemetery had by far the largest burial sample per year of use, but again, only around 10 percent of individuals were intensively investigated in the Secaucus Potter's Field project. Ultimately, for the Joint Courts Complex Archaeological Project, the sample density in terms of years of cemetery use was considerably larger than most historic cemetery excavations conducted to date in North America.

Another perspective on the representativeness of a cemetery excavation is the proportion of individuals who were buried in a given community—the burial population—that were actually recovered during excavations. Our excavations discovered the remains from a total of 1,386 individuals, 1,044 of them in graves and the remainder consisting of fragmentary remains in secondary context. Depending on which number is used, this constitutes a sample of anywhere from half to around three quarters of the approximately 1,800–2,100 people originally buried in the cemetery. Other investigations of large cemeteries have focused on much smaller proportions of the burial population.

Table 46. Historic Cemetery Reports for Investigations of More Than 100 Burials, by Number of Burial Features

Project	Affiliation	Temporal Range[a]	No. of Burials Exhumed	No. of Individuals Exhumed	Location	Year Excavated	Reference
Old Snohomish Cemetery	Euroamerican; Native American	1866–1923	113 grave shafts	97	Washington	2005	Tallman and Carrilho 2006
Historic Los Angeles Cemetery (HLAC)	Asian American	1880s–1922	118	131	California	2006	Gust et al. 2006
Fort Brooke's Cemetery	Euroamerican	1825–1838	126	126	Florida	1980	Piper and Piper 1982
Cemetery 2, Colorado Mental Health Institute	Euroamerican	1879–1899	131	131	Colorado	1992	Painter et al. 2002
Former Wesleyan Methodist Church Cemetery	Euroamerican	1821–1900	135 grave shafts	157	Ontario, Canada	1993	Kogon and Mayer 1995
First African Baptist Church	African American	1823–1842	140	140	Pennsylvania	1981; 1983–1984	Parrington et al. 1989
Sam Goode Cemetery	African American	1840–1920s	155	155	Virginia	1999	Crist et al. 2000
Grafton Cemetery	Euroamerican	1834–1873	252	252	Illinois	1995	Buikstra et al. 2000
Millwood Plantation Cemetery	Euroamerican	1880–1930	263	263	South Carolina	1980–1981	Orser et al. 1987
Third New City Cemetery (Allen Parkway Village)	African American	1875–1905[a]	355[a]	355	Texas	1998	Foster and Nance 2002
African Burial Ground	African American	seventeenth century - ca. 1795	more than 400	more than 400	New York	1991–1992	Blakey and Rankin-Hill 2009; Perry et al. 2009
Elmbank Roman Catholic Cemetery (Fifth Line Cemetery)	Euroamerican[a]	1832–1937	634	622	Ontario, Canada	200–2001	Lipovitch et al. 2003
Voegtly Cemetery	Euroamerican	1833–1861	724	724	Pennsylvania	1987	Beynon 1989
Freedman's Cemetery	African American	1869–1907	1,150	1,157	Texas	1991–1994	Condon et al. 1998; Peter et al. 2000
Milwaukee County Poor Farm Cemetery	Euroamerican	1882–1925	1,649	1,649	Wisconsin		Richards and Kastell 1993, Richards 1997
Secaucus Potter's Field	Euroamerican, African American	1900–1962	4,571 (409 analyzed)	4,571	New Jersey	1991–1992	Louis Berger Group 2005

Still another way to consider the representativeness of a burial sample is to consider the level of preservation. Preservation in excavated cemeteries ranges from a preponderance of highly fragmented and decomposed remains to remains that are exceptionally well preserved, including the preservation of hair, soft tissues, and clothing. In addition, preservation often affects remains differentially, so that young children and infants are poorly preserved and thus underrepresented (Walker et al. 1988). Preservation in the Alameda-Stone cemetery was generally fair to good throughout the cemetery, although all human remains were recovered in skeletal form with no soft tissues. Infants and children are well represented, and variation in levels of preservation appears to have been random, not affecting burials in one area of the cemetery more than others and not affecting particular groups more than others (Figure 161).

All these factors mean that the sample is unusually representative of the burial population and the cemetery, with one exception. The portion of the cemetery that was destroyed historically during construction of the Tucson Newspapers basement will always represent a gap in our knowledge of the cemetery, as it obliterated the southern half of the densest and most unusual area of the cemetery and also confounded our ability to understand how this area articulated with other areas of the cemetery. Nonetheless, when joined with thorough and detailed documentation; the integration of biological, contextual, and historical information; the multiethnic nature of the community; and the majority Hispanic component, the level of preservation and representativeness makes for a uniquely informative and valuable cemetery sample.

Major Findings from the Alameda-Stone Cemetery

Prior to the establishment of the Alameda-Stone cemetery, burials were placed at a graveyard in the Tucson presidio adjacent to the chapel and at two graveyards at the San Agustín del Tucson mission: one adjacent to the church and another in the northwest corner of the mission complex (see Figure 29). These earlier burial spaces were essentially churchyards, with burials being placed within a relatively small area of land according to variable arrangements that differ in pattern from those of later cemeteries. Grave pits were often reused in these earlier graveyards, with disturbed remains being placed to the side of newly placed burials, in a manner consistent with traditional Hispanic Catholic burial practices (Hard and Doelle 1978; Thiel et al. 1995).

As discussed in Chapters 5 and 8, by the time the Alameda-Stone cemetery was established, a long period of cemetery reform had taken place in both Mexico and the United States (Laderman 1996; Lomnitz 2008; Voekel 2002; Will de Chaparro 2007; see Chapter 8). Increasingly, suburban cemeteries were placed on the outskirts of town, instead of within town, as civic officials became concerned with sanitation and the potential hazards of decomposing bodies. In Mexico, cemetery reforms also combated baroque approaches to death and burial, which emphasized differential treatment and burial location according to wealth, status, and other factors. Intellectual reformists sought to transform ostentatious and boisterous forms of baroque piety to egalitarian, humble, and inward-focused forms of enlightened piety and to level the distinctions among social classes in burial treatment (Lomnitz 2008; Voekel 2002).

The new cemeteries were typically bounded spaces with formal entrances that symbolically declared their meaning to visitors. Burials were placed in a relatively ordered fashion, such as in ordered rows and sections, and were individually marked such that each individual's grave could be located and memorialized. Grave pits were not often reused, in part to emphasize the individuality of graves, but also to minimize the health hazards associated with disinterring decomposing bodies (see Rugg 2000). Changes in burial practices associated with efforts to deal with the hundreds of thousands of Civil War deaths were also affecting burial practices across the United States, as approaches to burial came to cut across ethnic and religious lines and a more homogenized set of expectations for the proper burial came to be accepted by people of multiple religious faiths and ethnic backgrounds (Faust 2008).

Archaeological excavation of the Alameda-Stone cemetery revealed that the cemetery reflects many of these changes, in contrast to earlier burial spaces in Tucson, as use of the cemetery conformed to many of the expectations of the new cemeteries. Unlike earlier burial spaces, the Alameda-Stone cemetery was located at the northeastern edge of the town, around 250 m northeast of the old presidio graveyard. The military section of the cemetery was circumscribed by an adobe wall built in 1868 or 1869, and the civilian section was bounded on the western and northern sides by a wall, with an entrance at the west side (O'Mack 2006). Archaeological excavation revealed that graves were placed in relatively ordered, meandering rows and that the cemetery was divided not only into military and civilian sections, but that the civilian section itself was possibly divided into four separate areas. Many graves would have been marked, which would have allowed the identification of individual graves in the cemetery, but according to historical records, many of these deteriorated rapidly or were subject to vandalism to the extent that they were soon illegible. In addition, markers would have been removed when the project area was graded to make way for residential construction after the cemetery had been closed (O'Mack 2006).

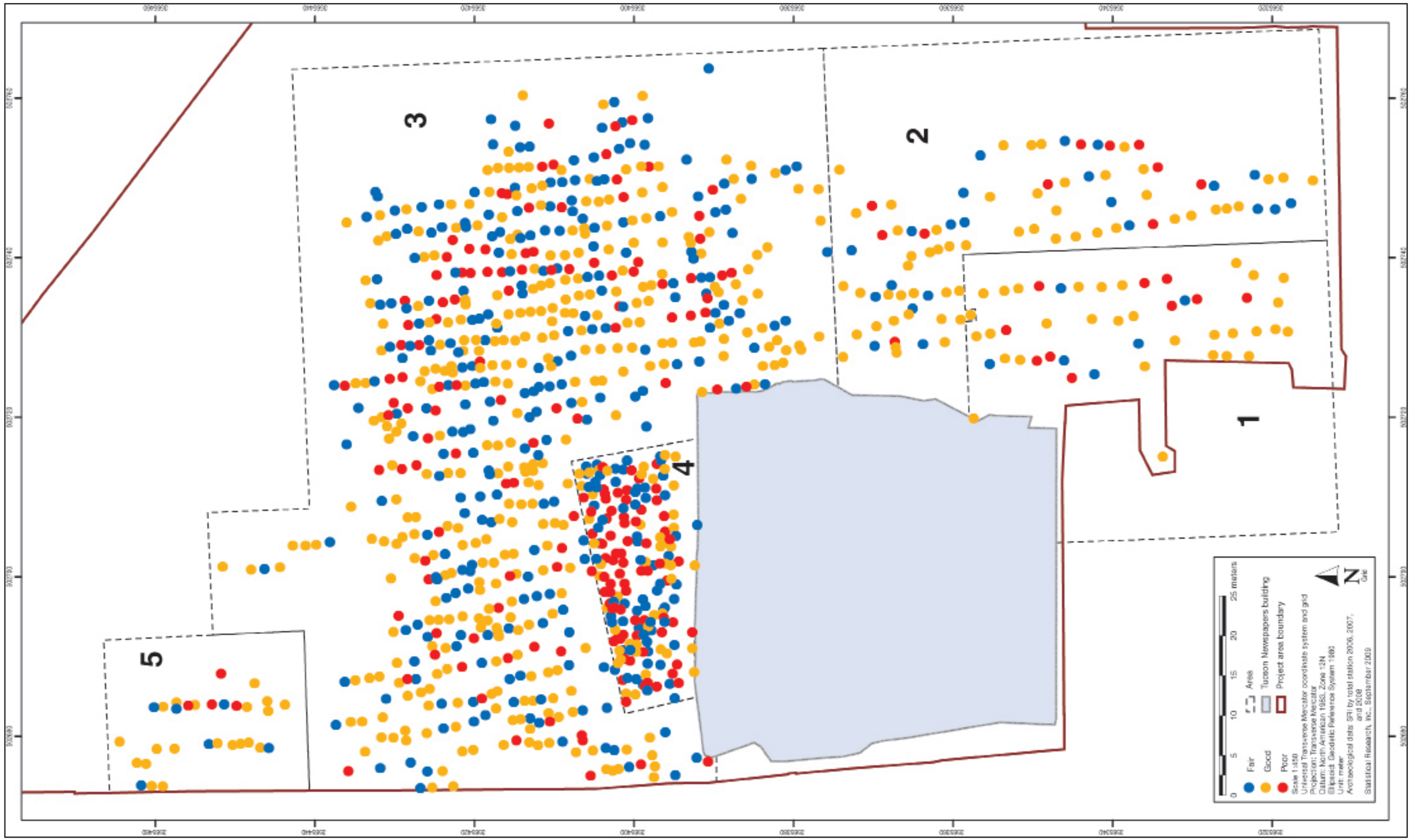

Figure 161. Spatial variability of burial preservation in the Joint Courts Complex project area.

The Beautification of Death movement—which was characterized by rural garden and parklike cemeteries, extravagant funerary accoutrements, solemn memorialization, lavish grave markers, and elaborate mourning clothing and paraphernalia—was common in other parts of the United States at the time but does not seem to have been particularly evident in the cemetery. The lack of evidence for the movement may stem from a lack of available formal hardware in Tucson for decorating coffins prior to the arrival of the railroad in 1880, a lack of professional specialists in the funeral industry in Tucson, and lack of surviving evidence on grave-marker design and construction. A park-like cemetery landscape similar to those in more mesic areas of the Unites States would have been difficult to achieve in the project area without irrigation. For instance, Assistant Surgeon Durant described the military section in 1872 as "well kept, but the sandy nature of the soil prevents any attempt at beautifying by means of grass or trees" (National Archives and Records Administration, Washington, D.C., RG 94, Entry 547, Bk 13:73). Many recent Euroamerican immigrants to Tucson may have shared the sensibilities of the Beautification of Death movement and expressed those sensibilities materially to the extent that they could. Two burials that had an abundance of formal hardware that could be associated with the sensibilities of the movement were found in the military section and appear to have been late. At least one of them could have been placed after the arrival of the railroad and, based on historical evidence, may have been marked with a marble headstone. Perhaps the movement came to be materially expressed in burials to a greater degree with the coming of the railroad and the arrival of funeral industry professionals in Tucson.

Patterns in the Cemetery Use and Mortuary Treatment

Analysis of the osteological and contextual data from different areas of the cemetery revealed fundamental differences between cemetery areas in mortuary treatment, demography, and life experiences. The northern areas of the cemetery (Areas 3–5) appear to have consisted mostly of the local and largely Catholic community, whereas the southern areas of the cemetery (Areas 1–2), including the military section (Area 1), appear to be more representative of the community of recent immigrants. In the northern areas of the cemetery, males and females were interred in relatively equal numbers, and individuals of all ages, from fetal-aged to old adulthood, were represented. The southern areas, by contrast, consisted mostly of adult males, with few females and few juveniles. Individuals in the southern areas were also more often of a Euroamerican cultural affinity than individuals in the northern areas. Mortuary treatment and osteological signatures differed both subtly and distinctly between the northern and southern areas of the cemetery. Differences were noted between the northern and southern areas in grave pit characteristics, coffin shape, burial orientation, clothing fasteners, religious artifacts, pathologies, evidence for medical intervention, and other factors. Among many, one difference between the northern and southern areas of the cemetery is particularly striking—nearly all religious artifacts (including frames, crucifixes, rosaries, possible bottles of holy water, and floral crowns placed on the heads of juveniles to resemble angels) were found in the northern areas of the cemetery (Figure 162).

Another interesting distinction appeared between Cemetery Areas 3 and 4, even though both areas appear to have been used by the local Catholic community. In Cemetery Area 4, grave pits were densely packed and often reused or intruded into by later grave pits, although still placed in north-south rows like other areas of the cemetery. Grave pits with multiple burials were also more common in Cemetery Area 4, and disturbed remains were sometimes redeposited beside a new burial or shifted to one side to accommodate new burials. Burial practices in Cemetery Area 4, in this sense, appear to conform more closely to earlier, baroque Catholic practices seen archaeologically at Tucson Presidio and San Agustín del Tucson Mission. A variety of archaeological evidence also suggests that Cemetery Area 4 may have at one time been enclosed by a fence, partitioning it from Cemetery Area 3 and the rest of the cemetery.

Grave pits in Cemetery Area 3, by contrast, were spaced further apart, according to a more standardized arrangement, and were less often subjected to disturbance from later grave pits or burial events. In other ways, however, mortuary treatment and demography was broadly similar between the two areas, suggesting that both are representative of aspects of the same community. One possibility is that Cemetery Area 4 represents adherence to earlier approaches to burial. Cemetery Area 3, although still mostly Catholic, could reflect a greater accommodation of reformist approaches to burial. Since the cemetery was used during a fairly brief period and artifacts could not be used in most cases to distinguish burials according to time, it is not clear that the distinction reflects temporal differences. The distinction may instead reflect differences in religious preferences among the Catholic population.

Altogether, differences observed within the cemetery, particularly among cemetery areas, appear to symbolize a growing rift that occurred within the community of Tucson between the local Hispanic community and the immigrating community of Euroamerican settlers. Although Euroamerican settlers became integrated within the community at first, adopting local customs and starting families with local brides, a division within the community began to emerge as Euroamericans gained more economic and political power. By the time the cemetery was abandoned, what had once been a fairly concentrated community became a divided community, with separate residential

Figure 162. Artist's rendering of Christ figure from the crucifix of an adult female of Apache cultural affinity. This grave was located in Cemetery Area 3, in the northern part of the cemetery.

neighborhoods occupied by Hispanics and Euroamericans in Tucson (Sheridan 1986) (Figure 163). In a sense, the division between the northern and southern areas of the cemetery could reify this social division. When the Alameda-Stone cemetery was closed on May 31, 1875, and the new Court Street cemetery was opened on the northern edge of the surveyed town site, the new cemetery had separate divisions for Catholics, Protestants, and fraternal burials. The city also offered to create a military section for burials removed from the Alameda-Stone cemetery. The divisions in the new cemetery suggest it may have mirrored divisions within the community that had emerged by this time and had become important to structuring the location of burials within the Alameda-Stone cemetery.

By contrast, the differences between Cemetery Areas 3 and 4 could reflect tension within the Catholic community itself in terms of expectations for burial, with some individuals being interred according to more traditional Hispanic Catholic practices and others buried according to newly accepted practices associated with cemetery reform.

Along with differences, there were also basic similarities across the cemetery, suggesting overarching trends in burial treatment that transcended individual groups. Most individuals, with some variation, were placed on their backs, within coffins, oriented along an east-west axis, and were buried in clothes rather than shrouds. Grave pits were typically placed in rows and were around 3–4 feet deep and rectangular in plan view, with straight, vertical walls and flat bottoms. Coffins were rectangular, trapezoidal, or hexagonal in shape and, because of the scarcity of materials and a lack of professional coffin makers, were built in vernacular styles using pine or juniper wood or both and using little formal hardware. Goldstein has demonstrated in Chapter 10 that these kinds of attributes were not only similar for many burials within the cemetery but were similar with other contemporaneous cemetery sites in the

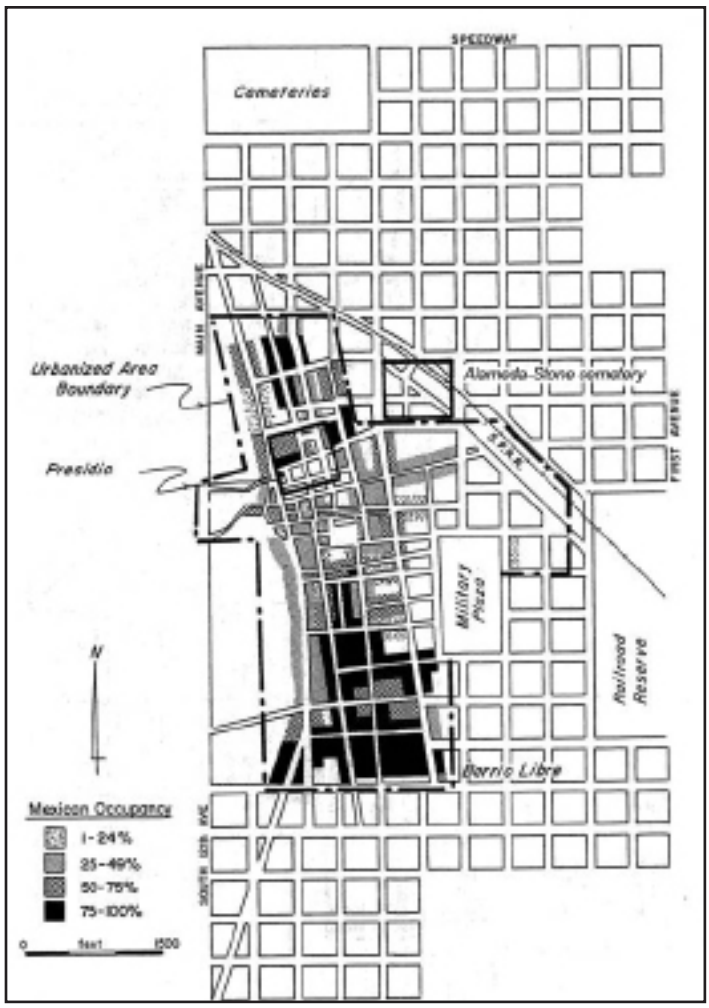

Figure 163. Concentration of Mexican population in downtown Tucson, 1881 (after Sheridan 1986: Figure 5.1).

United States. Many additional differences, some stark and some subtle, were noted between cemetery areas, cultural affinities, age, and sex in burial treatment, however, hinting at a variety of crosscutting differences in burial treatment among the community. Age, followed by sex and then cemetery area, were the most important determining factors in the distribution of most of the mortuary observations. The use of floral crowns, for instance, was restricted to children, who were likely dressed as *Angelitos*, or little angels, to symbolize their purity and innocence. Shoes, although rare in the cemetery, were also typically interred with children; jewelry, also rare, was buried with females or juveniles. Coat buttons and pants buttons, not unexpectedly, were found with men, although several women appear to have been buried in pants, representing a possible inversion of gender roles. Engraved shell buttons were found almost exclusively with men in the northern areas of the cemetery. Evidence for dental care, mostly fillings, was found exclusively in men in the southern areas of the cemetery. These patterns express a variety of differences in the identity, access to resources, and other factors explored in this volume and in Volume 2 of this series.

Osteological Patterns

Osteological analysis discerned important differences in work, diet and nutrition, health status, demography, pathology, trauma, and evidence for medical intervention between cemetery areas, affinities, sexes, and age groups, as well as between cemetery samples. Dental health for the burial population was generally good, suggesting that diets overall were sufficient, although individuals in the southern half of the cemetery appear to have experienced softer and more cariogenic diets than individuals interred in the northern half of the cemetery. Dental evidence suggests diets of individuals in the northern areas were grittier, due to the use of stone grinding tools, and less cariogenic, due to the absence of refined sugar and highly processed flours in the local diet. Males also had more severely worn teeth than females, possibly indicating differences in diet.

Individuals in the southern half of the cemetery more often had growth disruptions in their teeth (enamel hypoplasias), which may suggest greater exposure to metabolic stress at an early age, before coming to Tucson. In addition, Euroamericans were significantly more often affected than Hispanics by cribra orbitalia, bleeding beneath the periosteum lining the eye orbits. The condition stems from a combined "co-deficiency of vitamin C and B12" among the very young and could signal a lack of adequate access to animal foods and fresh fruits and vegetables during critical periods, gastrointestinal infection, or a combination of variables (Walker et al. 2009:119). Despite the elevated prevalence of cribra orbitalia among Euroamericans, evidence for metabolic disorders resulting from disruptions in the bioavailability of key nutrients was relatively rare for the population in comparison to other cemetery samples.

Evidence for work, including differential expression of degenerative joint disease, cross-sectional geometry of long-bones, and vertebral trauma resulting from physical exertion, suggested that males and females experienced different work patterns. Male work activities appear to have more often stressed the elbows, shoulders, and back, whereas women's activities more often stressed the lower body, particularly the knees. Hispanics also appear to have experienced greater levels of stress on the joints and bones from physical labor than other affinities, which corresponds to historical evidence indicating that Hispanics

filled many of the town's blue-collar jobs, whereas non-Hispanic Euroamericans held a disproportionately high number of white-collar jobs (Sheridan 1986).

Evidence for trauma suggested that Tucson was a hazardous place to live, in comparison to other cities, with both men and women experiencing high frequencies of broken bones and dislocated joints. Men experienced trauma more often than women, as is often the case, with men particularly affected in the cranium, thoracic region, and hands. A much smaller percentage of juveniles than adults was observable for trauma, so the level of trauma among juveniles is not clear. The vast majority of cases of trauma were antemortem, as some level of healing was observed (Figure 164). Very few cases of trauma could potentially be associated with events occurring near the time of death. Around a third of antemortem fractures were misaligned, suggesting that medical treatments were sometimes ineffective in setting and aligning broken bones. Another quarter of fractures appear to have become infected, as inferred by the presence of secondary osteomyelitis, suggesting that some fractures were severe and possibly open, having broken the skin.

Given that many people lived and worked around horses and wagons and probably led fairly physical lifestyles in frontier Tucson, the comparatively high incidence of skeletal trauma for the population was not unexpected. What was unexpected, however, was the limited evidence of weapons trauma. Because Tucson and the surrounding region were considered to be rife with gun violence, and violent conflict was common for soldiers and travelers, we expected to find frequent evidence of weapons trauma. This was not the case. Skeletal evidence for weapons trauma included trauma from stone projectile points, fired ammunition, knives or other lacerating devices, and weapons used in delivering blunt force trauma, but these cases were relatively few in number. Many pieces of spent ammunition were discovered in the cemetery context, but most were not directly associated with burials or, more specifically, with skeletal evidence for weapons trauma; many ammunition artifacts not associated with human remains could have been discarded as a result of military volleys during funerals, random gunfights, or vandalism involving guns. All of these activities involving ammunition were historically recorded as occurring within the cemetery. We suspect that weapons trauma was greater than that observed in the cemetery sample, but at the same time, it appears that the vast majority of trauma may have resulted from nonviolent events.

A diversity of pathologies was observed in the population, including general evidence for infections affecting bone (periosteal new bone, osteomyelitis, and meningeal/endocranial reactions), respiratory infections (sinusitis, tuberculosis), treponemal infection, degenerative conditions (degenerative joint disease, rheumatoid arthritis, diffuse idiopathic skeletal hyperostosis, seronegative spondyloarthropathies, gout/hyperuricemia, osteophytosis, osteochondrosis dissecans), and metabolic disorders (cribra orbitalia, porotic hyperostosis, osteoporosis). Evidence for most of these conditions was relatively rare, however. Periosteal new bone and degenerative joint disease were the most commonly observed pathological conditions. A higher incidence of active infection was observed among juveniles, whereas adults showed a higher incidence of healed infection. This is an expected age-related pattern, as skeletal evidence for pathology can increase with age.

Historical evidence for the occurrence of multiple epidemics in Tucson, coupled with comparison of historical demographic and paleodemographic data indicated that the population was likely heavily affected by infectious disease. Like many urbanizing settlements of the time, Tucson was subject to poor sanitation, aggregation, and the concentration of people and goods from many different areas, which meant that diseases spread easily and that people were increasingly brought into disease environments for which they had established no resistance (Haines 2004; Lee 1997). When age was controlled for, systemic infections were more common in the southern areas of the cemetery, whereas localized infection was more prevalent in the northern areas of the cemetery. This pattern could indicate that individuals in the southern areas were more often exposed to systemic infections or that individuals in the northern areas more often died of systemic infections prior to skeletal involvement.

Demographic analysis revealed that young children, infants, and old adults suffered particularly high mortality rates, likely as a result of disease. Mortality rates among females were also high, probably as a result of complications related to childbearing as well as exposure to infection. When compared to historical records, particularly the Tucson Diocese burial record, the mortality profile of the northern areas appears to match fairly closely the expected pattern for the local population, whereas the mortality profile for the southern areas appears to match our expectations for an immigrating population composed mostly of adult males. Possible artifactual evidence for the burial of diseased individuals includes the deposition of lime in the grave, to accelerate decomposition and the possible inclusion of clothing or other personal effects within the grave.

One area of the cemetery, the eastern half of Cemetery Area 3, had a disproportionately high number of infants and young children that were clustered within rows. One hypothesis regarding this pattern is that this was an area where the victims of epidemic disease had been placed. Given that death during epidemics may have come more quickly than skeletal involvement for infection, some of the strongest evidence we have for use of the area for diseased individuals is demographic. It is clear through multiple lines of evidence that the burials of diseased individuals were placed throughout the cemetery and were not placed exclusively in the eastern half of Cemetery Area 3. Future work may resolve this issue. Another possible effect of

Figure 164. Right scapula with lead ball, Individual P, Grave Pit 7529, Burial 8941, a Euroamerican child of indeterminate sex.

disease was dampened growth for individuals who died between the ages of 7 and 14, followed by a period of catch-up growth. A likely explanation for this pattern is compromised nutrition resulting from infectious disease. In general, many adult individuals in the cemetery were shorter than cohorts of people of similar biologies born a generation or two earlier. As discussed in Chapter 7, declining stature in the United States and other industrializing nations between 1830 and 1880 is referred to in demography as the "antebellum puzzle." Universal declines in stature are thought to result from shortfalls in nutrition and increasing exposure to infectious disease associated with rapid urbanization, the integration of disease environments at national and international scales as a result of widespread migration and long distance transportation, and a greater exposure of wage laborers to hunger due to fluctuating food prices and periods of joblessness (Haines 2004; Haines et al. 2003).

Significance of the Postcemetery Investigations

The postcemetery component in the project area contributed yet another unique contribution of the Joint Courts Complex Archaeological Project in that it represented development and change in an urban neighborhood after the arrival of the railroad in Tucson up until the project area was excavated, starting in November 2006. Several buildings were still standing in the project area when the project began. These were thoroughly documented by our architectural historians, and one was used as an on-site laboratory until it was demolished. Other previously demolished buildings in the project area were documented through Sanborn Fire Insurance maps, historical photographs, and archaeological information. Intensive archival research allowed us to chart the history of the project area according to the legal boundaries of blocks and lots established in the project area after the cemetery closed and to associate specific residents with the use of feature contexts in these lots (see Chapter 12, this volume, and Volume 3 of this series).

Because of the potential for human remains throughout the project area, the postcemetery period was more thoroughly investigated than would normally be the case in a turn-of-the-twentieth-century urban setting. During the course of our investigations, we excavated utility trenches, landscaping pits, building foundations, basements, refuse pits, roadbeds, privy pits, cesspits, and pet burials dating to the postcemetery period. One need only imagine the vast quantities of nonperishable items that we use today in our daily lives to imagine the enormous quantities of trash from an entire urban neighborhood spanning more than 100 years of use. Certainly, not all of the hundreds of thousands of artifacts from these contexts could be analyzed, but representative samples from primary and secondary contexts were analyzed, as were select diagnostic artifacts and unusual artifacts from trash-laden fill deposits that could not be inventoried in their entirety.

During the postcemetery period, the land containing the cemetery was surveyed into lots, sold, and graded and converted—first into a residential neighborhood used between 1889 and the 1920s, then into a commercial district. Postcemetery investigations provided a unique opportunity to consider development and change in an urban neighborhood during a period of major changes in transportation, demography, economic and political organization, commercialization, and other factors. Topics explored for the residential period included property ownership patterns, residential architecture and landscaping, differences in wealth and ethnicity, foodways, health and sanitation, politics, household industry, and leisure activities. Issues examined for the commercial period included commercialization, suburban flight, disturbances to the project area archaeology, and efforts at revitalization. Other general issues that were investigated included disturbances to the cemetery and transportation development.

During the course of these investigations, the question was often asked: Why would the people of Tucson allow the Alameda-Stone cemetery to be graded and built over, with its graves no longer accessible to maintenance, visitation, or memorialization, and the land converted to residential use? In essence, the cemetery seems to have been largely forgotten and ignored by Tucson residents, although human remains were repeatedly encountered in the project area when the ground was disturbed. Possible reasons for the abandonment of the cemetery and the repurposing of the land are many, but a few stand out. One possible reason for the lack of concern regarding burials remaining below ground is that drought, the withdrawal of the military, and the failure of mines in the region led to net loss in population in the 1880s. Although some residents did petition the City Council to turn the area into a park, rather than auction the land, other former residents may not have been in Tucson to voice their concern about burials remaining in the cemetery. Decline in population and in the local economy may have also led to a loss of tax revenue in Tucson, which could have been one motivation for selling the land containing the cemetery. Still another reason that conversion of the cemetery to residential use was tolerated could have been that many of the people immigrating into Tucson had no familial or cultural connections with the people buried in the cemetery. Moreover, landowners and renters in the project area were mostly non-Hispanic Euroamericans born outside of the region. Whether consciously or not, landowners and renters may have had few qualms about covering over and erasing the traces of Tucson's heritage.

The Residential Period

Ultimately, the abandonment of the cemetery and the sale of the land allowed for the project area to be repurposed into a residential neighborhood. During the residential period, between 1890 and the 1920s, at least 34 individual dwellings were constructed and occupied within the project area. The size of these varied widely, from a 280-square-foot former outbuilding used as a dwelling to the 4,400-square-foot house of Fred and Amelia Steward at 286 N. Stone Avenue. Most residences, however, were on the order of 850 square feet and most were used as rental properties rather than primary residences. Of the 34 addresses, only 7 were occupied by the property's owner for any length of time, and only 8 percent of the 318 families documented to have lived in the project area were owner-occupants. The properties were conveniently located downtown near the railroad but perhaps were not the kind of places where owners would choose to live. Only one commercial business, the Troy Laundry in Block 253, was present at this time.

Owner-occupants, who were typically white-collar professionals living in nuclear families, were most common during the early 1890s and early 1900s, after which point residences were increasingly occupied by renting households and small businesses. The limited number of owner-occupants created a certain bias in analyzing households from historical records, as much more information was recorded in official records about owner-occupants. Similarly, archaeological deposits found within the project area were difficult to associate with individual households, as residences were used by multiple households, residential turnover was high, and features were sometimes shared between residences.

Flat-roofed, adobe houses abutting the street are considered to be indicative of local, Sonoran architectural traditions (e.g., Ayres 1990; Thiel 2002), whereas housing in other parts of the United States often emphasized the construction of pitched-roof, brick or wood-frame houses set back from the street. In general, nonlocal architectural traditions became more prevalent in Tucson during the residential use of the project area, but to some extent, architectural styles and construction techniques in the project area reflect a mixture of local and imported materials and traditions. Three quarters of area residences were built of adobe, but only three houses were placed close to the street, and by 1908, all houses in the project area had pitched roofs, even those that originally had flat roofs. In Block 180, immediately west of the project area, contemporaneous buildings were made of brick and were set back from the street, in keeping with nonlocal traditions. Perhaps, adobe construction was chosen for rental properties as a cheaper alternative to brick. Architectural styles in the project area were mostly Spanish-Colonial or Folk Victorian—other styles included Egyptian Revival, Craftsman, Spanish Eclectic, and Art Deco.

Many of the lots were landscaped with trees. Historical photographs and archaeological evidence indicated that a few residents (e.g., John Brown on Block 252, Benjamin Fairbanks on Block 254) kept livestock and maintained corrals and stables.

A number of postcemetery features contained abundant trash that could be used to analyze patterns in household consumption and disposal as well as evaluate the relationship between cultural deposits and issues related to ethnicity, gender, status, and wealth. These included 23 trash pits, 6 privy pits, and 7 cesspits, the latter identified by the presence of pipes that would have transported effluent from water closets into cesspits. Septic tanks, which included pipes running from the tank to the leach field, were absent in the project area. Before the current project, cesspits had only been identified archaeologically in the Tucson Basin at the Lewis-Weber site, approximately 1 mile north of the project area (Curriden 1981), and septic tank pits had only been identified at Block 180, immediately west of the project area (Ciolek-Torrello and Swanson 1997:213–224).

Cultural deposits in the project area consisted mostly of mixed deposits of material culture from multiple households. In only a few cases could deposits be associated with a specific household, such as was the case for the Brown/Steward families on Block 252 and the Fairbanks and Mose Kelley families on Block 254, Lots 6 and 7. Nevertheless, certain artifacts were found that indicated variation in artifact use according to age and gender, including sanitary items and children's toys, and faunal remains indicated some, but not many, possible differences in wealth.

Ethnicity and Race

During the residential period, ethnic group distinctions appear to have become increasingly racialized as the growing economic and social divide widened between Hispanic and non-Hispanic Euroamerican residents of Tucson. Increasingly, Euroamericans acquired property once owned by Hispanic Tucsonans and took advantage of a labor system that subordinated and exploited Hispanics. Between the 1860s and the 1930s, neighborhoods became increasingly segregated, and Hispanic Tucsonans were consistently relegated to lesser-paying, menial jobs (Kalt 2007; Sheridan 1986). Up until the U.S. federal census of 1930, Hispanic Tucsonans were classified racially as "white," but now they were defined separately as "Mexican," even if born in the United States. For instance, 11 individuals living in the project area in 1930 were classified as "Mexican," including people who had been born in the United States and whose parents had been born in the United States.

Landowners in the project area were almost exclusively Euroamerican families or individuals. The vast majority of residents were born in the United States; others were born

in England, Germany, Japan, Mexico, Norway, Scotland, Switzerland, or Syria. Only 14 percent of residents of known nativity were born in Arizona; a slightly lower percentage were born in California, and around half as many were born in Mexico. The nativity of more than half of the residents is unknown, however, which could introduce some bias into interpreting patterns in place of birth.

Given the growing social and economic disparities between ethnic groups in Tucson, an effort was made to distinguish deposits according to ethnicity, but these efforts only demonstrated that ethnicity can be very difficult to tease out from the archaeological record. Archaeologists have sometimes used particular artifact types, feature types, or patterning in artifacts and feature types as ethnic markers in order to study ethnicity in an archaeological context. However, the assumption of a one-to-one correspondence between artifact types and ethnicity can be highly problematic and overly simplistic. Artifacts in the project area could not be tied unambiguously to a specific ethnicity, nor could things such as housing types or evidence for culinary practices be unambiguously related to specific ethnicities. The large number of users of individual features also precluded the clear identification of patterns in artifact deposition that could be associated with ethnicity.

Toys found in the project area appeared to reinforce dominant gender roles and racial stereotypes, with dolls being one of the principal artifacts used to socialize girls for expected gender roles, as well as racial stereotypes. All of the doll fragments in the project area had fair-skinned complexions, which was common until the civil rights movement of the 1960s.

Sherds from O'odham pots were found in multiple contexts, most commonly from large jars, or ollas. Such vessels were used by many households throughout Tucson, regardless of ethnicity (Fontana et al. 1962). A few sherds from ceramic vessels made in Mexico and two artifacts related to opium smoking were found in project area contexts as well but were not easily interpretable as ethnic markers for Mexican Americans or Chinese (see Figures 139 and 147). These were simply items that people had likely purchased on the open market for household use.

Dietary Distinctions

The many faunal remains from the project area revealed some possible differences in wealth or dietary preference and provided a picture of diet and resource availability in Tucson during the late nineteenth and early twentieth centuries. The most commonly consumed animals in the project area were cow or cow-sized mammals, sheep or sheep-sized mammals, chickens, and to a much lesser extent, pigs. Turkey, fish, shellfish, and wild game were also consumed.

Beef, much of which was grown in Arizona, appears to have been the most common animal protein, consumed by all economic and ethnic groups in late-nineteenth- and early-twentieth-century southern Arizona, including in the project area (Henry 1996). Consumption of sheep in Tucson, however, has in some previous investigations appeared to have varied according to economic status and ethnicity. For instance, sheep bone was restricted to higher-income, Euroamerican households in Block 83 (Mabry et al. 1994; see also Henry 1996). In the project area, sheep bone did vary in relative proportion to other faunal bone and in the parts represented, which could possibly signal ethnic or economic differences.

Pig bones were rare in the project area, a pattern that has also been observed in other excavations of historical-period sites in Tucson (Ayres 1990:99; Cameron 2003; Thiel 1993:88; Thiel et al.1995). Pigs appear to have been more commonly consumed in turn-of-the-century Phoenix than in Tucson, where higher proportions of pig bones have been recovered from Mexican American households in comparison to Anglo-American households (Henry 1983). Similar patterns have not found in Tucson (Diehl et al. 1997; Mabry et al. 1994:181). Perhaps pork was an expensive or uncommon meat in Tucson.

Analysis of meat cuts indicates that project area residents obtained meat cuts in a uniform style, likely from a local butcher. Despite the variation in wealth among project area residents, differences in the relative abundance of the various meat cuts were not great. In other words, wealthier residents of the project area could not be distinguished from their neighbors in terms of meat cuts and their relative prices (c.f. Hamblin 1981:284; Waters et al. 1998:198).

Other faunal remains give a sense of the increasing availability of foods transported from other regions via the railroad. Rare in Tucson before the railroad, saltwater fish and shellfish came to be common in Tucson during the residential period. Most fish obtained by project area residents were likely from California and Alaska, where a commercial fishing industry was well established by the early twentieth century. Saltwater fish elements found in project area contexts were from major, commercial, marine and anadramous species: herring, Coho salmon, cod, rockfish, jack mackerel, barracuda, Pacific mackerel, flounder, California halibut, and lingcod. Most identifiable fish bones came from species that would have most likely been imported fresh in refrigerated rail cars from California ports. The abundance of fresh rather than canned fish suggests that fresh fish may have been readily available and preferred over canned fish. If the bones of processed fish were removed prior to packaging, however, processed-fish consumption may have been underrepresented in the faunal collection (Oliver 2001). In addition to fish, oysters, mollusks, and shellfish were also consumed; these, like fish, came to Tucson fresh as a result of the railroad.

Although domesticated mammals and birds accounted for the bulk of the meat consumed by project area residents, wild birds and mammals were also consumed, but mostly by a few households, and only wealthier persons

seem to have eaten wild game fairly often. With one exception, residents of rental properties seem to have rarely consumed wild game, and when they did, they ate rabbit, the most widely available of game meat. By the end of the nineteenth century, small-game hunting was emerging as a popular leisure activity in Arizona, which could mean that wealthier individuals were more likely to hunt and obtain wild game, particularly given the costs of transportation, equipment, leisure time, a hunting license, and sports club memberships (Brown 2008; Reitz 1987:105).

Macrobotanical and pollen data recovered from the project area showed that in addition to animal foods, a variety of native and nonnative plants were grown or consumed in the area. Native foods included cactus fruits and flesh, mesquite pods, and cultivars such as beans, maize, cucurbits, and chilies. Figs, grapes, dates, apples, pomegranates, raspberries, elderberry, tomatillo, peaches, wheat, and barley were also found; figs were particularly common. Grocery receipts found in trash deposits indicated that lemons, carrots, and strawberries were available for sale and were purchased by project area residents.

Personal Items

In addition to issues related to economic status and ethnicity, artifacts found in the project area reflected to concerns about personal hygiene, appearance, and health during the residential period, as well as recreational drug use. A large number of douche-related items were found in cesspit and privy contexts, for instance, indicating that the practice of douching played an important role in male and female hygiene. Most of the fountain syringes were for vaginal use, although urethral and rectal syringes were also recovered. Shaving razors found in the project area were mostly safety razors recovered from the lower stratigraphic levels of cesspits, suggesting that the use of these items was particularly prevalent earlier in the residential period.

Almost 800 medicine containers used for proprietary/patent medicines, which had become widely available and familiar to consumers during this time, were discovered in project area contexts (Dary 2008; Fike 2006; Sears, Roebuck, and Company 1897, 1902, 1906). Common proprietary and patent medicines recovered from the project area included Pitcher's Castoria, Bromo-Seltzer, Vaseline, California Fig Syrup, and Dr. King's New Discovery (Figure 165). The remedies used suggest treatment for a wide variety of ailments, including gastrointestinal, respiratory, kidney, eye, neurological, endocrine, and skin complaints, as well as for headache/pain, "female complaints," and catarrh. The large number of medicine bottles used in the treatment of respiratory ailments is interesting, especially because Arizona was a leading destination for patients with lung diseases such as tuberculosis (Jackson 1999:17; Stein 1988:7).

Alcoholic beverage containers were found throughout the project area, with the exception of lots used only for

Figure 165. Philadelphia oval-shaped medicine bottle with original contents from Block 254, Lot 2, Privy Pit 102149.

commercial purposes. Despite the ubiquity of alcohol bottles across the project area, however, some lots exhibited much greater numbers than did others, suggesting heavy consumption of alcohol among some residents. Limited evidence was also found for opium smoking, as well as possibly for the use of Sterno (i.e., "canned heat"), perhaps during Prohibition, as recreational drugs (*Prescott Evening Courier*, 26 February 1929).

The Shift from Residential to Commercial Space

Residential use of the project area began to change in the early 1920s as residential vacancies increased, which may correspond to an economic slump following World War I, an expansion of the housing industry in the city, and increased ownership of automobiles, allowing people to live further from downtown (Sonnichsen 1987:204). Increasingly, existing residents moved to other neighborhoods, and people moving into the project area could not afford to own or rent an entire house. The use of residences as single-family homes declined, with the first apartments built in 1924 and several boardinghouses opening in subsequent years. By the 1930s, over a third of houses in the neighborhood were vacant, and commercial business began to replace residential use of the project area.

Commercial use of the project area peaked at the start of World War II and remained high over the course of the decade but dropped drastically in the late 1950s, remaining erratic thereafter. During this time, the construction of the Tucson Newspapers building in 1940 and 1953, caused major disturbance to the cemetery, but the building itself was demolished in the 1970s. Amazingly, despite the long and involved history of residential and commercial development of the project area, the majority of burial features in the project area remained intact, and three prehistoric features created thousands of years earlier also survived.

Significance of the Prehistoric Component

Our original research questions for prehistory focused on the Middle Formative period, in particular on the Colonial and Sedentary periods of the Hohokam in the Tucson Basin. Previous research in the vicinity of the project area had uncovered substantial numbers of artifacts and features related to intensive settlement nearby during the Middle Formative period (e.g., Ciolek-Torrello and Swanson 1997). Perhaps simplistically, we expected our findings to mirror or supplement previous finds in the project vicinity and anticipated the discovery of additional habitation and storage features related to the same previously studied settlements. We were incorrect in that assumption, however. Our excavations in the project area revealed only a diffuse scatter of ceramic and lithic artifacts from the Middle Formative period and no Middle Formative-period features, suggesting that the project area was on the outskirts of nearby settlements. During the Middle Formative period, the project area likely functioned as a limited-activity area where processing activities and diffuse trash disposal took place. It was not a locus of intensive settlement.

Contrary to our initial expectations, we did discover features dating to the Middle and Late Archaic periods, which required us to revise our original research questions to include questions of importance to understanding the forager-farmer transition in southern Arizona. The Middle and Late Archaic period discoveries of the project were not extensive in nature, consisting only of three features (a Middle Archaic roasting pit and two Late Archaic residential features) and associated artifacts, but they still contributed new data to the growing database on this important period in prehistory. A particularly unique aspect of the Late Archaic features is that they represent a different settlement location than most previous discoveries, which have tended to be found either in riverine, floodplain settings or in the upper bajada. By contrast, the Late Archaic features in the project area occurred in an intermediate setting.

Major Prehistoric Findings

The Middle Archaic Period

With the exception of the occasional projectile point dating to the Middle Archaic period, such as the Ventana Side-notched projectile point (ca. 3500–1800 B.C.) recovered from the fill of Grave Pit 7515, Middle Archaic period finds in southern Arizona are exceedingly rare (Gregory 1999; Huckell 1984). The dearth of archaeological discoveries dating to the Middle Archaic may relate in part to environmental conditions during the period. An exceptionally dry climate during the Middle Archaic period may have kept population densities low in the region. In addition, alluvial deposits dating the Middle Archaic period may often be either deeply buried or have eroded away (Waters 1988a, 1988b).

These factors have made the archaeology of the Middle Archaic elusive. The position of the project area on an ancient Pleistocene terrace, which has remained stable for millennia, was sufficient to preserve these faint traces (see Chapter 3). Like many Middle Archaic finds in the Tucson

Basin and elsewhere in southern Arizona, the Middle Archaic component found in the project area provided evidence for a fairly limited and ephemeral occupation. The component consisted of a roasting pit chronometrically dated to 2620–2460 cal B.C., along with a limited number of associated zooarchaeological, lithic, and botanical materials. The Middle Archaic component suggests that processing activities were conducted at the site, as evidenced by the use of ground stone tools and the application of heat in a thermal pit. A deer-sized long-bone fragment found in the roasting pit suggests that hunting activities were in some way associated with the site, although it is unclear whether an entire animal carcass or only a portion of an animal killed elsewhere was processed at the site. The presence of several manos in the pit suggested that the project area may have been repeatedly visited in the past for resource-processing activities. Although a relatively ephemeral occupation, we can interpret the Middle Archaic discoveries as representing the repetitive use of the project area for resource processing and, perhaps, short-term encampment.

The Late Archaic Period

The Late Archaic period in the project area was represented by two pit structures and associated artifacts. In comparison to the Middle Archaic component, the Late Archaic component of the project represented more-intensive and diverse activities associated with short term or seasonal habitation. AMS dates from the two features were determined to be statistically indistinguishable. As a result, a pooled calibrated date of 200–160 cal B.C. was calculated for both features. These features were also statistically contemporaneous with a large number of similar features investigated previously at other archaeological sites in the area: Los Pozos, Santa Cruz Bend, Stone Pipe, and Coffee Camp (Gregory 2001; Gregory and Baar 1999; Halbirt and Henderson 1993; Mabry et al. 1997).

Artifacts associated with the two Late Archaic features were fairly diverse and included shell, flaked stone tools and debitage, ground stone, and faunal bone artifacts. Differences between features in associated artifact types and attributes, however, suggested differences in feature use or abandonment. Both structures were habitations constructed in relatively shallow circular pits, with perimeter posts erected along the inside of the pit edge. Neither central support posts nor formal entryways were evident in either structure. Each structure contained multiple intramural pits, which were typically circular in plan view and bell-shaped in profile and often contained charcoal, ash, and small numbers of flaked stone artifacts. Because the two structural features were separated by the area disturbed by construction of the Tucson Newspapers basement, it is plausible that other features associated with this component were previously destroyed.

One of the features, Feature 3370, contained diverse material culture, including worked and unworked shell artifacts, flaked stone cores and debitage, two stone balls, four manos, a palette, an ocher-stained lapstone, Cienega projectile points, and other artifacts. Shell artifacts discovered in Feature 3370 were few in number but came from diverse taxa, most of which could be obtained from the Gulf of California. Worked shell artifacts all appeared to be ornaments made on cone shell (*Conus* sp.), dama dwarf olive shell (*Olivella dama*), and Annette's cowry shell (*Cypraea annettae*). Although most kinds of shell discovered in the feature are commonly found at prehistoric sites in the U.S. Southwest, cowry shell artifacts have been reported at only three sites in southern Arizona, all of them dating to the Formative period. The significance of this rare cowry shell in a Late Archaic period feature is unclear, but the presence of diverse marine shell taxa suggests that either long-distance exchange networks or long-distance coastal procurement had developed by this time.

In contrast to Feature 3370, Feature 19021 contained few artifacts, and those that were found appeared to be focused more on expedient tool manufacture and natural-resource processing. In addition to small numbers of flaked stone artifacts found in intramural pits in Feature 19021, two cores and a mano were found on the structure floor. Although both features were similar in architectural details, the differences in artifact content suggest different uses or abandonment processes.

Macrobotanical finds indicated the use of cottonwood/willow and mesquite as fuelwood and the use of grasses, which could have been used in wide variety of technologies, including matting, basketry, clothing, and thatching. Evidence for food use was slim, but the users of these structures apparently had access to maize, as maize pollen was present. Evidence for a dominance of *Chenopodiaceae-Amaranthus* pollen and the presence of cattail and willow pollen suggested proximity to channel-margin environments.

One of the more interesting aspects of the Late Archaic component of the project was the somewhat unusual location. Most of the intensively studied sites of the period have been located along the Santa Cruz River floodplain, and for some time, investigators have recognized an apparently bimodal pattern in Late Archaic settlement (Fish et al. 1992b; Premo and Mabry 2007; Roth 1989, 1996; Whalen 1971). Sites have typically been recognized as located either along the floodplain or in the upper bajada. Although evidently near a riparian environment, the project area is located some distance from the Santa Cruz River floodplain and seems to represent an environment that was intermediate between the floodplain and the upper bajada. In this sense, the Late Archaic component of the project could represent somewhat greater variability in settlement and land use than has been evident in previous studies. Possibly, riparian areas of Arroyo Chico offered habitats where a variety of subsistence activities could take

place, including high-water-table farming, collection of small seeds from annual plants, and hunting of terrestrial and avian fauna.

The Middle Formative Period

Evidence for use of the project area during the Middle Formative Period was relatively scant, consisting of scattered lithic and ceramic artifacts. Of the nearly 500 ceramic artifacts recorded, most were plain ware sherds from bowls, jars, or neckless jars. Other sherds included indeterminate red-slipped wares (some of which could be historical-period Native American wares) and a handful of decorated wares. Decorated wares were all Tucson Basin Hohokam wares dating to the Colonial and Sedentary periods; they consisted of Cañada del Oro Red-on-brown (A.D. 700–800), Rincon Red-on-brown (A.D. 950–1100), and Rincon Black-on-brown (A.D. 950–1100) sherds. Despite their limited number, the presence of the decorated wares and the relatively high proportion of bowls in comparison to jars suggest proximity to one or more settlements dating to the Colonial and Sedentary periods of the Tucson Basin Hohokam.

Epilogue

As a result of the Joint Courts Archaeological Project, a great deal was learned about a place that was repeatedly used for multiple purposes during prehistory and history. The project area was used for resource extraction and processing, tool manufacture, storage, residence, human burial, transportation, and commercial use. Despite the wealth of data and interpretations that resulted from the project, much remains to be learned, particularly about the cemetery and its burial population and the urban neighborhood built atop the cemetery. For years to come, researchers will no doubt continue to analyze project data and use the project findings for comparison with findings from other sites and regions.

The findings presented in this volume and in Volumes 2-4 of this series represent a tremendous amount of work performed by many dedicated professionals over the course of several years as well as an unprecedented level of project planning and coordination. Many people participated in the project, including researchers, descendant groups, and government officials, and many steps were taken to ensure the success of the project from beginning to end. The project represents not only the investigation of the archaeology and history of the project area, but importantly, the repatriation of individuals to descendant groups and the reburial of individuals in new burial spaces where they can now be honored and memorialized and protected from further disturbance. Given the success of the project along these lines, planning organizations will likely use the project as a model for how to conduct similar excavations in the future. Furthermore, methods developed for the project should contribute to the advancement of methods for excavating, documenting, and analyzing historical-period cemeteries and urban contexts.

This brings us to the question of what makes an archaeological investigation unique and why is it important? The answer lies in not only what an investigation can tell us about the past that other projects have not told us before, but what it can do to address the interests and needs of the present. The value of an archaeological project rests not just in the research questions it can answer about the archaeology but also in what it can do for the interests of a community (Brumfiel 2003).

The Joint Courts Complex Archaeological Project was able to provide details about the lives of Tucson's early prehistoric inhabitants, about the use of a historical-period cemetery and the lives and deaths of the people buried there, about what happened to the cemetery after it was abandoned, about the lives of the people who lived atop the cemetery, and about how the land containing the former cemetery was urbanized during the late nineteenth and twentieth centuries. At the same time, the project repatriated the people buried in the Alameda-Stone cemetery to their descendants and to the U.S. military and respectfully reburied the remains of more than a thousand individuals in new cemetery locations where they can now be remembered, memorialized, and honored. In doing so, the project helped to restore a material and symbolic connection to the past that had been lost and hidden to history and allowed for the construction of a new City/County joint courts facility. In these ways, the Joint Courts Complex Archaeological Project has not only answered important questions about the past, it has also served the diverse needs of the present and the community.

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