

**THE HERRERA GATE: AN ARCHITECTURAL, ARCHIVAL,  
AND CONSERVATION STUDY**

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## ABSTRACT

In November, 1984, the Herrera Gate, a badly weathered yet extremely rare example of late Spanish Colonial woodwork, was found on the Medina River in southwestern Bexar County, Texas. Located on property owned by Adolph Herrera of San Antonio, the gate was located at the historical site of 41BX672, one of a series of early historic sites owned or occupied since possibly as early as the late-eighteenth century by the historically prominent Ruiz and Herrera families in the lower Medina River Valley. However, the oral history tradition of the Herrera family states that the gate "came from one of the missions" (Adolph Herrera, personal communication; notes and tape on file, Center for Archaeological Research, The University of Texas at San Antonio). Additionally, according to Mr. Herrera, sometime after the Battle of the Alamo in 1836, the family obtained scrap lumber from the Alamo. This lumber was brought to site 41BX672, the Herrera's Medina River property. Thus, circumstantial evidence associated with the site strongly suggested that the gate may have come from Mission Valero (the Alamo).

Subsequently, the gate was moved to the Institute of Texan Cultures in San Antonio. Architectural, archival, and conservation studies were begun on the gate. Spanish Colonial architectural styles, periods, and methods were investigated with an emphasis on historical gates and gateways of the five San Antonio Missions: San Antonio de Valero, San José y San Miguel de Aguayo, Nuestra Señora de la Purísima Concepción, San Juan Capistrano, and San Francisco de la Espada. Studies using primary sources describing these gates and gateways provided substantive information on descriptive types, functional forms, sizes, and locations and confirmed that this type and size of gate had been present at the San Antonio missions. The gate's craftsmanship and configuration suggest a probable origin in the mid-eighteenth to early-nineteenth century. Extensive archival studies revealed that the natural resources and woodworking tools needed to have produced this type of architectural element were locally available. In addition, highly skilled and knowledgeable carpenters capable of constructing such joinery have been identified.

The specific origins of the gate have not been determined. The primary evidence for its original provenience remains the oral history tradition of the Herrera family. Research has substantiated that the family owned property at the missions, but the evidence linking the gate to the Mission Valero remains circumstantial. This large gate doubtless served as a main entrance to a substantial structure or complex, most probably Valero or one of the other San Antonio missions.

Conservation studies discuss the treatment and stabilization of the Herrera Gate. Also, metal, paint, and wood species analyses are outlined. The wood was identified as *Prosopis* sp., or mesquite, a tree which is ubiquitous in central and south-central Texas.



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## CHAPTER 1

# INTRODUCTION AND BACKGROUND

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## INTRODUCTION

### Project Description

This report presents the results of the architectural, archival, and conservation studies conducted on the Herrera Gate, an extremely rare example of a wooden architectural artifact dating to the Spanish Colonial period. The project was funded through the City of San Antonio by the Meadows Foundation of Dallas. The gate's association with the historically prominent Ruiz- Herrera families (see Appendix I), its Spanish Colonial architectural construction, its association with structures dating to the Republic of Texas/early statehood periods, and the gate's circumstantial connection to Mission San Antonio de Valero (the Alamo), contributed to its historical significance. The initial assessment of the gate's historical context indicated it was worthy of further research and preservation.

Jim Steely, Director of National Register Programs and Deputy State Historic Preservation Officer, Texas Historical Commission (THC) contracted with the CAR-UTSA to provide the architectural description of the gate. Additional architectural research was done by Kay Hindes and Bess Althaus Graham, architect. Graham also executed the architectural drawings. The drawings were produced over a period of four months from February through June of 1987 and they are the final product of 80 hours of sketching, measuring, drafting, and inking. The measuring process was complicated by the fact that the pair of leaves could not be viewed together: one leaf was stored in San Antonio at the ITC while the other leaf was being stabilized at the Materials Conservation Laboratory (MCL), TMM, UT-Austin.

Archival studies were undertaken through an interagency contract with the CAR-UTSA and the ITC. Principal Investigator for the CAR-UTSA was Dr. Thomas R. Hester, Director, and Co-principal Investigator was Jack Eaton, Associate Director. Kay Hindes, formerly of the CAR-UTSA, conducted the archival research and prepared the report. The work was con-

ducted from September 1986 through June 1987 and involved approximately 480 hours of research and report preparation.

The archival research was complicated by several factors: (1) the dispersal of documents among a number of research institutions or sources removed from one another; (2) the small proportion of Spanish Colonial documents available locally and regionally, as compared to the total known resources in Mexico and Spain; and (3) the inability to locate two key documents referenced in archival sources pertaining to Mission San Antonio de Valero (the Alamo). The latter consisted of an 1827 inventory of San Antonio de Valero by Erasmo Seguín and an 1847 inventory and record book of Alamo property bought, sold, and repaired by the U. S. Army Quartermaster's Department. The 1847 document was apparently discarded at some uncertain date by Army officials during routine clearing of files (Richard Cox, National Archives, personal communication 1987).

Conservation treatment and studies were conducted by Paul Storch, former Conservator, MCL, TMM, UT-Austin, under contract with the ITC. The conservation treatment was conducted over a period of 11 months from July 1986 to June 1987 and required approximately 124 hours to complete. The conservation studies have been previously published (Storch 1989), therefore this report includes a summary of those studies, and the reader is referred to Storch (1989) for a more detailed description of that work.

Archival data, working papers, and project files are on file at the CAR-UTSA and the MCL, TMM, UT-Austin. The original drawings of the gate, as well as architectural field notes, were submitted to the Historic American Buildings Survey, the Library of Congress, Washington, D.C. Copies and negatives of the original drawings are on file at the ITC in San Antonio. The Herrera Gate was curated and displayed by the ITC for a period of 10 years, after which it reverted to the owner, Mr. Adolph Herrera of San Antonio. In 1996, at the end of this 10-year period, Mr. Herrera placed the gates at the TARL, UT-Austin under a long-term loan agreement.

This report follows the guidelines established for the content of cultural resource management reports as recommended by the Council of Texas Archeologists (1981: Reports 1-17). The format consists of the following sections: Background, Research Design and Methodology, Architectural Analysis and Description, Archival Studies, Conservation and Analyses, Summary and Interpretations, Recommendations, References Cited, and Appendixes.

### Special Studies

Three special studies were conducted in association with the Herrera Gate project. These consisted of three investigative strategies: (1) wood species identification; (2) metallographic study of selected metal components of the gate; and (3) analysis of paint fragments collected from the artifact.

The wood species identification was conducted by Dr. Thomas Quirk, formerly of the U. S. Forest Products Research Laboratory in Wisconsin. In addition, a small sample of wood from Gate A was submitted to the U. S. Forest Products Research Laboratory in Wisconsin for use in a long-term study on the quantification of the effects of aging on different species of wood.

Metallographic analysis of metal components was carried out by Paul Storch, formerly of the MCL, TMM, UT-Austin under the guidance of Professor Ken Ralls and Don Artieschoufsky of the UT-Austin Engineering Department. Comparative samples of historic nails were provided by the following: Anne Fox, Research Associate, CAR-UTSA; Joe Labadie, former Research Associate, CAR-UTSA and currently with the NPS; A. Joachim McGraw, archeologist, TxDOT, Austin; Kevin Young, former curator, Presidio La Bahía, Goliad; and Kay Hindes.

The paint analysis was conducted by Paul Storch formerly of the MCL, TMM, UT-Austin and the late Dr. Donald R. Lewis, CAR-UTSA. Results of these analyses are presented in the Conservation and Analyses section of this report.

### BACKGROUND

In November, 1984, Kay Hindes and A. Joachim McGraw, both formerly of the CAR-UTSA, discovered a badly weathered gate of apparent Spanish Colonial construction on the property of Mr. Adolph Herrera of San Antonio, Texas. The gate was encountered during the course of CAR-UTSA fieldwork for the proposed Applewhite Reservoir which was to be located on the Medina River in southwestern Bexar County, Texas. The site, designated 41BX672, was believed by McGraw and Hindes (1987:248-249) to be eligible for listing on the

National Register of Historic Places. It was identified as one of a series of early historic sites owned or occupied since possibly as early as the late-eighteenth century by the historically prominent Ruiz and Herrera families (see Appendix I).

The leaves were found outside the exterior wall of a small adobe *palisado* (a structure constructed of vertical posts with horizontal lathing infilled with a mud daub (Figure 1). Both leaves had one long axis resting on the earth, with Gate B resting against the farm building and Gate A resting against Gate B. A discarded mattress lay against the outside of Gate A. This mattress, stored directly beneath the drip line of the roof of the farm building, retained moisture, kept the earth directly beneath it damp, and was the principal agent for the deteriorated condition of Gate A. The structure against which the leaves rested had been extensively altered. Another intact adobe *palisado* was located ca. 60 feet to the north of the first structure and two houses at the site dated to the mid-nineteenth century. Oral family history recalls that the first adobe *palisado* was constructed with scrap lumber acquired from the ruined mission of San Antonio de Valero (the Alamo) sometime after the siege of 1836 (Adolph Herrera, personal communication 1984; notes and tape on file, CAR-UTSA). Mr. Herrera also related that the gate "came from one of the missions." Based on circumstantial evidence, McGraw and Hindes speculated that the gate may have come from the same source as the scrap wood; at the least, its origin, based on physical characteristics, construction techniques, and oral history, may have been from one of the other four missions in San Antonio or some other major Spanish Colonial structure. Intensive research was limited by the scope of the larger project, but preliminary studies suggested that the artifact may indeed have come from one of these sources.

As noted above, the gate was found on the property of Adolph Herrera. Herrera is a direct descendant of the Ruiz-Herrera families, two of the most influential and significant families of early Texas. José Francisco Ruiz was one of two native Texans to sign the Texas Declaration of Independence in 1836 and his son, Francisco Antonio Ruiz, was the acting *alcalde* or mayor of Bexar during the Battle of the Alamo in 1836 (Tyler 1996, Vol. 5:710-712). Blas Herrera, son-in-law of José Francisco Ruiz, was a member of Juan Seguín's volunteer company and messenger to Colonel William B. Travis at the Alamo in 1836 (Tyler 1996, Vol. 3:575).

On December 10, 1984, James E. Ivey, historical archeologist with the NPS, Southwest Regional Office, Santa Fe, New Mexico, accompanied McGraw and Hindes on a subsequent visit to the site to examine and evaluate the gate. Ivey concurred, based on construction techniques and his familiarity with southwestern Spanish Colonial structures, that the gate was of colonial age and, most

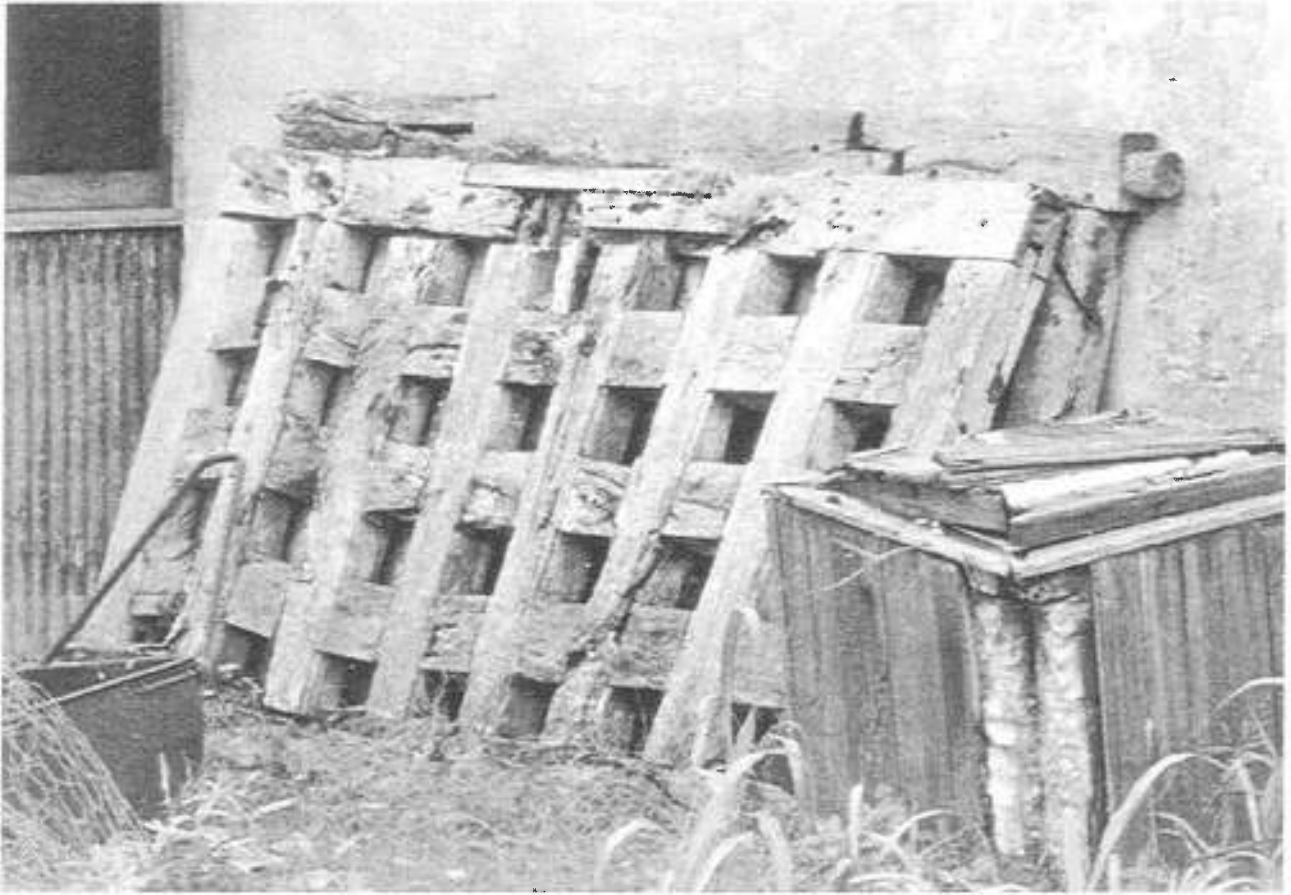


FIGURE 1. The Herrera Gate at 41BX672, November 1984.

probably, was a gate for a main compound such as those present at the San Antonio missions.

In January of 1986, Robert Benavides, Vice-Governor of the Granaderos de Galvez and Chairman of the Texas Independence Week Committee, a subcommittee of the San Antonio Sesquicentennial Celebration, actively began to seek funding for further research and conservation of the gate; additionally, a curatorial facility for the storage and display of the gate was also sought. A second individual, Gary Foreman, was also instrumental in exciting public interest and raising funds for research.

On April 16, 1986, under the direction of Dr. Thomas Guderjan, the gate was successfully moved to the ITC for storage (Figure 2). Based on the gate's circumstantial connection to the famous Texas landmark, the Alamo, and with 1986 being the Sesquicentennial anniversary of Texas independence, funding for research was sought

from the Meadows Foundation of Dallas. The objectives of the ITC were two-fold: (1) to research the origins of the artifact; and (2) to demonstrate its value as an extremely rare example of a wooden architectural artifact of the Spanish Colonial period. An additional goal of the ITC was to publicly display the gate in a future exhibit.

The deteriorated condition of the gate, similar to the deterioration found in nonwaterlogged wood recovered from subsurface archeological contexts, necessitated that stabilization and conservation be undertaken. Paul Storch of the MCL was contacted in January of 1986 and provided his expertise as a conservator.

The City of San Antonio was awarded funding from the Meadows Foundation in July of 1986. Shortly afterwards, one of the leaves (Gate A) was transported to the MCL, TMM, UT-Austin where conservation and stabilization procedures began. Archival research was also begun at this time.



FIGURE 2. Removal of the Herrera Gate from 41BX672 to the Institute of Texan Cultures, April 16, 1986.

## CHAPTER 2

# RESEARCH DESIGN AND METHODOLOGY

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### INTRODUCTION

The research design for the Herrera Gate project was intended to identify problem areas and to evaluate progress as it pertained to those study topics. Such a design should, as Canouts (1977:123–132) points out, compare the research objectives with the realities of the project (the complexity of the work, funding, manpower, and scheduling). This research design, as discussed by Canouts, is composed of the following considerations: (1) a recognition of evaluative stages of the research project; (2) the character and extent of the resource base; (3) basic study questions and topic areas that are addressed; (4) assessments of significance; and (5) future or further project recommendations.

The Herrera Gate project, actually composed of multi-stage research topics (architectural, historical, and archeological) as well as conservation, presents not only descriptive but evaluative and interpretive sections. Discussions are both a synthesis of topic areas as well as the results of a cumulative process of documentary and data accumulation. Recognition of research responsibilities and the mechanics of institutional cooperation were also important parts of the work.

### RESEARCH OBJECTIVES

The Herrera Gate project focused on three related but distinct strategies or evaluative stages: (1) architectural research; (2) archival research to offer direct and indirect structural and documentary support; and (3) the basic conservation and stabilization of the gate. Additionally, we hoped to be able to determine the gate's origin, if possible, or offer indications of its original provenience based on its physical characteristics and chronological associations. A synthesis of such project information would provide a means for eventual assessment of the artifact's material and cultural-historical significance.

### ARCHITECTURAL AND ARCHIVAL RESEARCH

The scope of the architectural and archival research was divided into three main areas: (1) an intensive architec-

tural study of the physical characteristics of the gate conducted concurrently with its stabilization and conservation; (2) a detailed investigation of historical and archival sources associated with the artifact; and (3) a discussion of the archeological data base related to the wooden artifact. A more-detailed discussion of these topics is presented below.

#### Architectural Topics

A detailed architectural study of the Herrera Gate was performed not only to provide a material description of the artifact but to offer future researchers technical data for comparisons with other examples of wooden architecture. The physical attributes were recorded by quantitative measurements including dimensions and methods and techniques of construction.

Architectural drawings of the Herrera Gate were with ink on mylar utilizing the format of the Historic American Buildings Survey (HABS) of the NPS, a federal agency which records the building arts throughout the nation. The HABS at present includes a collection of architectural drawings begun in 1933 that is housed in the Library of Congress, Washington, D.C. The material and the format of the project illustrations are considered to be the most favorable for long-term archival curation.

#### Archival Study Topics and Methodology

The archival focus of the current research was designed to center around documentary resources that could furnish direct or indirect evidences toward a clearer understanding of the origins, method of construction, and cultural and historical background of the Herrera Gate. The archival methodology, as contrasted to the archeological focus, would deal mainly with primary source data.

Archival research was divided into three main areas of investigation: (1) a careful review of available documentary records (primary and secondary, local and nonlocal) to locate and compare descriptive evidence of these artifacts or similar architectural features; (2) an identification and re-

view of indirect data to more accurately describe the cultural and chronological associations of this artifact; and (3) supplemental archival study to document the natural resources, craftsmen, skills, and tools available on a local basis during the Spanish Colonial era.

This research, although tedious and difficult, was thought to offer a wider cultural-historical perspective from which to assess the significance of the Herrera Gate. Equally important, this study topic attempted to discuss the artifact not only on the basis of its attributes but as the product of a little understood, poorly documented, yet relatively sophisticated woodworking industry in what was once the remote northern frontier of northern New Spain.

Five major lines of research were developed: (1) an investigation of primary and secondary sources (both published and unpublished) pertaining to the possible acquisition of the gate by the Ruiz-Herrera families; (2) an intensive examination of mission-related documents (primary and secondary, published and unpublished) that would provide descriptive data of structural designs and features of missions. Additionally, emphasis was placed on obtaining chronological construction data with particular emphasis on compound entranceways and gates; (3) a comparative analysis of other gates and entranceways (including extant features as well as those known only from descriptions and drawings); both locally and regionally; (4) an examination of Spanish Colonial documents, published and unpublished, that would provide information on secular Spanish Colonial buildings and construction techniques, again on a local as well as a regional basis; and, (5) oral history interviews to augment written sources.

Data collection consisted of a review of English and Spanish sources that were both primary and secondary, published and unpublished. Initially, extensive reliance was placed on translated Spanish Colonial documents. As research progressed, it became apparent that existing translations of documents were not adequate for the level of interpretation required for the present study; therefore, it became necessary to work with the original Spanish texts. This was particularly important with mission inventories and inspections in which specific Spanish terminology had been translated or transcribed but had been substituted with more-general and less-accurate terms. For example, the word "gate" or "door" was commonly substituted for the more specific original term such as *portón*, *pasadiso*, *havrita*, *portezuela*, *zaguán*, or *puerta levadiza*. It is probable that the original word reflected very specific meanings as to size, style, and construction techniques.

Research was conducted at the following institutions and repositories:

**In Austin, Texas:** Center for American Studies (CAS), UT-Austin (formerly the Barker Texas History Center); The Catholic Archives of Texas (CAT); Texas General Land Office (TGLO), Spanish Collection, Archives and Records; Texas Historical Commission (THC), Office of the State Ar-

cheologist (OSA); Perry Castañeda Library (PCL), UT-Austin; and the Center for Latin American Studies (CLAS), UT-Austin.

**In San Antonio, Texas:** The Old Spanish Missions Historical Research Library (OSMHL), Our Lady of the Lake University (OLLU); OLLU Library, Rare Books Collection; Bexar County Archives (BCA) at the Bexar County Courthouse (BCCH); Bexar County Deed Records (BCDR), Bexar County Courthouse; Daughters of the Republic of Texas Research Library (DRT), the Alamo; John Peace Library (JPL), Special Collections, UTSA; Catholic Archives of San Antonio (CASA); Research Library, Institute of Texan Cultures; San Antonio Missions National Historical Park Library and files, NPS; and the San Antonio Central Library.

**Other locations:** National Institute of History and Anthropology (INAH), Monterrey, Mexico; Presidio La Bahía, Goliad, Texas; National Archives, Military Reference Branch, Washington, D.C.; The Cartographic and Architectural Branch, National Archives, Washington, D.C.; Illinois State Historical Society, Illinois; and the Museo de Antropología, Mexico City, Mexico.

### Paleographic Research

Paleographic research (Table 1) concentrated on an examination of Spanish documents and sources, both published and unpublished transcriptions and translations. As noted, some reliance was originally placed on translated versions of several early documents considered critical to the study. It quickly became apparent that a review of the translated sources was not sufficient for two reasons: (1) inaccuracies of transcription; and (2) misinterpretation and generalities of translations. Although more tedious, it thus became necessary to work with as many of the documents in the original Spanish as possible, using the translations as comparative aids. This method proved to be more productive although more time-consuming. Mr. John Leal, former Archivist, Bexar County Archives, was extremely knowledgeable in this aspect of the document reviews.

Unpublished Spanish language documents, in the form of transcriptions, translations, or originals, are numerous and widely scattered. Given the limitations of scheduling and funding, not all of the available materials could be consulted; therefore, a systematic plan of investigation was designed to examine the various collections.

First, a priority system of document review based on the dates of the documents was established. The architectural style of the gate, as well as known or postulated episodes of construction or reconstruction at regional mission sites suggested a construction date between the years 1745 and 1820 (James E. Ivey, personal communication 1985). Therefore, the archival review concentrated, whenever possible, on documents of that period. This method provided a means of investigation focused on a definable chronological framework. It should be noted, however, that due to time



TABLE 1  
Paleographic Resources Examined and their Locations

Archives	Volume/Microfilm Roll Dates (if stated or compiled)	Location
SAN FERNANDO CATHEDRAL HISTORICAL COLLECTION	-	CASA; Translations at BCA, BCCH
Compañía Volante de San Carlos de Parras, Baptisms	1788-1825	CASA
Marriage Bonds and Inquiries	-	CASA
"Libros de Gobierno"; Presidio	1772-1825	CASA
Military Personnel	1772-1825	CASA
San Fernando Cathedral, Government Book 1	-	CASA
San Fernando Cathedral, Government Book 2	-	CASA
ARCHIVO GENERAL DE INDIAS		CAS
Audiencia de Guadalajara (Seville)	-	CAS
Audiencia de Mexico	-	CAS
ARCHIVO GENERAL DE MEXICO		CAS
Guerra y Marina	-	CAS
<i>Historia</i>	-	CAS
<i>Misiones</i>	Vol. 21, Part I (1623-1810), Part II (1623-1810)	CAS
<i>Provincias Internas</i>	-	CAS
SPANISH MATERIAL FROM VARIOUS SOURCES	-	CAS
San Antonio Archives	1815-1835	CAS
San Antonio City Records	1815-1835	CAS
San Antonio City Records Journal	1837-1849	CAS
Béxar Archives Translations	1730-1829	CAS
Archivo San Francisco el Grande	-	CAS
Documents for the Early History of Coahuila and Texas and the Approaches Thereof 1600-1843	1600-1843	CAS
Early History of Texas and Coahuila 1585-1811	1585-1811	CAS
MATAMOROS ARCHIVES	-	CAS
SALTILLO ARCHIVES	1689-1876	CAS
NACOGDOCHES ARCHIVES	1729-1819	CAS
ZACATECAS ARCHIVES	-	OLMHRL, OLLU
CELAYA ARCHIVES (Queretaro)	-	OSMHRL, OLLU
BENEDICTINE RECORDS	-	OSMHRL, OLLU
ZACATECAS AND CELAYA ARCHIVES	-	OSMHRL, OLLU
MEXICO CITY ARCHIVES	-	OSMHRL, OLLU
BÉXAR ARCHIVES	-	BCA, BCCH
Béxar Archives Translations (BAT)	35 1761-1762	BCA, BCCH
	36 1756-1762	BCA, BCCH
	37 1756-1763	BCA, BCCH
	92-94 Jan. 1780-March 1780	BCA, BCCH
	134-137 Oct. 1, 1785-1786	BCA, BCCH
	1-4 Jan. 1, 1804-Dec. 31, 1804	BCA, BCCH
Béxar Archives Manuscript Collection (BAMC) Blue Books*	20-25 Nov. 2, 1789-Nov. 1795	BCA, BCCH
	29-31 Aug. 1799-Dec. 31, 1803	BCA, BCCH
Béxar Archives Microfilm Rolls (BAMR)	39-49 Oct. 29, 1808-Jan. 7, 1812	San Antonio Central Library
Béxar Archives Microfilm Rolls (BAMR) Miscellaneous	1812-1831	San Antonio Central Library
MISSION RECORDS (MR)	1794-1830	BCA, BCCH
LAND GRANTS AND SALES (LGS)	1736-1836	BCA, BCCH
WILLS AND ESTATES	-	BCA, BCCH

\*Béxar Archives Manuscript Collection, Blue Books, on file with County Clerk; bound photocopies of the original Spanish documents located at the CAS, UT-Austin, untranslated. Also in the Béxar Archives Microfilm Rolls (BAMR), Central Library, San Antonio.

- Information not compiled

and monetary considerations, this method still did not allow the examination of all available documents pertinent to the study. Approximately 70% of the accessible resources were examined.

Secondly, it was considered necessary to identify sources that judgmentally had the highest probability of providing information critical to the study. Limitations of time precluded the examination of every document in various resource collections. A system of examination was initiated whereby calendars and indexes of various collections were first consulted. If this proved productive, then key documents that appeared relevant were examined in detail. This method produced significant documents in what seemed an efficient use of time; unfortunately, at least one important document that was later located in the B exar Archives collection was missed by this method.

One problem area that was encountered during the course of the studies must be made explicit. Many of the microfilm rolls utilized, especially those from the Old Spanish Missions Historical Research Library, OLLU, San Antonio, had illegible frame numbers. Therefore, when a particular frame number(s) could not be deciphered, the beginning and ending frames for a specified document are given. This was an unavoidable circumstance.

### Archeological Study Topics

The archeological background to the Herrera Gate is thought to represent strong supportive evidence for the posited cultural-historical context of the wooden artifact. The gate is associated with the historical site of 41BX672, in southern B exar County, Texas. This site, identified by McGraw and Hindes (1987:252), was one of several historical occupations by the Ruiz-Herrera families in the lower Medina River Valley adjacent to an early historic ford of the river, Paso de las Garza's Crossing. Archival research has shown that parts of this area have been continuously occupied by generations of these families at least since 1845 and possibly since 1786 (McGraw and Hindes 1987:252). The site consists of two *palisado* structures built ca. 1849 and an associated ranch complex. The less altered of the two structures was considered to be an extremely fine example of the early Mexican vernacular architecture of the region. McGraw and Hindes (1987:252) stated that 41BX672 was eligible for listing on the National Register of Historic Places based on: (1) the association with events that have made a significant contribution to the broad patterns of our history; (2) the association with the lives of persons significant in our past; (3) the embodiment of distinctive characteristics of a type, period, or method of construction; and (4) the potential to yield information important to the history of the area. Limited testing was recommended to more accurately determine site features, limits, and occupational sequences. Further archival research was recommended on the Herrera Gate as well as on the occupational episodes of the site.

Three archeological questions were formulated to guide the background topics. First, does the archeological record of known structures in the regional Spanish Colonial period provide any evidence of similar architectural features? Such information would require a detailed review of both published and unpublished archeological works as well as discussion with knowledgeable historians and archeologists. Second, what are the similarities and differences of identified features as compared to the Herrera Gate both in technical (architectural) and cultural-historical contexts? And finally, what conclusions, recommendations, or comments have been gathered to date from professional archeologists regarding these architectural features? In summary, a more-detailed investigation and review of the site-specific data as well as the overall archeological record was considered to be both a necessary and significant aspect of the general scope of work.

### Conservation and Stabilization Methodology

The conservation treatment was primarily directed toward the stabilization of the gate. Stabilization, according to current scientific conservation principles, denotes actions performed on an object in order to prevent further deterioration and to maintain its material and historical integrity. This implies that any specific materials used in the operation must be chemically compatible with the object's materials, must themselves be nondeteriorating, and must be theoretically reversible. These principles and the work performed on the gate are consistent with the American Institute of Conservation (AIC) Code of Ethics and Standards of Practice (revised 1980). Samples were taken from three nails from Gate A for destructive metallographic testing. This sampling and testing was also done in conformance to the guidelines of the AIC Code. The goal of the conservation process was to stabilize the gate to the point where it could be set into modern frames and exhibited in a vertical position to portray its former functional appearance, with a minimum of actual restoration.

### SUMMARY

In summary, it was believed that the research design offered guidelines for a careful and useful assessment of the Herrera Gate. The topic areas and study questions addressed in the following sections of this report allow an objective assessment of the gate and its history.

It was hoped, but not really expected, that such a design would result in the identity of the origin of this artifact. This would, in any event, resolve many of the primary questions concerning the gate's history and the skilled craftsmanship of its construction. Additionally, such data would offer substantial insights into the methods and techniques of carpentry along what was then the Spanish Colonial frontier.

## CHAPTER 3

# ARCHITECTURAL ANALYSIS AND DESCRIPTION

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### INTRODUCTION

Extant evidence of the Spanish Colonial occupation of Texas is represented by numerous stone and masonry structures. The mission churches of San Antonio display exemplary pieces of the art of the master masons and stone carvers of the Colonial New World. Substantial stone blockhouse structures along the Rio Grande date to or clearly reflect the building styles of the late-eighteenth to early-nineteenth centuries (George 1975). Plastered adobe dwellings and *jacals* from the period remain as well, demonstrating the undaunted adaptability of a desert-wise culture to a land of limited timber resources.

Finely crafted wooden artifacts, particularly architectural elements that have been exposed to the elements for centuries are now extremely rare. The craftsmanship and condition of the Herrera Gate probably indicates it was neither part of a humble dwelling nor a veteran portal from a military stronghold. This artifact likely came from either a fine residence or one of the mission complexes.

The gate's craftsmanship and configuration suggests a probable origin in the mid-eighteenth to early-nineteenth century. Indeed, its design and evident use are indicative of the architecture of the period. The tools to produce such woodwork were readily available on the Spanish Colonial frontier as documented in the meticulous mission inventories dating from that time period.

### SPANISH COLONIAL ARCHITECTURE

The architecture of Spain was influenced by Roman settlement in the Iberian peninsula and the establishment of the Visigothic Kingdom in A.D. 419, which lasted for three hundred years (Fletcher 1975). Moorish influences were introduced following the Moslem invasion in A.D. 711 (Fletcher 1975) and these persisted until 1492 with the final expulsion of the Moors following the fall of Granada. More-recent styles of Gothic and Renaissance architecture in Spain also influenced architects working in the Spanish colonies of the New World (Fletcher 1975).

The architecture of colonial Latin America followed the pattern of Spanish and Portuguese work which was derived from Spanish Medieval prototypes and later Moorish influences. The Plateresque, Churrigueresque, Baroque, and Antiquarian phases of the Spanish homeland are all represented in the New World although materials, local skills, social customs, and climatic conditions produced strong regional characteristics (Fletcher 1975:1103, 1227).

Kubler (1948) provides a discussion of the pre- and post-Conquest status of architecture and artisans in Mexico. The developments there during the sixteenth and seventeenth centuries would have profound effects in the eighteenth and early-nineteenth centuries. For more information on the architecture of the San Antonio missions, the reader is referred to Eaton (1980), Ivey (n.d.a), and Schuetz (1980, 1983, 1986).

The Spanish architecture of sixteenth-century Mexico resulted primarily from work of the mendicant orders of Franciscans, Augustinians, and, later, the Dominicans. Skilled European craftsmen under the direct control of the Orders were brought over to construct the magnificent buildings of the sixteenth century. These same craftsmen taught their skills, such as stonecutting and carpentry, to the local Indian populations such as the Tiripitio in the bishopric of Michoacan, ca. 1537 (Kubler 1948:110). The Augustinians, and probably the other Orders, began to send the Indians to Mexico City for apprenticeship to masters practicing the crafts needed by the missions (Kubler 1948:110). Some of these masters have been identified by Kubler (1948), including the master carpenter Juan Franco. Nonsecular craftsmen identified by Kubler include the carpenters Diego Ramírez, Martín Pérez, and Juan de Larios. The influence of these carpenters as well as later artisans, would manifest itself through two channels: direct participation in construction and/or the training of Indian workmen. It is probable that many of the carpenters working in San Antonio de Béxar in the late-eighteenth and early-nineteenth centuries learned aspects of their crafts from forebears who had been taught generation to generation as far back as these early masters.

The missionaries strove to maintain influence over the Europeans, especially the civilian craftsmen, and tried to exclude any European skilled labor not engaged in the work of the mendicants (Kubler 1948:115). Also, the European artisans, while instructing the Indians in certain instances, were at times reluctant to give any such instruction for fear of increasing economic competition. The formation of trade guilds in the late-sixteenth century probably represents to some extent the effort of European craftsmen to maintain control over a market invaded by Indian competitors (Kubler 1948:115).

Within the guilds, very specific rules and regulations for membership and performance of duties were instituted. While the guilds were very active and influential in Mexico and may have controlled craftsmen being sent to the northern frontier, no archival evidence has yet been found that attests to the presence of guilds in the San Antonio de B exar region in the colonial period (Felix Almar az, personal communication 1986).

From the beginning of the sixteenth century and lasting more than 300 years in Mexico, the Spanish maintained careful control of colonial building activities. This policy ensured a remarkable consistency in town planning, as well as in the design and architectural styling of major building projects. Other factors, including the guild system through which all craftsmen entered their trades and the coincidence of climate and building materials similar to those of the homeland, contributed to the high degree of consistency of building solutions throughout the colonial period.

A standard Spanish practice for buildings of all types called for an enclosed *patio* for protection against hostilities and as shelter from the oppressive heat of the region. A *patio* was a central, open court within the building itself, that could be expanded to form a walled court attached to a structure or integrated into a larger complex. Wooden gates, set in the few entryways through the stone or adobe walls, were common architectural elements that controlled access to the living and working areas.

### THE PORTÓN IN THE SPANISH COLONIES

The type of Spanish colonial door that concerns us here is the *port n*, a heavy gate of two leaves that closed the *patio* or *plaza* and was stout enough to withstand an armed attack (Bunting 1979:71). Each leaf was between 3 1/2 feet (1.26 *varas*; a *vara* is equivalent to 33 1/3 inches) to 4 feet wide (1.44 *varas*) and about 8 feet (2.88 *varas*) high. Interestingly, no eighteenth century examples appear to have survived in New Mexico (Bunting 1979:71). These gates, because of their size, were generally constructed with wooden pivots mounted into wooden lintels and thresholds (Kubler 1940:49). This type of door must be mounted (or hung) when the frame is installed and cannot be removed without dismantling the lintel. In New Mexico, thicknesses of these doors averaged from 2 to 2 3/4 inches; the thicker

lumber was easier to produce than the thin boards that could later be produced by sawmills (Bunting 1979:71.) Frequently, one leaf contained a wicket, or smaller, inset door, common in Mexico and Spain, which was to be used when the heavy gate was closed. The heavy weight of these doors discouraged frequent dismantling for repairs and when the likelihood of Indian hostilities diminished, most were allowed to deteriorate (Bunting 1979:71). The walls of Mission Nuestra Pur sima de la Concepci n had four *port nes* by 1786; one of them contained a wicket (Lopez 1786; translation by Dabbs 1940:6).

Mounting systems for some of these large gates were similar to that of the Veramendi doors, originally from the Veramendi home in San Antonio (Simmons and Turley 1980:140; Tyler 1996, Vol. 6:722) and now on display at the Alamo. These doors have large wooden pins capped with iron cups that reinforced the pins while they pivoted in the header and threshold of the door frame. Two other methods for mounting heavy doors by the colonists have been identified: (1) the use of iron gudgeons and blocks with sockets; and (2) the use of a limestone block that formed part of the threshold with an iron plate (Simmons and Turley 1980:140). At Mission San Juan Capistrano, Schuetz (1968) excavated the area of the *porteria*, the principal door of the convent, and encountered part of a squared limestone block on the interior wall that she identified as a support for the gate post. No trace of the original mounting remained.

At Presidio La Bah a (Nuestra Se ora del Loreto Presidio) near Goliad, Texas, excavations undertaken under the direction of R. E. Beard, archeologist, and Raiford L. Stripling, architect, in 1963 located the remains of the south wall, the main entrance gate to the compound (O'Connor 1966:278). The opening has been restored as the sally-port thought to exist in 1836. The field notes of the excavations reveal that Beard and Stripling located an opening ca. 8 foot wide in this area as indicated by the dimensions of the sill and an adjacent postmold (Beard and Stripling 1963). The modern replicated gate now located in this south wall is constructed according to Stripling's careful research of Spanish Colonial carpentry techniques and forms. It is very similar to the grate-like Herrera Gate; however the replicated gate at Goliad is planked on one face.

Excavations in the area of the south gate at Mission Nuestra Se ora del Rosario, also in Goliad, Texas, revealed an opening in the inner wall ca. 18 feet wide (Gilmore 1974:68). A small posthole impression, 0.4 feet in diameter with a red clay fill, was found on the interior, 1.4 feet north of the wall and may be indicative of a component of the gate for this opening.

In the vicinity of the Falc n Reservoir, extending along the Rio Grande border of Texas and Mexico, structures and sites of the Spanish Colonial settlement of this area were located and recorded from the late 1940s and into the 1950s (George 1975). These observations reveal that doors, single or double, were substantial, were constructed of mesquite

with heavy mortised, tenoned, and pegged frames, and were rabbeted (grooved) to receive wide cypress panels (George 1975:42). Mesquite was also utilized for lintels, fireplace mantels, window grills, door jambs, and thresholds. The mesquite jambs and thresholds were used on doors with pivots that were 5 inches in diameter by 7 inches long. Unlike other descriptions of Spanish Colonial crafts which emphasized the poor quality of wood craftsmanship, the Falcón study revealed that the carpentry techniques of the reservoir were quite good (George 1975:44).

Most structures in late-eighteenth to early-nineteenth century Spanish Texas—mission complexes, military barracks, residences, and businesses—usually reflected vernacular configurations and obvious adaptations to local materials and climate. Stone, if plentiful and easily quarried, was the preferred material. The majority of Spanish Colonial structures, from the Rio Grande to San Antonio, were probably of *adobe* or *jacal* construction. The production of *adobe* bricks from an earthen mix was an ancient technique in the Old World. The binding of brush and twigs set into foundation trenches produced *jacales*, with precedents in both the Old and New Worlds.

Only a few elements of these early common structures were of wood, a material not as plentiful in south Texas by comparison to the distant forests of east Texas. Stone and *adobe* shelters usually incorporated wooden lintels at windows and doors and a system of *vigas* (ceiling beams) and *latias* (in-fill strips between the beams) covered with earth to form flat roofs. The *jacales* usually were finished with pitched roofs of thin rafters covered with thatch.

More-elaborate structures or complexes, commissioned by wealthier individuals and organizations, might have utilized wood crafted for refined tastes and decorative applications. An ancient guild system, typical of European practice, had long been transplanted from Spain and continued to produce craftsmen in the New World. These masters carried to the farthest frontier a common set of standards and techniques and made their skills available for premium wages.

The development of Spanish Baroque architecture was at its zenith during the mission building period in San Antonio after 1720 (Jim Steely, personal communication 1987). Master masons (*maestros albanil*) hired by the priests to build the major mission buildings were trained by the guild system and they, in turn, took on apprentices at these remote building sites (Schuetz 1986:56). Carpenters (*carpinteros*) were similarly employed, some supplementing the stonemasons' work with wooden framing, scaffolding, and wheeled vehicles essential to stone construction projects.

Other carpenters were skilled in the production of sophisticated furniture and wooden architectural elements such as windows, doors, and gates. After secularization of the San Antonio missions, begun in 1793 and completed in the late 1820s, and the growth of a local colonial economy, craftsmen became an important part of the developing secular community.

Historically, in the San Antonio area, four types of gates have been identified: yard gates, field and farm gates, corral gates, and *plaza* or *patio* gates. Little detail on variations in construction techniques of these various types has been located to date. Within the mission system, seven terms have been recognized in conjunction with the gates: *puerta*, *pasadiso*, *portón*, *zaguán*, *portezuela*, *portada*, and *porteria* (includes a structure). Additionally, numerous descriptive terms such as *rastrillo*, *levadiza*, etc., provide further evaluative information. It is believed that these specific terms, excepting the generic *puerta*, have specific meanings as to size and perhaps construction techniques. The term *havrita* was found generally in reference to farm or field gates.

The Herrera Gate probably represents the work of a skilled master who produced this wooden artifact for a significant passageway, perhaps into a spacious *patio* or *plaza* of an important building. The concept of security is clearly conveyed by the weight and sturdiness of the gate, an acknowledgment of the external dangers then present in Texas. Its esthetic purpose is also evidenced by the fine craftsmanship. The quality of workmanship is confirmation of the growing importance of San Antonio as an agricultural, political, and trade center in the mid-eighteenth to early-nineteenth centuries.

## DESCRIPTION

The two leaves of the Herrera Gate are evidently a matched pair, but they are not an exact mirror image of each other (Figure 3). Each leaf is 4 feet 6 inches (1.66 *varas*) wide by 8 feet 3 inches (3 *varas*) long and would secure an opening approximately 9 feet (3.24 *varas*) wide. Gate A is constructed of mesquite lumber planed to a thickness of 4 inches (.12 *varas*); Gate B is planed to a thickness of 3 1/2 inches (.11 *varas*).

Each leaf was constructed of at least 35 pieces of sawn and dressed mesquite lumber (see Appendix II), assembled with mortise-and-tenon joints and fastened to the outer stiles with wooden pegs at strategic points (Figure 4). The pegholes were bored in three sizes, with 3/4 inch (.02 *varas*) as the most common diameter. The leaves are each assembled of eight solid rails (horizontal members), measuring approximately 5 3/4 inches thick. The top rail (rail 1) of Gate A is 6 1/2 inches (.19 *varas*) in height. The top rail (rail 1) of Gate B is 5 1/2 inches (.17 *varas*) in height. Both were built with 6-1/2 inch-high (.10 *varas*) bottom rails (rails 8). These rails are mortised into a pair of lateral stiles (vertical members), one on each side of the leaves, and medial lock stiles, one on each side of the leaves. Both jamb stiles exhibit a rounded edge. Twenty-one muntins are mortised into the eight rails of each leaf, creating three evenly spaced vertical structures between the stiles. The resulting pattern creates 28 rectangular openings in Gate B (see Figure 3). Were the jamb stile of Gate A intact, it would also exhibit 28 rectangular openings.

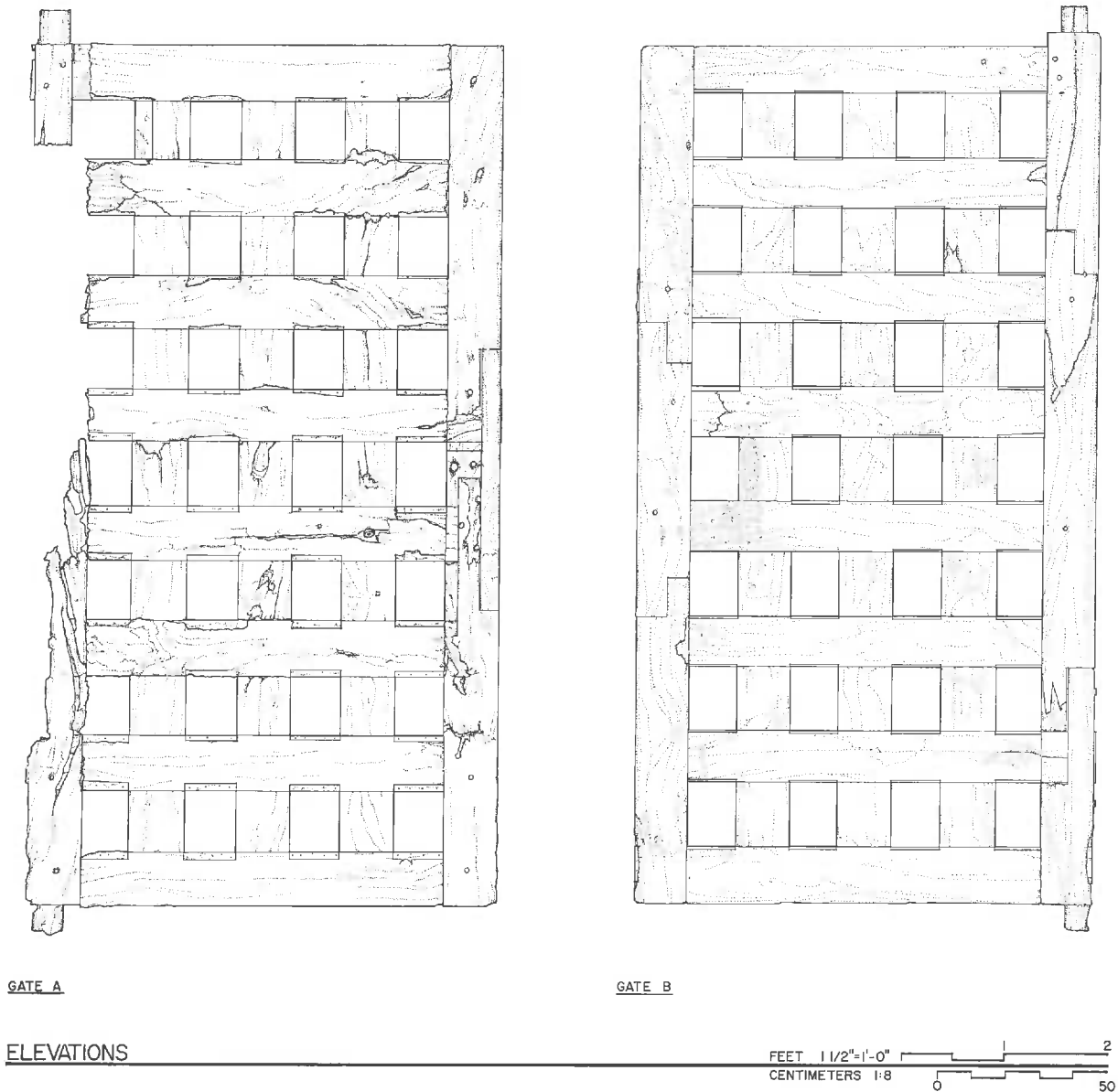


FIGURE 3. Architectural scaled drawings of the Herrera Gate (in upright position).

The rails were given number designations from the top down. Muntins were assigned alphabetical letters with numerical subscripts designating their horizontal position from the jamb stiles of Gates A and B, moving across and down to the bottom rail of the leaves. The stiles were given Roman numerals starting with "I", which was assigned to the left stile.

Extensive wear is present on the posterior surface of rail 8, Gate A and rail 8, Gate B, end rails on each of the doors. This rail is assumed to be the bottom of the specimen. The interior and exterior faces as well as the top and bottom of the gate were determined by several observations. The first was the location of the remaining eyebolt on Gate A and the corresponding metal stain of the lockplate on Gate B, both of which were assumed to be on the interior of the gate.

Secondly, the wear pattern of the stiles, subsequently designated stiles II, rails 8, seemed to indicate their position as being next to the threshold, carrying the weight of the gate. Also, the height of the metal components, e.g., the eyebolt, seemed indicative of the gate's original hung position. As positioned, the locking system would have been at hand level for a standing person.

The gate was socketed into the frame and lintel by wooden pivots carved into the ends of the outer side framing stiles (I) on each gate. The pivots on each leaf are correspondingly of different diameters: 3 1/2 inches (.11 *varas*) on Gate A and 2 3/4 inches (.08 *varas*) on Gate B. Wear on the wooden pivots, integral to the top and bottom outside stiles on each leaf, indicates that the gateway frame was slightly racked or out of alignment. Yet the pivots are not

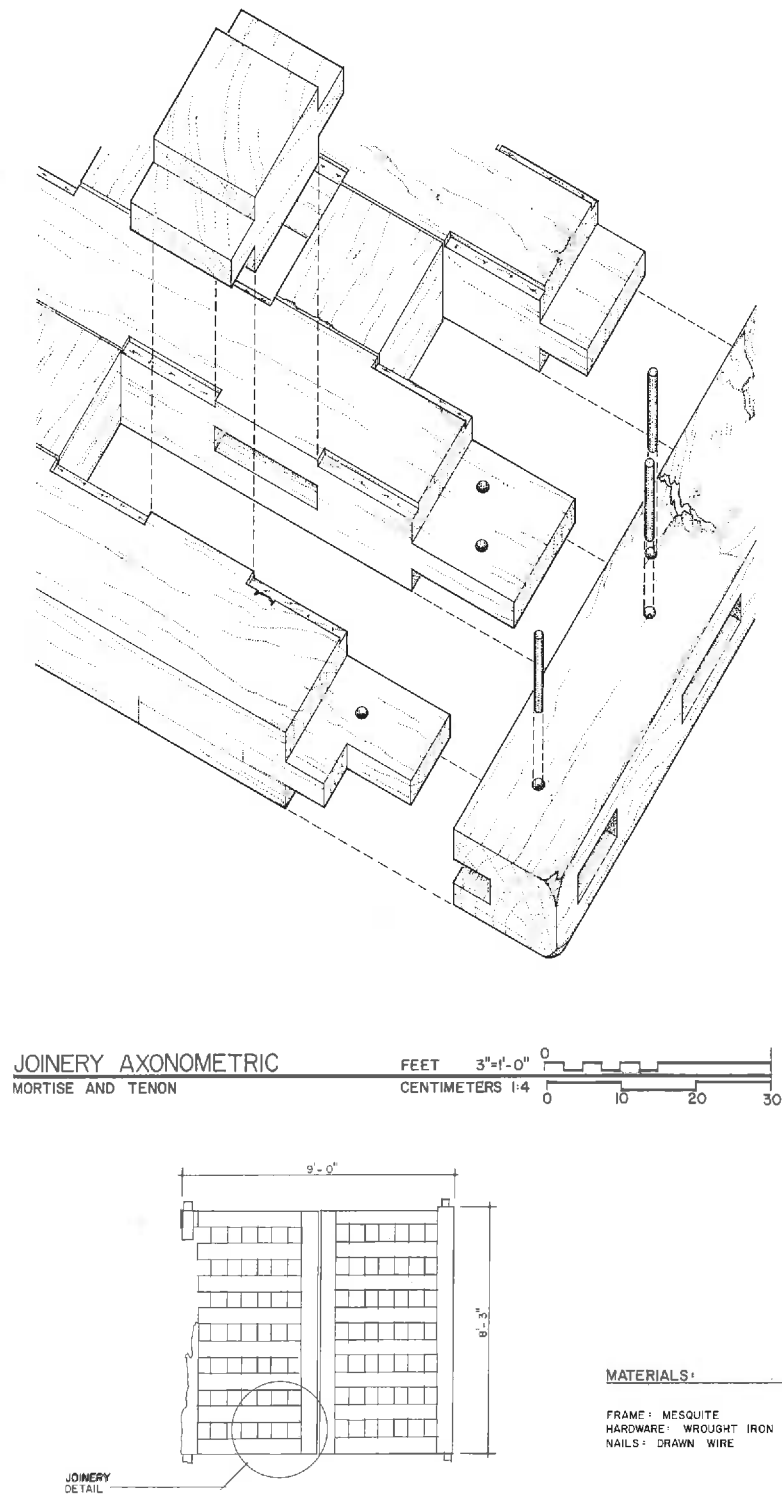


FIGURE 4. Joinery axonometric of mortise and tenon construction of muntins, cross beams, and side beams.

substantially worn, perhaps implying that the gate was normally either open or closed, rather than operated regularly.

The longitudinal medial lock stile of Gate A (II) is an interesting composite of four mortised and tenoned spliced pieces of mesquite, that were secured with wooden pins inserted in the face and side of the stile. This configuration could indicate the scarcity of mesquite lumber of the dimensions suitable for large stile components or, perhaps, later repairs around the locking mechanism. The jamb stile (I) on the left side of Gate A, which was attached to the doorway, is almost completely deteriorated, with only the lower part remaining. This factor prevents a more thorough analysis of comparison with the jamb stile of Gate B. The longitudinal medial lock stile of Gate B (II) is composed of three pieces of grooved and spliced mesquite.

Four openings between the jamb and lock stile are created between the muntins and the rails. The muntins vary in width from 6 to 6 1/2 inches wide. On the interior side of each of the rails, rabbets are present at the top and bottom of the opening for the inseting of wooden panels. The rectangular openings on each leaf are consistently about 7 1/2 inches (.23 *varas*) high and 5 1/2 inches (.17 *varas*) wide. None of these panels was present at the time of the gate's discovery, and it is not known whether or not they were original components of the gate. The panels were positioned by rabbets in the rails at the top and bottom of each opening. Only rails 4 and 5, Gate B, lack complete rabbets. This is directly at the position where the lock plate was located, suggesting that the lock plate was still on the gate at the time the rabbets were cut into the leaf. The rabbeting on Gate A is deeper and more variable. On Gate A, the rabbeting varies from 1/8 inch (.01 *vara*) to 1 inch (.03 *vara*) chiseled in the vertical dimension. Gate B exhibits rabbets with a consistent vertical dimension of 1/4 inch (.01 *vara*).

A few remaining wire-drawn nails hammered into the rails and bent over the rabbets indicate they once secured such panels in place. It seems highly probable that the rabbeting cuts were added at a date much later than the original construction of the doors in order to hold wooden panels. During the Spanish Colonial period, most rabbet cuts would have completely surrounded the opening rather than being cut only on the top and the bottom. This also suggests that the panels may have been added. The presence of

wire-drawn nails used to secure these panels also seems to support a later addition.

Evidence of saw marks on the timbers of the Herrera Gate is minimal, due in part to surface weathering; some telltale patterns that might be pit-sawn courses were seen on some surfaces. But many types of wood planes, including a rabbet plane in 1794 at Mission Concepción (Muñoz 1794a), were available in the Spanish Colonial workshop, and the tooled faces of this gate display a carefully finished surface on most pieces. What may be charring occurs on the lower jamb stile and rail 7 of Gate B.

Locking hardware on the gate consisted of a wrought-iron hook-and-eye system (*tranca*) attached at the fifth rail (rail 5) from the top. Only the eye bolt (*armella*) remains in Gate A in rail 5 between muntins 4c and 5c. Rail 5, Gate B bears evidence of an iron panel (now missing) where the corresponding hook was attached as well as a wear pattern from the hook. This placement is a comfortable height for human use. Other metal components of the doors consist of iron spikes and brads. The manufacture methods, metallography, and relative dates of the metal components and nails are discussed below in the "Metal Analysis and Treatment" section of this report.

These overall measurements, and the measurements of the components of each leaf were based on a standard proportion system or module familiar to the carpenter. In practical application, the dimensions of this gateway could accommodate wagons and carts, common products of the Spanish Colonial carpenter.

As found and restored, the appearance of the gate, when closed, resembles the grid pattern of a lowered portcullis in a medieval castle or other fortified structure. Presently it is not known for certain whether the panels were original or later additions to the gate; however, the panels would have quite negated much of the resemblance (intended or otherwise) to a portcullis.

A 1-cm square sample of wood was taken from a loose component of Gate A for wood identification. The wood was identified as *Prosopis* species. The common name for this genus is mesquite, a tree which is ubiquitous in central and south-central Texas. Given good water and soil conditions, mesquite trees can grow to heights of 50 to 60 feet with girths of 3 feet (Thomas Quirk, personal communication 1986).



## CHAPTER 4

### ARCHIVAL STUDIES

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#### INTRODUCTION

The archival research on the Herrera Gate consisted of a synthesis of multitopic research areas including architectural and archeological studies. The integration of these data provided a base for assessments and interpretations of the historical significance of the Herrera Gate.

Information is provided on the availability of natural resources and procurement, treatment, and storage of raw materials. Direct descriptive information based on primary source documents provided comparative evidence and established a temporal framework of construction sequences at each of the missions. In addition, the studies investigated and assembled indirect and supplemental archival data including that on the availability and expertise of carpenters and an examination of mission tool inventories. Archeological research of identified structures on a regional basis provided quantitative evidence of entranceways and gates based on physical remains as well as comparative data of similar features.

These archival studies consisted of a review and examination of both primary and secondary data, with the former preferable over the latter. Furthermore, both local and nonlocal sources of information were investigated.

#### NATURAL RESOURCES

The valleys of the lower Medina River and the upper San Antonio River are located along an environmental transition zone of the Edwards Plateau and the Gulf Coastal Plain and once supported extensive and productive ecosystems. The natural resources needed by the missionaries, the soldiers, and the settlers were available here, though some were more plentiful than others. This section examines those resources that would have been utilized by carpenters working in the area from the late-seventeenth through the early-nineteenth centuries. Ancillary studies are offered that discuss natural resources from precolonial through twentieth-century times within the Gulf Coastal Plain and the Edwards Plateau. The reader is referred to Ford and Van Auken (1982),

Gunn (1982), and Inglis (1962) for more complete information on these resources. The following discussion places particular emphasis on the availability of mesquite to the early carpenters.

#### Resource Availability

Early travelers in the seventeenth and eighteenth centuries, as well as later nineteenth-century accounts, detail the wide variety of indigenous wood species in the San Antonio area that were available to settlers. As early as 1689, Alonso de Leon mentioned the presence of large mesquites, oak, and pecan around the Medina River (Canedo 1968:92-95; West 1905:209). In June of 1691, Don Domingo Terán de los Ríos wrote in his journal that they "marched five leagues over a fine country with broad plains the most beautiful in New Spain. We camped on the banks of an arroyo, adorned by a great number of trees, cedars, willows, cypresses, osiers, oaks, and many other kinds. This I called San Antonio de Padúa" (Hatcher 1932:14). The arroyo referred to by Terán de los Ríos is the San Antonio River and his description of the flora is one of the earliest accounts for the area.

Father Isidro de Espinosa, apostolic preacher and missionary in charge of Mission San Juan Bautista on the Rio Grande del Norte, accompanied Fray Antonio de Olivares in 1709 on an expedition through the area. In his diary, Espinosa described the flora encountered:

April 11. Thursday. We set out...towards the Medina River which we reached and crossed...This river is bordered by walnuts...along the river are many green and white poplars, elms, and a diversity of other trees which beautify it...

April 13. Saturday. We continued our course towards the east through some ravines filled with holm-oaks, mesquites, and some white oaks until we arrived at the arroyo of Leon....We crossed a large plain...and after going through a mesquite flat and some holm-oak groves we came to an irrigation ditch, bordered by many trees....We

named it San Pedro Spring (*agua de San Pedro*) and at a short distance we came to a luxuriant growth of trees, high walnuts, poplars, elms, and mulberries....

April 14. Sunday.... we went on towards the northeast...and crossing over open country except for some mesquites, we came upon a branch of the Guadalupe River [the Comal River] [Tous 1930a:4-6].

Captain Domingo Ramón's diary of his 1716 expedition into the Province of Texas recorded the following information:

[May 12, 1716]: This day I traveled...three leagues, part of which territory was a pecan grove. There were other varieties of timber...until we reached the Medina River....

[May 14]: On this day I marched to the northeast seven leagues through mesquite brush...we reached a water spring on level land which we named San Pedro....The scenery along the San Antonio River is very beautiful, for there are pecan trees, grape vines, willows, elms and other timbers.

[May 16]: This day I marched two leagues to the northeast through some hills with good pasturage and mesquite trees. We crossed the Salado Creek....

[May 17]: This day we advanced five leagues to the northeast through some hills and mesquite brush [Foik 1933:11-12].

Fray Isidro de Espinosa, who also accompanied the Ramón Expedition in 1716, observed the following in his diary:

May 13. Wednesday. After Masses were said we set out through a forest of oaks and scattered mesquite clumps to find the River Medina....Then over rough ground with many groves of holm-oaks, gray oaks, and walnut trees we went two more leagues between northeast and east-northeast, turning to the north another league...we went right through a very spacious forest in the direction of east-northeast. Then making some deviations, we reached the Medina River....On the bank of this river were many poplar trees, blackberry bushes....  
May 14. Thursday. We entered the plain at the San Antonio River. At the end of the plain there is a small forest of sparse mesquites and some oaks. To it succeeds the water of the San Pedro...along the bank of the latter which has a thicket of all kinds of wood...[Tous 1930b:8-9].

Fray Francisco Celiz arrived in the area in 1718 as a member of the Alarcón Expedition. Writing in his diary about the area in the vicinity of present-day Lacoste, Celiz reported:

[this] road is densely bordered by mesquites, oaks, and pecans....This river [the Medina] is densely shaded by poplars [cottonwoods], elms, mulberries, savins [cypress, juniper or cedar] and hackberries....At the upper end of [San Pedro Springs] is a thick wood of different trees, such as elms, poplars, hackberries, oaks....[The Salado] is bordered by trees such as live oaks, hackberries and elms....All of the land is rough and overgrown with mesquites [Celiz 1935:47-48].

In 1777-1778, Father Agustín Morfi, chaplain of the Croix expedition, recorded:

From here [Gallinas Creek in present-day Atascosa County] the soil changed and the vegetation. The sand ended, and with it the oaks, live-oaks, etc., and began a clayey soil, with large mesquites, prickly pear, of which we had seen no vestige in the forest left behind....At the edge of the forest is a group of thirty-one live oaks, so green, so straight that they are the shape of a beautiful maul....After going down from this the forest began again and continued to the [Medina] river [Morfi 1935].

In 1829, Jeán Louis Berlandier (1969:364) wrote the following about his travels:

After leaving the Arroyo Hondo, we entered some hills covered with oaks....On the seventeenth at sunrise we struck camp. We still crossed some small hills covered with mezquites [sic]. They grew in a layer of black earth which was stony in some places (limestone and flint) and very suitable for agriculture. About five leagues...we arrived at the banks of the Medina.

Sixteen different species and genera are mentioned in the above reports; other species and genera are no doubt represented in the "thick woods" described for the transition zone. Rivers mentioned include the Medina River, the San Antonio River, the Salado River, Leon Creek, San Pedro Springs, and the Comal River. The presence of mesquite is attested to by all the expeditions whose chronicles were examined, with the exception of the Terán Expedition. Later travelers, including Bracht (1848), Olmsted (1857), and Roemer (1935), also reported thick "woods" of different trees (including mesquite) along the area rivers.

Mission records (Dolores y Biana 1755; Gumiel 1772a, 1772b, 1772c, 1772d; Leutenegger 1977, 1985, n.d. (a), n.d. (b); Leutenegger and Habig 1978; Lopez 1786, 1793; Marmolejo 1757; Muñoz 1794a, 1794b; Muñoz and Pedrajo 1794; Músquiz 1823, 1832; Salas 1785) provide information regarding the various types of local wood species utilized at the five San Antonio missions. Cypress (*sabine*, *savine*)

was utilized for the main doors of the church, the sacristy doors, and the vestibule doors at Mission Concepción; benches, chairs, and beds at Mission San José; and a confessional, bookshelves, benches, cabinets, stands, and doors at Mission San Juan. Walnut (*nogal*, including black walnut) was utilized for chairs and brackets at Mission Concepción; legs of cabinets and balcony gratings, a baptismal font and a box for hosts at Mission San José; and a baptismal font and a tabernacle or box for hosts at Mission San Juan. Oak (*encino*) was utilized for the wooden floor in the chapel [?] at Mission Concepción and the roof of the sacristy at Mission San Juan. Cedar (*cedro*) was used for chests and cabinets at Missions San Juan, Concepción, and Espada as well as for portions of the roof of the convent at Mission Valero. Mesquite was utilized for fences at Mission Espada, portions of the roof of the convento cells at Mission San Juan, and for gutters and drains (*cañales*) at Mission Valero. Mesquite was used for interior walls at Mission Valero (BCA, Miscellaneous Files).

The Spanish settlers would have had approximately two centuries of experience with New World wood species, including mesquite, prior to the founding of San Antonio de Béxar. As in other areas of the Spanish frontier, such as California and New Mexico, the carpenters and other craftsmen of Béxar, whether they were civilian, presidial, or of the missions, utilized indigenous resources. These same craftsmen very often arrived at ingenious solutions to complex working problems associated with available resources and climate.

### Resource Procurement

Collectors or cutters (*acheros*) were responsible for the selection of wood varieties (such as mesquite, cypress, oak, walnut, etc.) for various purposes and also selected individual trees as well. It seems probable that frequently the *achero* was the carpenter and that some carpenters would have individual preferences for one species of wood over another. Carpenters, thus, would be integrally involved directly or indirectly in wood selection activities.

This selection process was no menial task for it was necessary to select wood varieties and specimens with great care if they were to be used for carpentry purposes. One of the most important aspects was to select a species that would serve for years, be resistant to rot, and would have a straight grain. Trees selected for their wood type and to be used for carpentry "should be at least two feet in diameter at a point two feet above the ground, straight and without limbs for about twenty feet up. Often, a large even fork in the top indicates good grain. The most reliable sign of good grain...is the bark. If the ridges of bark run straight from roots to fork generally one can depend on the grain being straight" (Bealer 1972:60-61). The mesquite trees utilized would have been at least 3 feet in diameter to have produced beams and stiles of the size utilized for the Herrera

gate (Thomas Quirk and Robert Hensarling, personal communication 1986).

A second aspect of the procurement process was the timing of the felling of the tree: "Wood was cut at certain times (by the moon and the sun). It should be cut when the sap is gone and if cut at the right time, the wood would not rot as quickly or be as prone to insect damage" (Adolph Herrera, personal communication 1985). The best time of the year to cut a tree is in February when the sap is down and at a time of the month when the moon is dark, or in the "wane of the moon" (Bealer 1972:60-61). Boards made from a tree cut at this time will last years longer without warping (Bealer 1972:60-61) and, indeed, in January of 1781, Juan Andres Trabieso (Travieso) "went out to the Medina River...to mark wood which might be cut for this presidio's use during the moon's wane in the coming month of February" (BAT Vol. 107:5-6). Trees were selected and marked for cutting during cattle workings, hunting expeditions, and other such outings (Adolph Herrera, personal communication 1985).

### Resource Treatment

Little archival information is available locally on the treatment of trees after the felling. In 1793, Juan Cortés of the Presidio of La Bahía, received an unsigned letter regarding the unsuitability of green lumber: "I think it advisable to use seasoned wood for the minister's house and priests's doors. If seasoned wood is not available, there does exist a fire curing method which other cities have employed, but I do not know of anyone here who knows how to use that method" (BAMC Blue Book 1793; translation by Dora Guerra). Cortés wrote:

Yesterday, Sergeant Prudencio Rodríguez of the Presidio of your city arrived at Mission Refugio and with him came the person who is going to do the doors of that mission church and the house for the priest, and I have ordered him not to do anything else, only the planks and to work on the frames so that the work can continue, because to work on the green wood would be work wasted, unless your Excellency wishes it to be done, then let it be done, let it be done. But I have lumber for the doors of the church and for the Presidio already cut and planked since 8 months ago. I have not had it done, fearing it would be done wrong [Cortés 1793; translation by John Leal].

In 1811, Fray José María Camarena of Mission Espíritu Santo, was reminded not to let the *morillos* (logs or beams) intended to be used for the construction of quarters touch the ground or they would rot (BAMR 49:0487).

Interpretations of various archival documents suggest that the same considerations applied in sixteenth-

and seventeenth-century Mexico affecting wood harvesting may have been applied later on the northern frontier in the following centuries. As early as the mid-1500s in Mexico, the Indians were cutting green trees and adzing the trunks, a technique that allowed only one or two boards per tree (Kubler 1948:172-173). The city council ordered the Indians to use saws which the council provided in order that the number of boards per tree be increased. Another specification was that no tree could be cut within 5 leagues of the city without license. The municipal council of Mexico City in 1537 ordered that the wood to be used in the construction of wagons must be seasoned for a minimum of 8 months after cutting (Kubler 1948:172-174).

Similar requirements regarding the cutting of trees for lumber was followed in the B exar region by at least the late-eighteenth century. In 1791, Gabriel Gal n and four others asked for and received permission to secure lumber from the Medina River (BAMR 21: ff 0257). Additionally, in 1781, the distance cited for cutting wood on the Medina River was 5 leagues (BAT Vol. 107:29). Juan Cort s wrote that the lumber for Presidio La Bah a was planked 8 months before it was to be used. These documents strongly suggest that the same requirements instituted in Mexico over 200 years prior to their use in B exar had been transferred to the northern provinces.

Felled logs to be used in a heavy timber framework and which were to be pit sawn required some preparation. The bark and sapwood were usually removed. A straight line was marked on the topmost surface with chalk or charcoal. Then the logs were raised and placed in a trestle or before the end of the seventeenth century, over a pit (Bealer 1972:88). They were carefully sawn on all four sides forming a heavy square timber. For a more thorough discussion of the pit saw, see "Mission Inventories and Tool Descriptions," this report.

### Storage of Materials

The mission inventories contain lists of materials kept in storage for future use. The documents list a wide variety of items, but only those pertaining to carpentry or blacksmithing were assessed for the present study. For example, nails (*clavos*) were noted in storage at Mission San Jos  in 1755 (Dolores y Biana 1755). In 1785, the storerooms at Mission San Jos  contained "two jugs almost full of nails," "16 angle irons for doors," "five sets of irons for chairs," and "about five dozen copper rosettes for door nails," as well as "six house doors without frames," and "four small windows" (Salas 1785). In 1793, Mission Valero had "150 andirons [metal racks for holding logs] filled with cedar logs that had been prepared for the repair of the roof and 5,500 small mesquite boards" [stored next to the granary] (Lopez 1793:5813-5814). At Mission San Juan in 1772, 82 pairs of new hinges and 7 new locks and 2 single hinges were recorded in the inventory of the mission. In one of the mission

workshops, 50 new *savine* (cypress) boards were stored; they were to be utilized for construction of new church doors, 10 house doors, and 10 windows (Gumiel 1772c). In 1772, Mission Espada had six large and two small beams (*vigas*) that were necessary for any purpose, 34 stacks of oak (*enzino*), 21 cypress boards (*sabino*), and about 300 mesquite logs for boards or any other purpose (Gumiel 1772d; translations by John Leal and Dora Guerra).

It is interesting to note that the presence of 300 mesquite logs would have been sufficient for such a major construction effort as the Herrera Gate. Minimally, 10 to 12 logs would have been needed for each leaf, or a total of 20 to 24 logs, to construct a gate similar to the Herrera Gate (Robert H. Hensarling, personal communication). This closely approximates the 30 *palos* (posts) of mesquite needed by Pedro Hu zar in 1801 for the construction of three doors, if one figures 10 posts per door (BAMC Blue Books, 1801).

### MISSION GATES AND GATEWAY DESCRIPTIONS

Originally, the San Antonio missions were unenclosed *pueblos*. Enclosure of these *pueblos* began as early as 1745 at Mission Concepci n. A feature common to all of the mission enclosures was the *puerta*, or gate, that allowed access into and out of the *plazas*. In the event of hostilities, the gate served as a part of the defenses of the settlement. The examination and documentation of these mission gates and gateways, critical to the study of the Herrera Gate, provide substantive information on descriptive types, functional forms, sizes, and locations as well as offering possibilities for the original location of the Herrera Gate.

#### Mission San Antonio De Valero (Figures 5 and 6)

##### Description

Mission San Antonio de Valero (the Alamo) was founded in 1718 and first enclosed in ca. 1759. A possibly later enclosure, ca. 1793, is attested to in later archival documents. In 1762, Fray Dolores y Biana described the mission: "They have made seven rows of houses...this plaza is walled and above the gate is a fortified tower with its portholes, three pieces of cannon, some firearms, with the corresponding ammunition for defense if required" (Leutenegger 1985:332-333).

An earlier translation and subsequent interpretations of this document indicate that the fortified gate was in the south wall; our examination of the document reveals no clue to the location of the gate. The *porteria*, the principal door of the *convento* (convent) or other large building was described by Dolores y Biana in 1762: "The town consists of a convent fifty *varas* square, with an interior corridor and arched colonnade, onto which open the appropriate rooms necessary for use by the ministers. There is a porter's chamber, a Refectory, a kitchen and an office" (Leutenegger

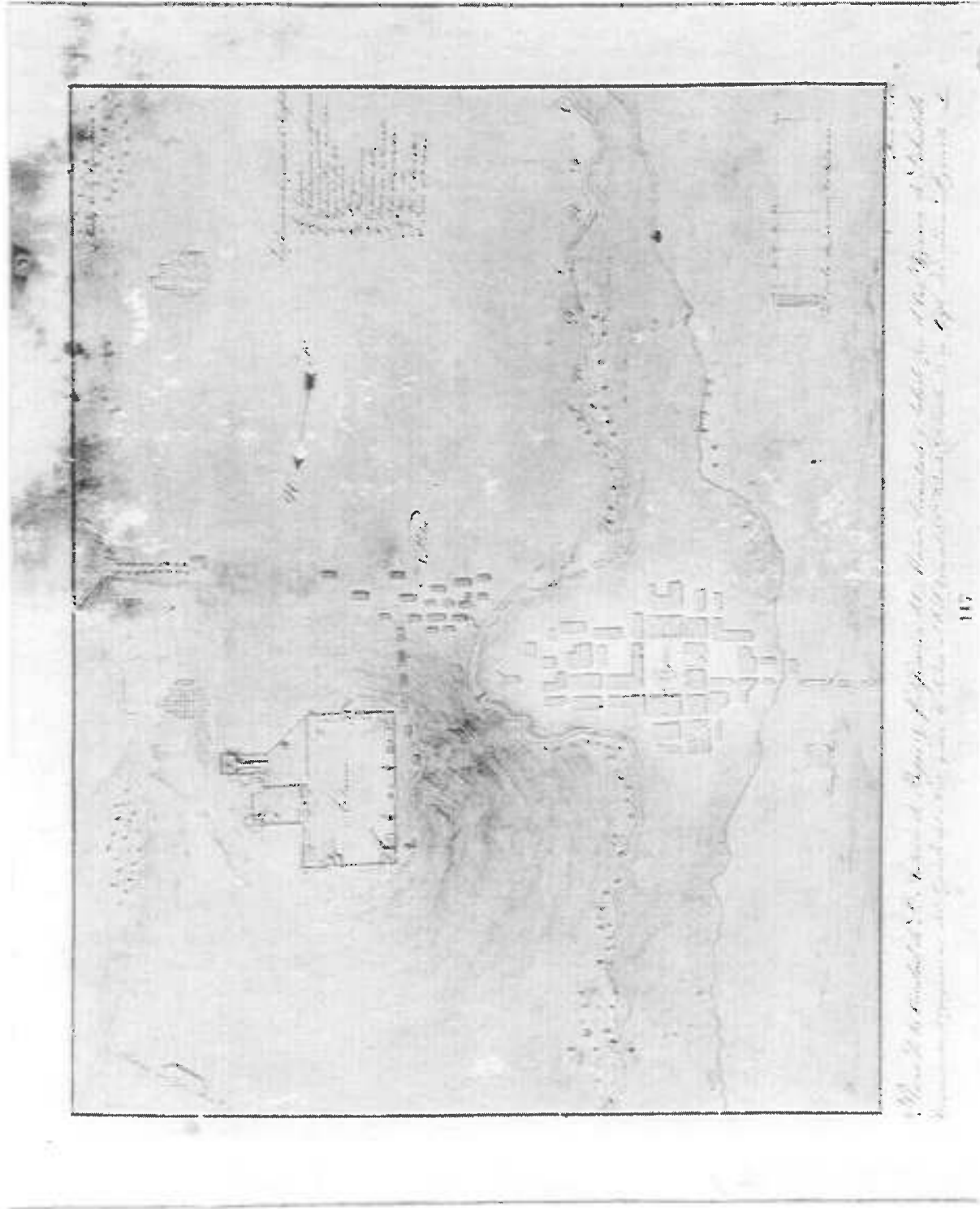


FIGURE 5. Plan of Mission San Antonio de Valero, 1836. *Plano de la Ciudad de San Antonio de...de Béxar y Fortificación del Alamo...* by Ignacio Labastida. Figure reproduced by permission of the Center for American History, The University of Texas at Austin.

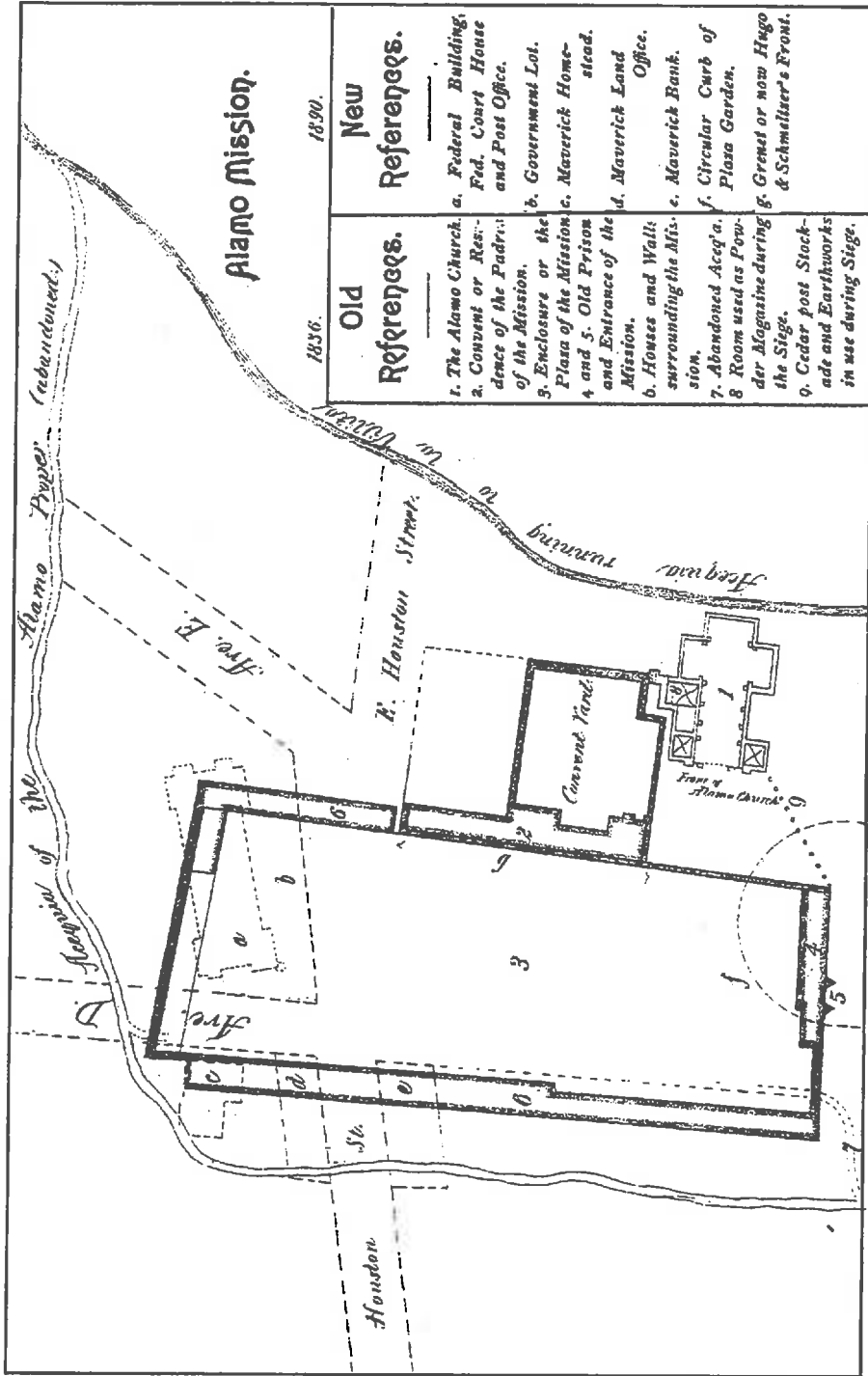


FIGURE 6. Plan of Mission San Antonio de Valero (from Corner 1890, DRT Library).

1985:331; retranslation by Dora Guerra). Dolores y Biana also described the *pueblo* as being large (*dilatada*) with an *acequia* lined by willow and fruit trees and having a dug well with a rock wall around it.

The 1772 inventory of Mission Valero by Fray Juan José Saenz de Gumiel does not mention enclosing walls but does discuss the *convento* entrance: "The site which some generally refer to as the mission, and which others call the convent is a *patio* in the middle of which there is a stone curbed well. There is an ample porter's chamber [*porteria*], 9 *varas* long and 5 *varas* wide on the west side (of the *patio*)" (Leutenegger 1977:30; retranslation by Dora Guerra).

The measurements for the *porteria*, 25 feet (9 *varas*) long by 13.89 feet (5 *varas*) wide, might represent the dimensions of the mission *convento* and not just the gate. A ca. 1829 sketch by José Juan Sánchez Navarro (or Estrada or José María Sánchez y Tapia) shows this *convento* entrance as an arched opening (Sánchez-Navarro n.d.a); however, Schoelwer (1985:25-26) believes this sketch to date to ca. 1835. In 1772, Fray Gumiel described the *pueblo* thusly:

This *pueblo* consists of 5 rows of houses. Each row has 3 houses. The houses measure 8 *varas*, and have a door facing east and a window facing west. Said houses are along a corridor of stone arches, allowing light to enter for the greater comfort of the residents. Two other houses are found at a distance from the aforementioned. Although they do not have porches, they are well built and well equipped against rain and wind [Leutenegger 1977:25; retranslation by Dora Guerra].

Fray Gumiel tells us that the buildings were called the "mission" by some and the "convent" by others, implying that some confusion existed as to what actually composed the mission of Valero (Leutenegger 1977:39; retranslation by Dora Guerra).

In 1778, Morfi described Mission Valero as such:

...the settlements or huts of the neophytes are under the arches which form a *plaza* with the church and house of the ministers. It has on the main door a little tower, built without art, where are kept two rock throwers for defense [Morfi 1935:70; McDonald n. d.:126].

Morfi further informs us that:

the *plaza* was closed at night to be prepared for a surprise and they customarily slept within the walls which though weak, were sufficient to resist the enemies who might insult them....Over the door of the convent they raised a little tower, with mountings for three field pieces, which with some

rifles and the necessary munitions, they carefully kept guarded there [Chabot 1932:60].

In his *Memoria*, (Chabot 1932:60) which relied heavily on Fray Dolores y Biana's report of 1762, Morfi reports that the **convent** entrance had a tower with mountings for three field pieces and some rifles (probably muskets or fusils). This sounds identical to the **plaza** entrance as described by Fray Dolores y Biana in 1762 (Leutenegger 1985:332-333). It is possible that Morfi confused the *plaza* entrance with the convent entrance, or perhaps two fortified towers existed with one in the south wall and one in the convent entrance and the convent *patio*.

Schuetz (1966:30) believed that the tower as described by Morfi in 1778 had been added to the convent. The lack of a description by Fray Gumiel in 1772 of enclosing compound walls, though, is disturbing. A map drawn in 1764 appears to show at least a partial wall on the south with a road entering from the southwest and enclosing walls on the north, east, and west (Menchaca 1764). A 1767 plan of the *villa* and *presidio* of San Antonio done by Urrutia (1975), however, does not show enclosing walls for Mission Valero and misidentifies it as "Mission of San José."

It is probable that an opening in the east wall between the convent and the northern portion of the convent walls, as delineated by Ygnacio Labastida (1836), was a secondary gate of ca. 6 feet. The 1786 report by Fr. José Francisco Lopez (1786) mentions only that the mission was enclosed by a stone and mud (*adobe*) wall located 300 paces from the center of the square. A later inventory by Fray Lopez (1793; translation by John Leal and Dora Guerra) conducted when the mission was secularized, stated that "in the south wall is the principal entrance (gate) into the *plaza* and it is 5 *varas* [13.89 feet] long with 4 *varas* [11.11 feet] high." The height of the walls along the south was 3 *varas* (8.3 feet). Lopez (1793; translation by John Leal and Dora Guerra) wrote also that "next to the entrance door to the Rev. Fathers's house there is a small bulwark with a small bronze one-pounder."

For the first time, we are provided with an unambiguous indication of two co-extant entrances or gates—one into the convent and another through the south wall. The latter was 13.89 feet long by 11.11 feet high with the adjacent walls being 8.3 feet high. This increase of ca. 3 to 5 feet in the height of the wall at the gate was typical of Spanish Colonial building practices (Manucy 1978:131). Lopez again confirms the existence of a fortified entrance into the convent but states that it is equipped with a small cannon of one pound. This convent entrance, clearly shown in the sketch drawn by José Juan Sánchez Navarro (n.d.a) prior to the battle of the Alamo, may have been partially walled up in ca. 1835.

Labastida's (1836) map of the Alamo compound in 1836 depicts the opening as ca. 6 feet wide, a dimension considerably smaller than the one provided by Fray Gumiel in 1772

(Leutenegger 1977:30). The width of 13.89 feet that we have from Fray Gumiel may in fact be that of the enclosing structure, or *porteria*; the scale drawing by Labastida (1836) is likely an accurate indication of the width of the opening itself. Sketches drawn after March 6, 1836 clearly do not show a large opening into the convent from the west wall, a circumstance that suggests that the opening was narrowed by at least the 1840s.

Following the secularization of Mission Valero in 1793, the lands of the mission were granted to the Indians who resided at the mission, "the sons of the Village," and to the refugees from the Presidio of Los Adaes (Lopez 1793). The mission buildings and walls were in a state of deterioration (Lopez 1793). In 1795, Juan Barrera asked permission from Governor Manuel Muñoz to take some lumber and stone from the derelict houses to repair the old convent so that

1. *Primerante dos chapas sueltas intuíles.*
2. *Una puerta con chapa y llave de la Yglesia que cai ala nueva.*
3. *Una alazena con chapa y sin llave dentro de la Yglesia.*
4. *Una puerta sin chapa de la sacristía.*
5. *Una puerta con cerrojo contigua ala dicha, (sacristía).*
6. *Una puerta con chapa y llave que de la Yglesia cai al patio.*
7. *Una puerta con chapa sin llave que esta contigua a la dicha (Yglesia) del lado de adentro.*
8. *Una puerta con chapa y llave, y dos puertas con cerrojo qu sirven en las dos piezas que vive el Señor Capitán.*
9. *Una puerta con chapa y llave del cuarto del Padre Cappellan.*
10. *Una dicha (puerta) con chapa y llave del corredor que cai al la asotea.*
11. *Una puerta con chapa de la escalera.*
12. *Una puerta con chapa y sin llave de la alcoba.*
13. *Una puerta con chapa y llave del la pieza en que vive el Alférez Don Francisco Adam.*
14. *Una puerta con chapa y llave del cuarto que sirve de alamazon? de habitación.*
15. *Una puerta con chapa sin llave del cuarto en que vive el Teniente Don Dionicio Valle.*
16. *Una dicha (puerta) del campo sin chapa.*
17. *Una puerta (dicha) sin chapa ella que sirve en la cosina.*
18. *Una dicha (puerta) sin llave que sirve en los lugares comunes.*
19. *Una puerta de la troje actual sin chapa.*
20. *Una dicha (puerta) con chapa y llave de las sala que esta contigua ala dicha troje y cai a ella.*
21. *Una puerta con llave del cuarto en donde esta el Repo. de armas.*
22. *Una puerta con chapa y llave en la sala que era troje de la misión.*
23. *Un cañón pedreno sin cureña.*

he might live there (BAMR 25:0975). At about this time, other buildings were granted to the mission Indians and to the Los Adaes refugees. Following secularization, the buildings were stripped of their doors and locks and were unoccupied (Chabot 1941:14), but archival studies reveal that at least some of the buildings such as the convent remained in use.

In 1802, the *Compañía Volante de San Carlos de Parras* (also known as the *Auxilio la Compañía Volante del Alamo de Parras*) arrived in B́exar from Alamo de Parras, Coahuila, Mexico and was garrisoned at the former mission (BAMR 30:947-949; Ivey n.d.b). On August 6, 1803, Vicente Amador, *alcalde* or mayor of the mission turned over the doors, locks, keys, and tools of the former mission to Captain Francisco Amangual, captain of the *Compañía*. An inventory of the doors taken by Amangual (1803; translation by John Leal) is revealing:

1. Two (key hole) plates that are loose and are useless.
2. One door with plate and key of the Church that goes to the new one.
3. One cabinet with plate, and without a key, that is inside the Church.
4. One door without a bolt of the sacristy.
5. One door with a bolt (or latch) that borders the church on the inside.
6. One door with plate and key which door goes from the church to the patio.
7. One door with plate, no key, that borders the Church on the inside.
8. One door with plate and key and two doors with bolts (or latches) that are used in the two rooms where the Captain lives.
9. One door with plate and key in the Chaplain's room.
10. One door with plate and key of the corridor that goes to the cellar.
11. One door with plate for the stairway.
12. One door with plate without a key, for the bedroom.
13. One door with plate and key of the room of the Second Lieutenant Francisco Adam.
14. One door with plate and key of the food warehouse? [room which serves as the living quarters of Alamazon?]
15. One door with plate, without a key, of the room where Lieutenant Dionicio Valle lives.
16. One door (gate) that goes to the camp ground (or field), no plate.
17. One door, without a plate, which serves as the kitchen.
18. One door, no key, which serves as the common room.
19. One door of the actual granary without a plate.
20. One door with plate and key of the living room that is next to the granary.
21. One door with a key where the weapons are kept.
22. One door with plate and key of the living room that was the granary of the mission.
23. One swivel cannon without a carriage.



Listed in the foregoing are 21 single doors and 1 set of double doors, the last with a *cerrojo* (latch, lock, or bolt). The location of the double doors appears to have been in the southeast wall of the old convent which Labastida (1836) labeled as “houses of the officials,” or in the west wall of the convent where the earlier described *porteria*, or convent entrance, was located. Both Sánchez-Navarro (n.d.b, 1836) and Labastida (1836) designate this area as “officer’s quarters” or “barracks” in 1836. Five new doors, frames, and thresholds were made. Doors were still present on the new church, the sacristy, various convent rooms including the cellar and stairway doors, the kitchen, the old granary which was in use as a living room, the new granary, the common room, and a door between the church and the convent patio (Amangual 1803). Areas of the convent apparently served as living quarters in 1803 before being turned into a hospital in ca. 1805-1806. The door to the *campo* (campground or field), No. 16 in the inventory, may be the outer gate to the south wall. The presence of adjacent rooms implies that structures associated with the south gate were present by 1803. The guardhouse shown by Labastida (1836) as the single room west of the south gate was already present in 1806 (BAT Vol. 19:94-95). Uses assigned to these rooms appear to roughly correspond with the 1836 plans of Labastida and Sánchez-Navarro. This may be part of the area described as an old *jacal*, or house, that remained from the original mission and into which Amangual, the Captain of the *Compañía*, had been relocated into in 1806 and described in a grant and sale of land and a house to Amangual in 1808 (BCA LGS 34). By 1806, the old convent became the first hospital to be established in Béxar (BCA LGS 34). Work done on the convent/hospital in 1809 included repair of the roofs and floors, repairing, rebuilding, and whitewashing the walls, and the addition of *pretils* or (parapets), on the north and southeast walls (BAMR 41:0206-0208).

Additionally, it appears that portions of the property purchased by Amangual in 1808 “*en el pueblo de Valero*” were sold by him to Benito Outón, a merchant, in 1809 (BCA Miscellaneous UFO Files 24). Included in the sale were a rock house with a living room with two doors and keys, a porch on the side of the *plaza* with a double door and key, one room with flat roof without a door, a porch on the west with a thatched roof, mesquite walls and cedar beams, another room without a door and two other rooms, one which served as a privy and one as a storeroom, one kitchen without a door and one corral gate. These are the rooms shown by both Labastida and Sánchez-Navarro in 1836 and to which they assigned uses such as the guardhouse, the hospital, the officials’ houses, and the entrance to the compound. Ramsdell (1959:20) wrote that the *Compañía* had put a gate through this south wall. A series of additions and renovations in ca. 1809-1810 at both Mission Valero and Presidio La Bahía coincided. The two carpenters responsible for repairs at La Bahía, Juan Espargo of the Aguaverde Company, and Dionisio Liendo of La

Bahía, “experts in lumber and other materials,” were ordered to San Antonio de Béxar in order to construct new barracks (BAT Vol. 24:89). The location of these barracks is not specified, but may have been in the south wall, known as the “Low Barracks” in 1836. An 1810 report stated: “I have notified his Excellency of the repair that has been done at Mission Valero with the object that it can serve as a hospital. Since this project has been completed, I am now concentrating for the project of the quarters to be built for the soldiers at La Bahía... which would accommodate 300 men” (BAMR 45:0036; translated by John Leal). Mission Valero already had an entrance here possibly as early as 1762 and at least by 1793.

Repairs and additions made to the former mission included the conversion of the convent into a hospital and guardhouse complex and included the reparation of two rooms to be used as a pharmacy and warehouse ca. 1807-1809 (BAT Vol. 27:166). Also, the gallery adjacent to the old convent was reconstructed and made into quarters for the unmarried soldiers in 1810 (BAMR 44:0615). What is more, two pieces of artillery were ordered to be sent to Mission Valero (BAMR 48:0369) and placed in the deconsecrated church (BAMR 44:0953).

The buildings and walls of Mission Valero were abandoned and fell into ruins during the 1813 Revolution (Saltillo Archives 1825, MR 19:1053-1072). In 1814, Mariano Varela reported that his cavalry troops were quartered in ruins that had unsafe walls and missing roofs (Varela 1814). General Joaquín Arredondo ordered that the funds from the sale of contraband goods be used for the repairs of the compound (Arredondo 1815). Also, Captain Juan de Castañeda of Mission Valero sought permission from Governor Antonio Martínez in 1818 to salvage the lumber and doors of the “old quarters” for the use of his troops (BAMR 60:0759-0760). Just which quarters are not clear; in any event, Castañeda says that some of them had been burned. Many of the doors and a great amount of the lumber had been taken away from Mission Valero by individuals (BAMR 60:0759-0760).

In 1825, José Antonio Saucedo, Governor of Coahuila and Texas, suggested that the old walls and buildings of the former mission be sold and the Mexican Legislature passed a resolution supporting the sales for the benefit of the State (Saltillo Archives 1825 MR 19:1053-1072). This matter was debated among the Captain of the Department of Texas who wished to continue to utilize the buildings for the *Compañía* troops as well as for a hospital, the Governor, the Mexican Legislature, and the Commandant General of the Internal Eastern States, Don Anastacio Bustamante. The Mexican Legislature passed a law in 1825 directing the sale of the buildings, and by July of 1827, the Legislature ordered the political chief of Texas to sell the buildings (*edificios*), walls (*murallas*), and anything else that could be sold at public auction at the main gate of the mission. The convent houses and the quarters used by the troops

were to be exempted from this sale (Saltillo Archives 1825, MR 19:1053-1072).

Auctioning the buildings began possibly as early as 1825. Also, it appears that some of the *Compañía* (now called the Alamo de Parras) troops demolished some of the old buildings and walls in order to construct new houses (Saltillo Archives 1825 MR 19:1053-1072). On September 7, 1827, the Legislature sent an official notice suspending the sale of the buildings and walls of the mission. The notice of this cancellation arrived after some of the property had been auctioned to Colonel José Francisco Ruiz for 328 *pesos* (BAMR 107:0032-0035). Ruiz's purchase included the house of the deceased Lieutenant Colonel Juan de Castañeda but the document provides no other specifics. These documents covering the auctioning of the property of Mission Valero and Ruiz's purchase support the oral tradition within the Herrera family that states that members of the family purchased mission property in the 1800s. In the late 1820s and 1830s, much of the Valero property was sold by heirs of the original grantees. In 1837, Francisco A. Ruiz purchased a parcel of the former farm land from María Teresa Bustillos (BCDR Vol. B-1:204-205).

The next significant event concerning the former mission, now called the Alamo, was its conversion into a fortress and the fateful siege that lasted from February 24 to March 6, 1836. This report will not attempt a comprehensive account of the siege and its place in the Texas Revolution; the reader is referred to Castañeda (1970), Hardin (1994), Long (1990), Lord (1961), Perry (1975), Tinkle (1958), and Woolsey (1985), among others. The following will concentrate on matters prior to, during, and following the siege that pertain to the south gate and wall.

Prior to 1835, General Martín Perfecto de Cos arrived in Texas from Mexico as a military response to the first steps of the Texas Revolution. At the same time, Colonel Ugartechea began fortifying the Alamo, including the erection of the cedar palisade and ditch from the southwest corner of the church to the south wall or "Low Barracks."

A tambour, or lunette, (a projecting fieldwork consisting of two faces and two flanks) was located outside the gateway (Woolsey 1985:184). Both Labastida (1836) and Sánchez-Navarro (1836, n.d.b) illustrate this area. Labastida shows one room that he identifies as the guardhouse, located to the west of the gate, and two rooms identified as the officials' houses or quarters, located east of the gate and including the northern extension. The outer gateway was partially blocked by an extension from the east side of the opening and by the lunette on the west, which also contained an opening. Sánchez-Navarro (n.d.b) in the "*Plano*" depicts two rooms west of the gate, to which he assigned no use, and two rooms east of the gate labeled as a hospital, with an additional three rooms in the northern extension labeled as kitchens. Sánchez-Navarro's "*Plano del Fuerte*" (n.d.b) depicts one room west of the gateway and one room east of the gateway with two rooms in the northern L-shaped

extension used as a kitchen and a hospital. The "*Fuerte*" shows the lunette, which contained two six-pounder cannon, with an opening on the west and a parapet located north of the inner gate in the south-central courtyard, the latter area contained two eight-pounders. Labastida's (1836) sketch shows the outer gate opening of the south wall as ca. 11 feet wide.

On the morning of March 6, 1836, the south gate of the Alamo was attacked by the Fourth Column made up of over 100 chasseurs (light cavalry) under the command of Colonel Juan Morales and Colonel José Miñon (Castañeda 1970:103). The guns of the lunette were taken and the embrasures penetrated into the square (Williams 1933:35). Troops in each column were provided with axes, crowbars, and scaling ladders (Williams 1933:35). The defender's cannons were turned to bring down the doors of rooms or the rooms themselves (Perry 1975:51).

Following the battle, General Juan José Andrade was ordered to destroy the Alamo. An eyewitness, Dr. J. H. Barnard, wrote "they are now as busy as bees tearing down the walls, etc.... [the compound] was completely dismantled, all the single walls were leveled, the fosses filled up, and the pickets torn up and burnt" (Barnard 1949:43-45).

If the gates of the Alamo had survived such intense fighting, Barnard's testimony suggests that the destruction of the fortification (or what were probably the wooden components, for we know that at least some of the stone structures survived) was so complete that Andrade may have consigned the gates to the flames. William Bollaert (1956) wrote in 1840 that "not half the walls are now to be seen and those grown over with weeds, moss, and shrubs growing out of the cracks in its walls". According to the oral traditions of the Herrera family, it was at this time or somewhat later that Francisco Antonio Ruiz obtained scrap lumber from the Alamo (Adolph Herrera, oral history interview, tape on file, CAR-UTSA). The possibility exists that Ruiz, acting *alcalde* of Béxar, would have been able to negotiate with Santa Anna for such items as survived the siege and its aftermath. Preliminary observations of the gate suggest that some charring of the jamb stile has occurred on Gate B. This line of evidence requires further investigations.

Stone from the old mission was sold to individuals by 1840 for four *reales* per cart load (Everett 1975:18); earlier sales for these and other materials may have occurred, perhaps in 1827 when the auctioning of the former mission took place. This document does substantiate the selling of various components of the mission at least by this date. By 1841, the south gate complex was known as "*La Galera*" (BCDR, Vol. A2:470). A *galera* is a "house of corrections for women" (Velázquez 1974:352). This definition appears to correspond to at least two plans of the Alamo compound: a plat attributed to Green B. Jameson (DRT, Alamo Maps File Collection) ca. 1835-1836 and Francois Giraud's (BCA, City Survey Book) survey for Samuel Maverick in 1849, both of which label the area west of the gate as the *carcel* or prison.

The south gate complex of walls and structures formed the southern boundary of the land belonging to Mariano Romano which included most of the current-day Alamo Plaza property. Romano sold this property to Samuel Maverick in 1841 (BCDR Vol. A2:470).

In 1845, “cacti plant decorated the tumbled-down roof of the old building that stood across the square, forming the southern side of the quadrangle that was known as Alamo or Mission Plaza” (Everett 1975:18). A rough penciled field drawing entitled “*La Barricade*” sketched by Theodore Gentilz (1845) in ca. 1845-1846 illustrates the south wall and gate opening. The sketch is very faded and fragile but the scaled measurements of the gate appear to be ca. 9 feet.

The United States Army began use of the Alamo compound for a Quartermaster’s Depot ca. 1846. Plans and descriptions of the buildings that were prepared for the Army provide information on how the buildings appeared in the late 1840s. An 1846 plan prepared by Edward Everett, “Plan of the Ruins of the Alamo near San Antonio de Béxar” depicts the south wall with the entrance and one room located to the west and one room located on the east; the remainder of the walls were gone (Everett 1846). His 1847 “Plan of the U. S. Depot at the Alamo” depicts the same configuration—the south wall buildings were utilized as a “forage house” (Everett 1847). An undated map of the Alamo complex (United States National Archives n.d.) shows the south gate as ca. 12.52 feet and shows only one division, a small room on the eastern side. This map is very similar to the plat map prepared by Francois Giraud and printed in the *San Antonio Light* on February 12, 1912 (DRT, Alamo Maps File Collection). Both plats show the area to the west of the opening as a “prison.” The outer gate/opening measures 12.52 feet. Between 1847 and 1849, the Army apparently partially closed in the inner gate entrance with a wall and replaced this larger opening with a small door. The outer opening remained as it was in 1847. Edmund Blake’s (1849) “Plan of the Quartermaster’s Depot in 1849” depicts the south gate with one room on the west and two rooms on the east; these rooms had cement roofs. The splayed wall with an outer gate shows the outer opening to be ca. 11 feet with the inner gate opening partially closed with a small opening.

Deed records record some information on the size of the gate/opening. An 1849 survey by Giraud for Jesús Cantú and Juan Losoya gives the splayed opening as 15.65 feet on the outside and 9.39 feet on the inside (BCA, City Survey Book Vol. 1:118). A second deed record, also dated 1849, between Concepción Charli and Jesús Cantú shows the outer dimension to be ca. 15.65 feet, but the inner dimension cannot be measured reliably (BCDR Vol.1:503-504). Captain Reuben Potter’s (1878) plat of the Alamo that accompanied his article “The Fall of the Alamo” published in the *Magazine of American History* in 1878 is based on what he found on a visit to the Alamo in 1841. The Potter map depicts the

south gate as being a porte-cochere that passed through the building under the roof (Williams 1933:414).

In 1841, the Republic of Texas granted the Alamo church, outbuildings, and lots to the Catholic Church (Catholic Archives 1841). In 1871, Bishop C. M. Dubuis, by general warranty deed, sold to the city the “*Galera*,” the old south wall gate complex (BCDR Vol. W-1:237). The building was to be demolished in order to combine the Plaza de Valero and Alamo Plaza into one open area (BCDR Vol. W-1:237-238). The building was subsequently torn down and the last vestiges of the old entrance to the mission disappeared.

### Summary

Mission San Antonio de Valero was enclosed ca. 1759 but it is not clear if this was the same as the later enclosure of ca. 1786-1793. The mission contained at least two large entrances: the main gate located in the south wall and the convent entrance located in the west wall of that building. Archival sources offer confusing and contradicting information concerning the width of the entrances with variations from ca. 9 feet to 15.65 feet on the south wall and 6 feet to ca. 25 feet long at the convent entrance. By 1793, the height of parts of the south wall was 3 *varas* (8.3 feet), the exact height of the Herrera Gate. By 1849, the south wall gate entrance was splayed with an interior opening of 9.39 feet and an exterior opening of 15.65 feet. Archival research supports the oral history of the Ruiz-Herrera family which states that members of the family bought property and other components at the former mission of Valero. These transactions took place as early as 1825 to 1827 and as late as 1837.

At the time of secularization in 1793, parts of the walls and buildings of the old mission had deteriorated, yet some areas, such as the convent, were still being utilized. The *Compañía Volante* arrived at Mission Valero in 1802 and were stationed there for the next 25 years or so. Repairs made by the *Compañía* to the compound included the addition of structures to the gate area of the south wall and may possibly have included the addition (or repairs?) of the south wall gate itself. Some of the property was auctioned beginning ca. 1825-1827; one successful bidder was José Francisco Ruiz, ancestor of Adolph Herrera, present-day owner of the Herrera Gate. In 1835 and 1836, hostilities between the Mexican and Texian forces culminated in the infamous fall of the Alamo to the Mexicans on March 6, 1836. Although it is possible that wooden gates could have survived such fierce combat, the subsequent partial destruction of the fallen fortress renders the likelihood of such an occurrence extremely small. The U. S. Army took possession of the compound in ca. 1846 and by 1849, had reduced the width of the inner opening for the south wall. The convent entrance appears to have been reduced by or at this same time. If any gates were still in position, they could have been removed during this interval, perhaps as late as 1849. In 1876, the city of San

Antonio purchased the extant standing sections of the south wall and demolished it, removing any standing vestiges of the south wall.

### San José y San Miguel de Aguayo (Figure 7)

#### Description

Early inventories and visitor descriptions indicate that Mission San José y San Miguel de Aguayo (San José), founded in 1720, was enclosed into a *pueblo* compound sometime between 1758 and 1768. In 1768, Fray Solís provided the first description of the enclosing wall and gates:

It [the *pueblo*] is built in a perfect square of lime and stone. Each wall measures 220 *varas*, and each wall has a door [gate]. On opposite corners there are turrets for guarding each of the walls. The Indian's dwellings are constructed against the wall....Exterior portholes serve for defense against enemies [Leutenegger and Habig 1978:144; retranslation by Dora Guerra].

This account lists four gates (*puertas*), one located in each wall of the compound between two towers (bastions) on opposite corners that protected the two wall sections.

In 1778, Fray Juan Agustín Morfi (1967:103) wrote that the mission had “four gateways and in them four towers or bulwarks.” He added a further description and identified a fifth gate:

It is a very beautiful plaza...with four identical doors on each of the walls; above each one [gate] there was a raised [?] At the doors, corresponding to the lateral sentry boxes, interior and exterior gun ports were cut, making it possible for the sentries to fire toward the interior while under protection, should the enemy break down the doors. Additionally, in front of the church there is a fifth door which can be raised [Morfi 1935:226; retranslation by Dora Guerra].

Morfi used the term *rastrillo* for this fifth gate (Chabot 1932:61). This term has been translated as a “portcullis” (Pei 1968:427) or a “gateway of a palisade” (Velázquez 1974:553). A portcullis is a strong grating, as of iron, made to descend along vertical grooves at the sides of a gateway of a fortified place thereby preventing passage (Parker 1986:207). Morfi (Castañeda 1935:42) noted that the gate located in the west wall and opposite the church at Mission San José had an iron grating. This would resemble other known Spanish Colonial defensive gates. For example, the main gate into the Castillo de San Marcos, St. Augustine, Florida begun in 1672, is constructed in a similar fashion to the Herrera Gate. The interior gate is a heavy

timber lattice type construction as the Herrera Gate. While the present gate is replicated and not original, its design is based on original plans of the Castillo obtained from Spain (John Suddeth, personal communication 1987). Corner's (1890) scale plan of Mission San José delineates this gate as ca. 20 feet. Smith, Sr.'s (1934c) architectural drawings for the restoration of Mission San José show this gate (based on located foundations) as being splayed from ca. 22 feet wide on the exterior splay to 10 feet wide on the inner wall splay.

By at least 1785, a sixth gate was present in the mission enclosure: “the six gates of the mission have iron locks and keys” (Salas 1785). Fray Lopez (1786; translation by Dora Guerra) reported in 1786: “the wall has four carved wooden doors [gates] facing the four cardinal points so as to facilitate exits destined for those directions. The doors [gates] have strong locks. Besides these four doors [gates], two other smaller ones were added as the population increased.”

Lopez's report is the first one that relates more than that the gates exist; they are described as *puertas de madera labrada*, or doors of worked wood. *Madera* could also mean “timber or lumber” (Velázquez 1974:437), such as a planked type of door construction common to the Spanish Colonial period or it could mean a heavy timber construction like the Herrera Gate. Father Leutenegger translates the term *labrada* as “carved” when he encounters the term in association with wood (*madera labrada*), but “worked” when associated with stone (*piedra labrada*). The same distinction is observed by Ivey (n.d.a3:31, 57) and Dabbs (1940:5, 7). Velázquez (1974:419) states that the term *labra* is the “action of working or chiseling stone” or “carving or other work given to materials before placing them, especially if rough stone.” Pei (1968:308) gives “wrought; worked” when used as an adjective. The term “worked” is closer to the original meaning when it is used in reference to *pueblo* gates. The term *talla* or *tallado* is used when referring to a carved piece of wood in the sculptural or architectural sense.

The next mention of gates or gate openings at Mission San José is contained in the 1823 Inventory by Ramón Músquiz (1823). Only three gate openings or former openings are mentioned: the *pasadiso*, a narrow passage or covered way (Velázquez 1974:499) on the north wall, the *puerta principal*, the main door on the west, and the walls of the street which ought to open on the west (Músquiz 1823:114-116). According to this secular appraisal, only the small north gate and the “main” gate on the west wall were in use by this time, with an additional gate on the west wall apparently having been closed up.

On the southwest corner, the walls stood to a height of 2 *varas* (5.56 feet) and on the west wall to a height of 3 *varas* (8.3 feet) (Músquiz 1823:114-116). A 2-*vara* wall was one of five standard wall heights identified by Manucy (1978:128) in St. Augustine, Florida. The 3-*vara* height seems to also have been a standard height for walls but also was

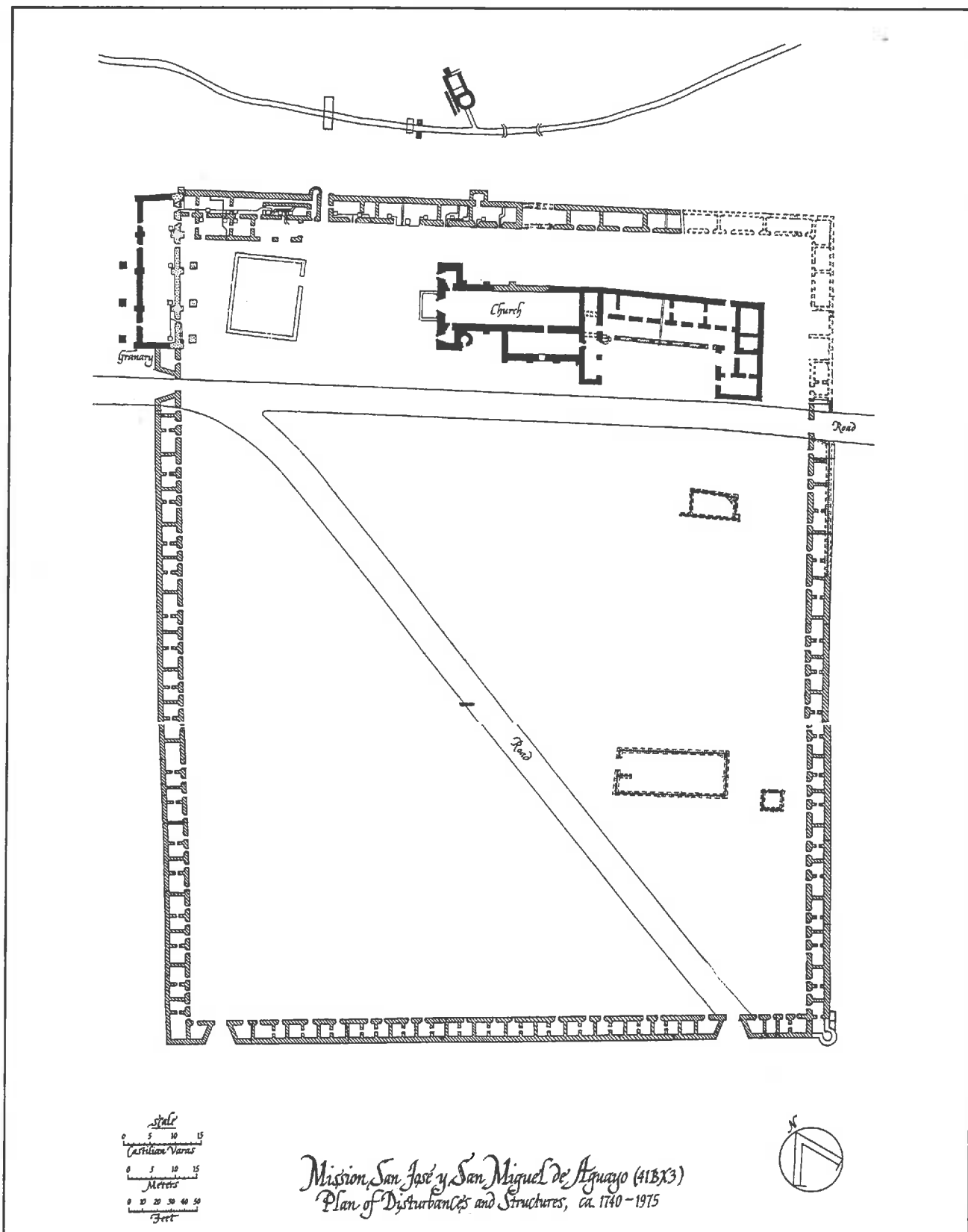


FIGURE 7. Plan of Mission San José y San Miguel de Aguayo (adapted from Clark 1978).

associated with the height of one-story buildings. This is, significantly, exactly the height of the Herrera Gate.

In 1824, the north wall passage, including the *fabricas* (buildings) east of the granary, were auctioned to Colonel José Francisco Ruiz (BCA MR89). This was the section of the compound identified by Ivey (n.d.a3:23) as the carpenter's shop. Boundaries for the buildings included: "on the east by a small door which leaves from the square" (BCA MR89). Additionally, in 1823, Ruiz was granted two *dulas* of water and two *suertes* (plots) of land in the *labors* (farms) of San José (BCA MR89). This grant is shown on a map of the original claimants of the irrigable lands in the *labores* of the four lower missions (Giraud and Navarro 1874). Again, the gate given in the boundary description in 1824 was referred to as a *portezuela*, or small door. This door was ca. 5 feet wide and dissimilar in dimensions to the Herrera Gate. The document does establish, however, that the Ruiz family owned property at Mission San José at least by the early 1800s. In 1825, Ruiz sold the north wall property to Juan Martín Veramendi for 450 pesos (BCDR Vol. F-1:64-65). This sale did not include the two *suertes* of farm land.

In 1826, Francisco Rojo wrote about the mission in reference to its defenses:

Mission San José can be guarded by four men. However, it is imperative that they seal a small door in the wall, I mean to say in a simple wall on the East side. On the South side, they need to gather the stones which have fallen from the three sides of the wall which face the plaza, rendering the wall penetrable. If they do not carry out this small repair, which would take one or two days, Your Excellency, it is then imperative for these same four guards to appoint a sentry during night time guard duty to guard those three vulnerable spots in the wall through which it would be possible for a horse and horseman to enter. This mission does have a strong, defendable point inside, which is in a good state of repair, and that is the convent, or home of Don Juan de Veramendi. This site can be perfectly defended by the same four guards in the event of enemy penetration through the door, or through any other point [Rojo 1826; translation by Dora Guerra].

In 1832, the lands and buildings of Mission San José, which had not previously been assigned or sold after secularization of the mission, were ordered to be auctioned at public sale; houses assigned to the priests for living quarters were excluded. The money was to be deposited in the Treasury of the *ayuntamiento* or city council (Músquiz 1832).

#### Summary

At least four mission compound gates, one in each wall, were located at Mission San José from 1768 to 1777. By

1778, a fifth gate also was located in the west wall in front of the church. This gate/opening has been identified as being from ca. 20 to 22 feet wide on the outer splayed wall to 10 feet wide on the inner wall. The 10-foot width probably represents the width of the actual gate. By 1785, a sixth gate was located in one of the enclosing walls. The 1786 report reveals that four large gates and two smaller ones were present and provides the first, although brief, description of the actual gates as contrasted to the entranceway. By 1823, only two functional gates are mentioned—the small passage on the north wall and the main gate in the west wall. Apparently at least one of the gates, the second one in the west wall, had been closed up. In 1826, a report recommended that a small door opening in the east wall be closed up, suggesting that the gate was no longer present. The same report also suggested that fallen stone along the south wall be used to close up the opening in that area and identified a main gate large enough to enter on horseback, but did not give its location. Some of the walls were 3 *varas* (8.3 feet) in height, the height of the Herrera Gate. Colonel José Francisco Ruiz, the great-great-grandfather of Adolph Herrera (owner of the gate), owned land at Mission San José at least by the early 1800s as well as buildings along the north wall that contained at least one gate of the mission.

The 1830s and 1840s were probably the last decades that retained any vestiges of Spanish Colonial gates at Mission San José. The records examined have not provided direct information concerning their eventual disposition.

No known sketches or archival photographs of Mission San José provide indications of its gates for the compound. One door, possibly of original Spanish Colonial manufacture, remains at the Mission San José granary (Habig 1968a:181). The door is hung on the southeast corner of the granary and is of panel construction. The two sacristy doors in the church are also believed to be of original Spanish Colonial construction.

The main doors to the church were replicated by Peter Mansbendel, a sculptor, in 1937 working from old photographs. He used Kentucky black walnut to make the doors (Habig 1968a:179), each measuring 9 feet 8 inches wide by 14 feet 8 inches tall. They are 2 1/2 inches thick and weigh several hundred pounds. The style of the doors is Spanish Baroque containing elements of traditional Moorish design (Habig 1968a:179). Mansbendel also carved the doors to the baptistry at this same time. Wooden architectural elements replicated by the Works Progress Administration (WPA) at Mission San José in the 1930s were of cedar (notes on file, San Antonio Missions National Historical Park, San Antonio).

#### Mission Nuestra Señora de la Purísima Concepción (Figure 8)

#### Description

Mission Nuestra Señora de la Purísima Concepción (Mission Concepción), moved to San Antonio in 1731, was

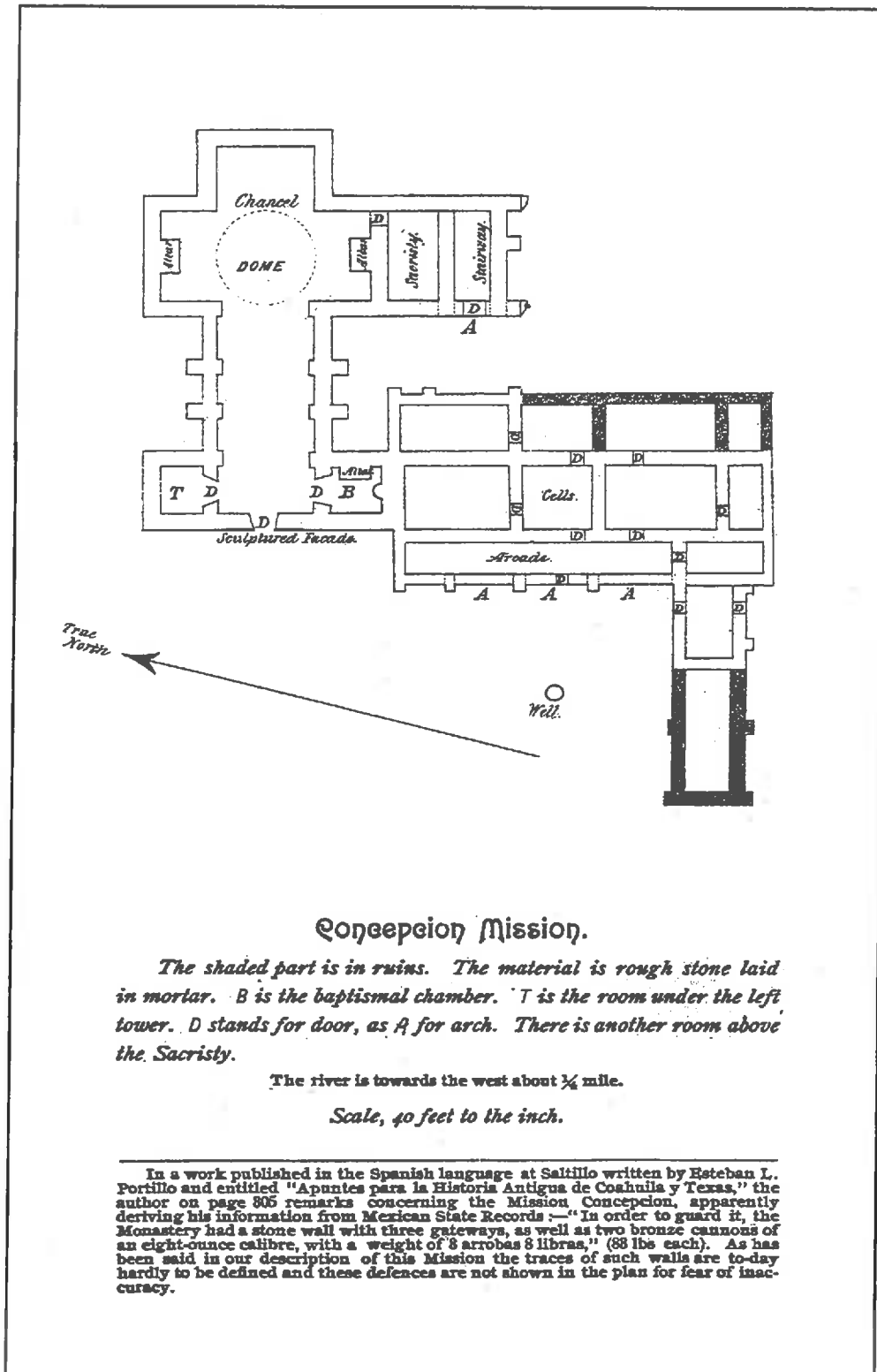


Figure 8. Plan of Mission Nuestra Señora de la Purísima Concepción (from Corner 1890, DRT Library).

already enclosed by walls by the year 1745 when Fray Francisco Ortiz visited and noted “the pueblo is encircled by a protected wall of stone and adobe.” (Ivey n.d.a3:41-42).

The 1762 report by Fray Dolores y Biana reported that “the town is fenced in and walled for protection and defense” (Leutenegger 1985:336). No gates are mentioned in the description. Ivey (n.d.a3:55) believes, based on archeological evidence, that the 1762 enclosure was not the same as the 1745 enclosure.

The 1772 inventory contains the first specific mention of the gates of Mission Concepción: “The pueblo is completely enclosed in a good wall of roughly worked stone with four gates to the four winds” (Gumiel 1772b). A 1786 report by Fray Francisco Lopez offers substantial information regarding the gates of the mission: “The mission is square in shape and enclosed by a stone and mud wall, low in parts, and provided with three ample openings, one on the East, another on the West, and a third on the South. These have gates of carved wood with good locks” (Lopez 1786; translation by Dabbs 1940:6).

Lopez uses the term *portónes de madera labrada* here to describe the gates themselves as opposed to the gate openings which he mentions independently. This is the only mission for which Lopez describes the gates as *portónes*; at Missions San José and San Juan he uses the term *puertas* and at Mission Valero, *portadas*. Lopez’s specificity strongly suggests that the gates at Mission Concepción were distinctive enough to be called *portónes*. As previously discussed in the “Architectural Analysis and Description” section of this report, a *portón* was a heavy gate of two leaves that closed off the *zaguán* or the plaza and was stout enough to withstand an armed attack. Each leaf of a *portón* was generally between 3 1/2 feet to 4 feet wide and about 8 feet high (Bunting 1979:71). The measurements of the Herrera Gate conform closely to these dimensions, but unfortunately no precise measurements for the gates at Mission Concepción have been found. Again, as at Mission San José, the term *madera labrada* would be more appropriately translated as “worked wood” as opposed to “carved wood.”

The 1794 Inventory of Mission Concepción discussed the walls and gates: “also, said Indians received their homes which are encircled by a stone wall with three doors, one (a *postigo*) of which includes a see through window, and all of which have their appropriate locks and bolts” (Muñoz 1794a; translation by Dora Guerra). Ivey (n.d.a3:5, 58) translated the term *postigo* into a “postern-door,” a back door or gate, a private entrance, or any entrance other than the main one. The term *postigo* can mean: (1) wicket, small door; (2) sallyport, postern; (3) a door of one leaf; or (4) any of the divisions of a door or window (Velázquez 1974:529). Pei (1968:404) noted that it could also mean a “peephole.” Guerra translates this as a small window. The discussion may refer to a wicket or a small door (in a *portón*) common in Mexico and Spain that was used by pedestrians when the heavy gate

was closed (Bunting 1979:71). The 1794 Inventory is the last reference found to mention or describe gates (Muñoz 1794a).

### Summary

Mission Concepción was enclosed much earlier than the other four missions. The 1772 Inventory reports four gates, one in each wall (Gumiel 1772b), but the 1786 report only lists three: one each on the west, east, and south walls (Lopez 1786). Lopez related that the gates were *portónes* which should be taken to mean that they were heavy gates of two leaves and that one or both leaves had a wicket or small door for foot traffic or functioned as a small window.

Research has revealed that Mission Concepción was virtually abandoned during 1813 to 1815. By 1826, the walls of the mission were completely in ruins (Rojo 1826; translation by Dora Guerra). Colonel José Francisco Ruiz and Joséfa Hernández were married at Concepción in 1804 and their child, Francisco Antonio Ruiz, was born at Concepción in 1812 although he was baptized at Mission San José (BCA San Fernando Church Records). As early as 1828, stone from Mission Concepción was donated by Vicente Gortari, José María Sambrano, Ponciano Muñoz, José María Cárdenas, Ygnacio Chavez, and Baltazar Calvo to repair the San Fernando Church which had burned (BAMR 118:0732). This indicates that salvage of some materials from the dilapidated former mission was occurring. It is possible that these salvage efforts could have included wooden architectural components such as the Herrera Gates. No vestiges of Spanish Colonial gates would have remained at Mission Concepción past the 1820s.

### Mission San Juan Capistrano (Figure 9)

#### Description

Mission San Juan Capistrano (Mission San Juan) was probably enclosed between the years 1762 (when no walls or gates are mentioned) and 1772 (Gumiel 1772c). The 1772 inventory described the walls: “A new pueblo was in the process of being built almost in a square with a strong stone wall which serves as a rampart against the enemy” (Gumiel 1772c; translation by Leutenegger).

The only reference to gates in the walls referred to the *labors* (farms) of the mission: “The farm begins at the gates of the mission. . . . On the East [sic] side there is a stone wall; on the west side there are portions which are fenced. Other sides [facing the river] do not require fencing since the ravine and depth of the river itself serve as protection enough” (Gumiel 1772c; translation by Dora Guerra).

We may infer from the above that a gate was located in both the east and west walls by 1772. Corner (1890) shows two possible locations for the west wall entranceway: an opening ca. 10 feet in width between the convent and chapel and an opening labeled “gate” north of the chapel ca. 7 feet



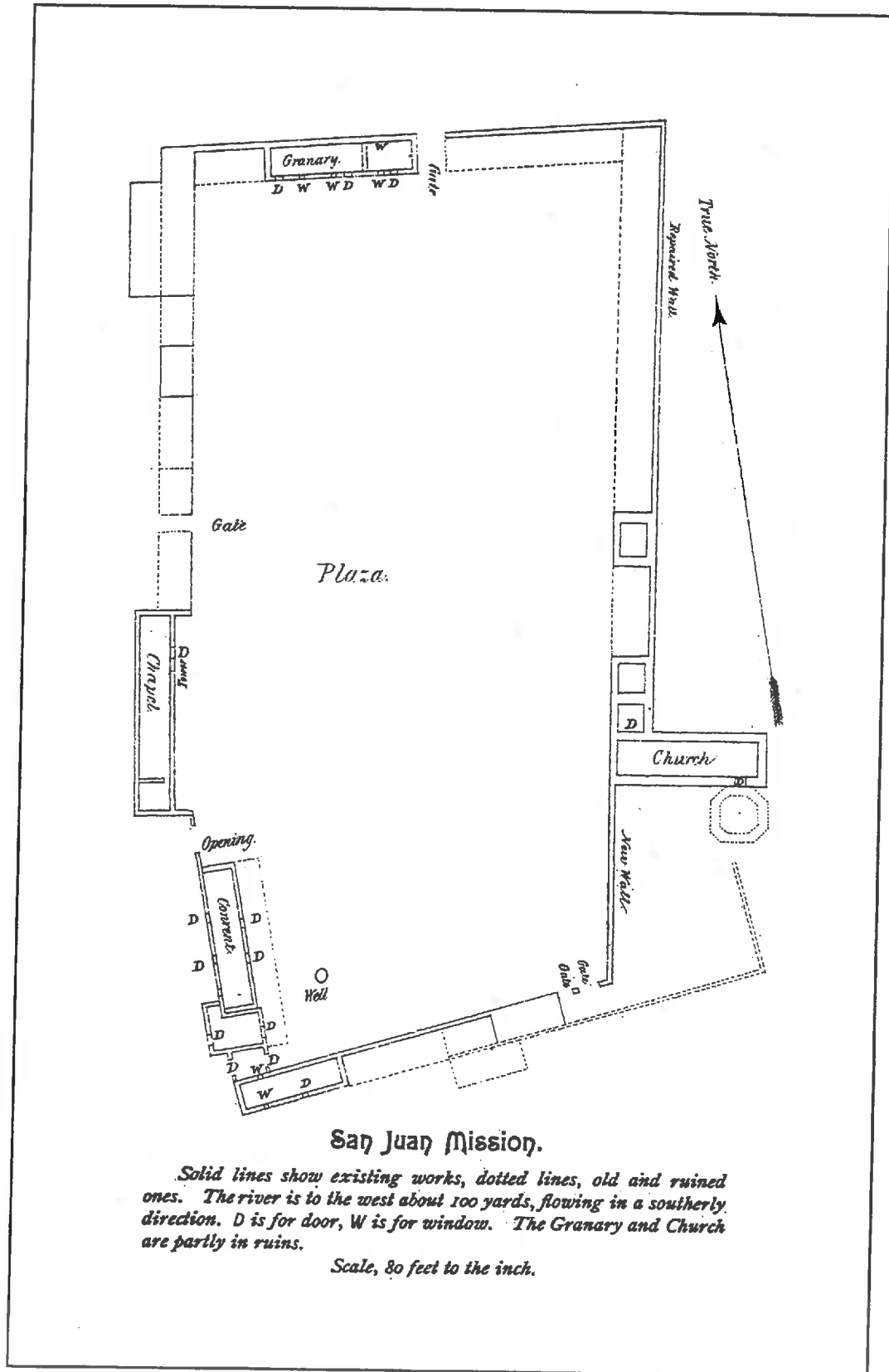


FIGURE 9. Plan of Mission San Juan Capistrano (from Corner 1890, DRT Library).

in width. Smith, Sr. (1934b) included only the opening between the convent and chapel and showed it to be ca. 7 feet. Archeological work by Schuetz (1968:116) revealed that Spanish Colonial midden deposits, often associated with gateways, were present in the opening north of the church currently in use. This is the area shown by Corner (1890) as a gate and probably represents the small gate mentioned in 1772 on the west wall. This gate was infilled with a house prior to 1827, possibly in response to suggestions made by Francisco Rojo (1826) regarding the defenses of Mission San Juan.

Corner (1890) did not show an east wall opening; this opening may have also been closed in response to Rojo's suggestions. However, Saucedo did not show the gate in 1823 suggesting it had been closed by that time (Schuetz 1968: Figure 5a). Harvey Smith, Sr. (n.d.b) noted two openings in the east wall which may possibly have been gate openings. The height of the east wall varied from 3 *varas* (8.3 feet) on the north to 2 *varas* (5.56 feet) on the southern end (BCA MR 15).

The Lopez (1786; translation by Dora Guerra) report provided further information on the mission and its gates: "Its shape is square with a wall like those aforementioned [missions], with three gates in it, one large and the others small." The J. Saucedo Plat Map, ca. 1824, of Mission San Juan not only indicates the west gate, but also a north gate which is no doubt the third gate mentioned by Lopez (1786). The east gate, however, had apparently already been closed by 1824. The 1824 appraisal of the mission revealed that Father Francisco Maynes had bought ca. 56 feet of the north wall on the right of the entrance into the *plaza* (Saucedo 1824).

In 1826 Mateo Ahumada (Ahumada 1826; translation by Rock n.d.:70) gave instructions for guarding Mission San Juan against Indians. Included in the document was the following:

He will maintain a guard every day of a corporal and four soldiers at the wall entrance and it will be [maintained] with such vigilance so as to be ready for any surprise whatever...With the disengaged troop he will maintain a watch all day from the tower which will allow [an] opportunity for an assessment of the enemy....He will place the freed [disengaged soldiers] from the wall day and night posted in such a way that the Indians could not strike the first blow and the guard will be charged with opening and shutting of the gate always to count carts or horses.

In the same year, Francisco Rojo (Rojo 1826; translation by Dora Guerra) wrote the following about the defenses of Mission San Juan:

Mission San Juan must also be guarded by four men. It is also imperative for its community to seal a small door which is in the West wall. I do not perceive this door as being useful to the community. At the open door in the North wall, near the main entrance,

and against the wall, a dump has been created which spills over into the interior, forming a ramp.

The north gate, probably present since at least 1772, but most certainly since 1786, was the main entrance to the compound (Ahumada 1826). Corner's (1890 n.p.) scaled plan shows this gate to be ca. 10 feet in 1890. Smith, Sr.'s (1934b) profiles of the north wall prior to WPA reconstruction in the 1930s shows an opening of ca. 46 feet. Schuetz's (1968) drawings of the Mission San Juan are only schematic and cannot be used. The height of the walls on the north were 3 *varas* (8.3 feet) (BCA MR 15). Archeological excavations conducted by the CAR-UTSA in 1986 revealed Spanish Colonial midden deposits ca. 15 feet north of this gate area (Anne Fox, personal communication 1986).

The last identified archival record that mentioned the north gate was the 1830 appraisal of houses and land at Mission San Juan (no other gate locations were mentioned): "A portion of rock wall belonging to Barbara Torres...bounded on the north with a depth of 20 *varas* recently granted to her on the west by the main gate of the wall" (BCA LGS 27).

Three other gateways at Mission San Juan must be considered: the entrances to the *convento* and a gate shown by Corner (1890: n.p.) in the entrances to the convent. The 1772 Inventory (Gumiel 1772c; translation by Dora Guerra) stated the following about the convent entrance:

Place where the priests live:

This [place] consists of four walls in a square forming a spacious patio in the center of which there is a water well which is never dry. The main door is new, sturdy, and wide enough for a horse. It faces North in the direction of the town.

By 1772, this gate replaced the earlier *convento* entrance. Located in the southwest corner of the compound and known as the *porteria*, this gate and entrance is today restored and provided with a replica gate. The stone support for the gate post in the interior wall as well as a paved plaza was found by Schuetz (1968). Based on archeological excavations, this opening measured ca. 8 feet. The *porteria* was enclosed prior to the 1772 inventory. The location of the 1772 gate is not known but was possibly located along the north wall of the original *convento* complex (Anne Fox, personal communication 1987).

The unclaimed lands and buildings at Mission San Juan were ordered to be sold at public auction in 1831 (Habig 1968b:180). In 1832, Ramón Músquiz, political chief, wrote to José Antonio de la Garza that "the public sale should proceed excepting those buildings occupied by the Priest" (Músquiz 1832).

### Summary

Current studies suggest Mission San Juan was not an enclosed *pueblo* prior to 1762. It appears that three gates

were located in the walls: the largest, the main gate on the north; a small gate on the west; and a third small gate on the east. Additionally, a large fourth gate to the *convento* was present in 1772 which replaced the earlier *porteria* (the present entrance on the southwest). The height of some of the walls varied from 2 *varas* (5.56 feet) to 3 *varas* (8.3 feet). The north gate was new in 1772.

The exact locations of the original gateways of Mission San Juan remain speculative: reports, inventories, and deed records offer unclear and often contradictory information. Tentatively, Mission San Juan, like Missions San José and Concepción, probably contained no vestiges of wooden Spanish Colonial gates more recently than the 1830s, but this is unclear. Sketches dating to the 1840s-1850s do provide us with a glimpse of at least one of the gate openings at Mission San Juan but does not illustrate the actual wooden gate. At least three gates appear to have been large gates over 8 feet in width: the large main gate in the north wall, the 1772 entrance gate to the *convento*, and the *porteria* entrance. The grating-like replica gate in the *porteria* measures ca. 6 feet 8 inches wide by 7 feet high, and currently serves as the main entrance. Smith, Sr. (n.d.b) noted that it was made of red cedar.

### San Francisco de la Espada (Figure 10)

#### Description

Work began on enclosing Mission San Francisco de la Espada (Mission Espada) in ca. 1756 and by 1762 three sides of the compound had store houses built against the inner walls with the *convento* area forming the fourth side (Ivey n.d.a3:90). The 1772 inventory (Gumiel 1772d; translation by Dora Guerra) recorded the following:

Also, immediately adjacent to the door [gate] at the main entrance to the town, there is a stone fortification six *varas* high [17 feet]. It has the customary stone decoration as well as the customary gun ports on the sides making it possible to hold back enemy attack with guns and muskets, as well as with cannon, one of which is on a gun carriage. The other cannon is firmly secured on the ground. Each cannon has its respective ramrod.

The location of this gate is not given, but Ivey (n.d.a3:90) believed the 1772 compound enclosure did not include the present walls east of the south wall granary (which can be seen today as the foundations extending south from the southern wall) but rather were located in the east and west sides of the southern corner of the compound. A second gate must have also been present since reference is made to "where the two streets began" (Gumiel 1772d). Smith, Sr.'s (1934a) measured drawings and restoration plans for Mission Espada show a fortification in the west gate opening.

Smith, Sr. found only tentative evidence for the northern part of this fort although he added the southern part in his restoration. The 1827 description of the houses and lands of Mission Espada refer to the west gate as the main gate (BCA MR 65).

Additionally, the Corner (1890) map shows a fortified entrance located in the south wall on the west side of the south wall granary ruins. This plan seems to follow a pattern present in the layout of the early missions such that the granary was near the main entrance or a secondary entrance. This entrance measured approximately 9 feet on Corner's (1890) map. Corner (1890) additionally illustrated a ruined opening in the post-1770s east wall which measured ca. 12 feet wide. The extension of the south wall in ca. 1780 included the arched gate which is still present today. Corner (1890) showed the gate to be ca. 9 feet wide. Rough penciled field notes by Smith, Sr. (n.d.a) also showed this gate as 9 feet. In Smith, Sr.'s formal restoration drawings done under the auspices of the Civil Works Administration in the 1930s, he drew the width of the southern arched gate entrance as 9 feet 8 inches, as based on then-existing walls and foundations. The opening as stabilized by Smith, Sr. was approximately 9 feet 8 inches on the outer wall and 10 feet 2 inches on the inner wall. This measurement conforms very nicely to the combined 9 foot width of the Herrera Gate allowing for a 4-inch-wide jamb on each side. This is the same gate described as being "*falsa*" or loose (see below) in 1827 (BCA, LGS 65).

This extension of the south wall, other additions to the compound, and the evident change in construction plans of the houses may be attributable to an influx of new residents at the mission (Ivey n.d.a3:96). Some of these differences might result also from the presence of the Mexican Ninth Cavalry Regiment and the Twelfth Battalion stationed at Mission Espada (as well as at Mission San Juan) in the late 1820s in response to Indian threats (Rojo 1826). Francisco Rojo (1826) boasted in 1826 that: "Three guards are sufficient for Mission Espada because it is smaller in size, and because the walls which enclose it are sturdy and in good repair. If the main entrance is properly guarded, it will render the rest of the interior secure."

As noted, the walls of Mission Espada were in better condition than those at the other missions. Indeed, the walls were even able to withstand an attack by 200 Mexican soldiers in 1835 when James Bowie and James W. Fannin, Jr., commanded a small contingent of Texians there (Habig 1968b:224-225).

The 1827 distribution of houses and lands of Mission Espada provided some information about the gates. On the south were: "Two rooms belonging to Ramón Leal...bounded on the north by the *plaza*, on the west by land of José Farillas, on the east by a loose (*falsa*) gate, extending one hundred *varas* to the south" (BCA, LGS 65). On the west wall were: "Ninety-three *varas* of wall, belonging to Magdalena de los Reyes...bounded on the north with the main gate of the mission, on the south by

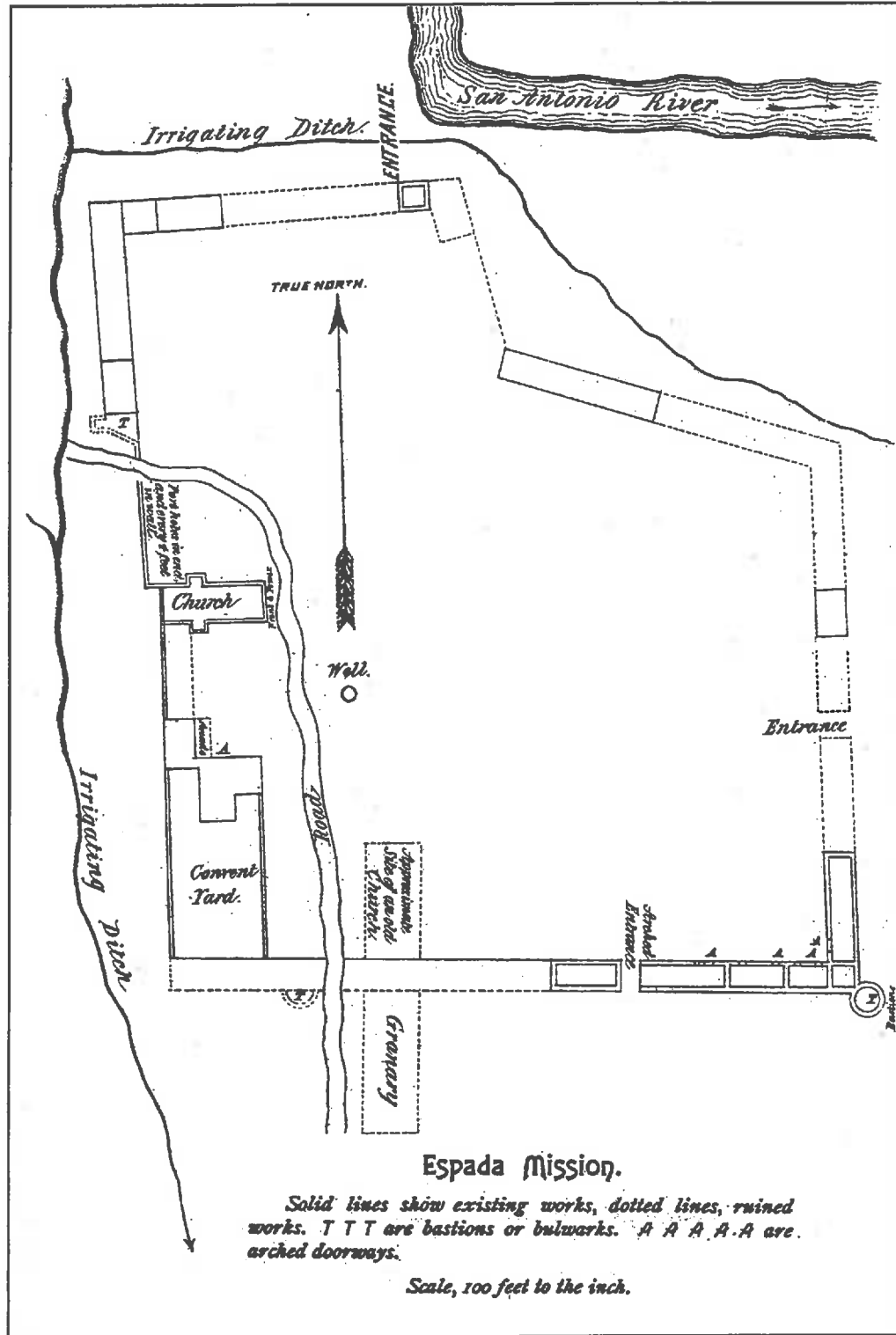


FIGURE 10. Plan of Mission San Francisco de la Espada (from Corner 1890).

the cemetery....Nine *varas* of wall belonging to Simon Gonzáles...bounded on the north by land of Ramón Casillas, on the south by the main gate (*puerta*) of the mission" (BCA LGS 65). On the north, "A room belonging to Siriaco Cantú is stone, and measures seven and one half *varas* long by four

*varas* wide, with an earthen roof. The *acequia* borders it on the North. On the west it borders with the community's entrance [*saguán nacional*]. Again on the West, as well as on the South, it bounds with the *plaza*" (BCA, LGS 65; translation by Dora Guerra).

We now have an additional entrance on the north, known as the *saguán (zaguán) nacional*, or national entrance that was apparently within a structure. The walls adjacent to this entrance were called the *muralla nacional*, or national wall. The existence of this covered gate is confirmed by Corner (1890:n.p.) who illustrated the entrance as being through a structure, measuring 12.52 feet wide. Smith, Sr.'s (1934a) restoration drawings show the gate opening, based on existing walls and foundations, as 8 feet 10 inches.

The 1827 document that describes the division of mission lands is particularly interesting because it also notes that the south gate was *falsa*, in this case meaning loose or defective. The Herrera Gate appears to have been distorted by a warped frame. Possibly this "loose" gate was wracked in its frame. The unclaimed property of Mission Espada (including houses and lands) was ordered to be auctioned at public sale in 1831 and the money to be held by the city treasurer (Habig 1968b:224). By 1832, the buildings of the priests were reserved, thereby allowing the sales of property to proceed (Músquiz 1832).

### Summary

Espada was originally enclosed in ca. 1756 but was enlarged with additional walls by 1780. In 1772 the enclosure contained two gates, at least one of them fortified. Between 1780 and 1824, a north wall gate, an arched southern gate, an eastern wall gate, and possibly others not yet identified had been added. At least four of the known gates appear to have been at or over 9 feet wide with the arched south gate 9 feet or 9 feet 8 inches wide.

The condition of Mission Espada's walls was somewhat sound through at least the Texas Revolution. By 1840, the compound was a mass of ruins (Habig 1968b:225). It is probable that no Spanish Colonial gates would have remained at Mission Espada past the 1840s, but this is not clear at this time.

### CARPENTERS AND CARPENTRY IN SAN ANTONIO DE BÉXAR

An assessment of the availability and expertise of carpenters in colonial San Antonio de Béxar was obviously pertinent to the Herrera Gate studies. One goal was, if possible, to identify the carpenters who practiced their craft in San Antonio during the eighteenth and nineteenth centuries. Assessments of their duties and capabilities as well as the identification of areas of labor and expertise would contribute to a more-refined interpretation of the Herrera Gate.

An examination of primary and secondary sources has identified 31 carpenters (BCA, Census Records; BAMR; BAT; Castañeda 1936; Ivey n.d.a, n.d.b; Leutenegger and Habig 1978, 1983; Schuetz 1980, 1983; TGLO Vol. 50) working in the missions before and after secularization, the presidio, and the villa of San Antonio de Béxar between the early-eighteenth century and the early-nineteenth century (Table 2).

Of the 31 carpenters identified, 17 can be further identified by their previous postings (see Table 2). They came from five diverse areas: one from Aguas Calientes, (Mexico); one from San Luis Potosi (Mexico); two from Zacatecas (Mexico); one from New Orleans (Louisiana); one from Durango (Mexico); one from Queretaro (Mexico); two from San Fernando (San Antonio, Béxar or San Fernando, Mexico) and one from Mission San José/Mission Concepción (San Antonio, Béxar); one from Naquitoches [sic] (Louisiana); three from Saltillo (Mexico); one from Los Adaes (Texas); one from Santa Rosa (Mexico); and one from Algiers? (French colony, Africa). Ethnic origins included Spanish, Indian, Mexican, French, American, and "mulatto." Only two carpenters were designated as *maestros*, or master carpenters: Pedro Flores y Baldes, a Spaniard, working in the 1730s and Luis, an Indian working in the early part of the nineteenth century. For some of these, we know something about their backgrounds and families, (e.g., Pedro Huízar), but for others, only future research can shed light on their activities.

### Working Duties

As early as 1760, guidelines and instructions for the mission carpenters' duties were being given to the missionary in charge of Mission Concepción in San Antonio:

There must always be in the mission one or two carpenters from among the older Indians who can work on the plows and yokes used in planting and repair them when needed. Also they are to make the carts that are needed in the mission. They also have the job of cutting the planks that are needed for these implements. And when they need help for this work, they inform the missionary who appoints the helpers. The carpenters are in charge of the implements in the carpenter shop and the missionary shall see to it that they are not lost or lent to anyone without his consent [Leutenegger 1976:33].

These guidelines mention only plows, yokes, and carts as the carpenter's work. Schuetz (1980:279) noted that carpenters and, perhaps, apprenticed youths manufactured beds and other furnishings (i.e., boxes used to store clothing) and also prepared roof beams, lintels, shutters, gates, doors, fences, and, again, carts. Current research has revealed other wooden items mentioned in mission inventories and descriptions that can be added to this list: altars, altar screens, altar platforms, choir and communion railings, confessionals, vestment cabinets, *retablos*, statues, lecterns, bookshelves, cupboards, shelves, closets, tables, chairs, benches, chests (e.g., cedar), floors, ceilings, balconies, window gratings, stairs, gun racks, and corrals.

Ivey (n.d.a:24) divides the tasks of workers associated with the actual construction of the missions into three areas: (1) manufacturers (including a carpenter who would make the doors, windows and window frames, roof beams

TABLE 2  
Identified Carpenters in San Antonio de B exar

Name	Ethnicity*	Origin	Dates**	Comments***
Santiago P�erez	-	-	1700	Accompanied the military detachment which was to establish the Presidio de San Antonio de B�exar
Geronimo	Hierbipian	-	1720-60s	-
Asencio el Grande	Xarame	-	1720s-60s	-
Pedro Flores y Baldes	Spaniard	-	1730s	<i>Maestro</i> (Master)
Miguel N�unez	Payaya	-	1730s-60s	-
Juan de Osorio	Spaniard	-	1730s	-
Pedro Hu�izar	Mulatto	Aguas Calientes, Mexico	1770s-90s	Missions San Jos�e and Concepci�n, carpenter of Casa Reales Building in 1793
Pierre des Angeles Charlis (Pedro Charli)	French	Algiers?	1770s	Mission Valero
Juan Jos�e Mireles	Mestizo	-	1790s	Mission San Jos�e
Manuel Arenales (Arenalez)	Indian	San Luis Potosi	1790s	Missions San Jos�e and Valero (1808)
Ferm�n Argueyo	Indian	-	1792	Mission San Jos�e, 23 years old, married to Paula Santos
Jos�e Antonio Conas (also Conar) alias Antonio LaFor�e	Spaniard	New Orleans	1792	Mission San Jos�e, 40 years old, married to Mar�a Gertrudis Granado, carpenter at Casa Reales
Nicolas Pru	Spaniard	Durango, Mexico	1792	Mission San Jos�e, 27 years old, single
Bentura Billegas (also Villegas)	Pajalat	-	1792	Mission Concepci�n, 50 years old
Jos�e Luis Espinosa	Mestizo	Zacatecas, Mexico	1792	Mission San Jos�e, 27 years old, widower
Manuel Soto	Mestizo	Queretaro, Mexico	1792	Mission Concepci�n, 24 years old, single
Ygnacio Casanova	Spaniard	San Fernando (San Antonio de B�exar?)	1793	43 years old, married to Dorotea Montes
Don Francisco de los Santos	Spaniard	San Fernando (San Antonio de B�exar?)	1793	40 years old, married to Do�a Antonio Granada
Don Mauricio DeMuy (de Muy)	French	Naquitoches [sic]	1793	40 years old, married to Mar�a de la Gaona
Jos�e Luis Beltr�n	Spaniard	Zacatecas, Mexico	1793	29 years old, single
Asencio de Cu�ellar	Spaniard	Saltillo, Mexico	1795	30 years old, married to Refugia de la Garza
Beronimo Losoya (Bitoriano Losoya)	Mestizo	Los Adaes	1795	29 years old, married to Barbara M�usquiz
Francisco Diendo (Liendo)	-	Saltillo, Mexico	1803	40 years old, married, came to San Antonio ca. 1801
Eusevio Morales	-	Saltillo, Mexico	1803	58 years old, widower, came to San Antonio in 1796
Jos�e Antonio Menchaca	-	Santa Rosa, Mexico	1803	28 year old, single, came to San Antonio ca. 1798
Andres Gonz�ales	Spaniard	-	1804	44 years old, married to Encarn? Ortiz
Luis	Indian	-	ca. 1804	<i>Maestro</i> (Master)
Juan Espargo	-	-	1807	<i>Aguaverde</i> Co., sent from Presidio La Bah�a to work on barracks at Mission Valero
Dionesio Liendo	-	-	1807	Sent from Presidio La Bah�a to work on barracks at Mission Valero
Jos�e Geronimo Hu�izar	-	San Antonio de B�exar	1809	Born at Mission San Jos�e, moved to Mission Concepci�n ca. 1792, 20 years old, son of Pedro Hu�izar

Table 2, *continued*

Name	Ethnicity*	Origin	Dates**	Comments***
Francisco Herrera	-	-	1823	Contributed to the repair of San Fernando Church after it burned; offered to make a door if given the lumber
Esteban Gonzáles			1828	Volunteered to contribute the material and labor for two doors (including the Sacristy door) at San Fernando Church

\*Ethnicity given based on earliest available record.

\*\*Dates given are for the earliest record found that is in direct association with occupation.

\*\*\*Location, age, marital status, etc. given as of the date appearing in column 4.

and other wooden structural components, as well as other necessary woodwork); (2) “collectors” (including the *acheros* or woodcutters, who selected the various woods and also selected the individual trees for specific purposes as well as the firewood); and (3) “collectors/transporters” who used carts to haul the felled, but otherwise unprepared materials, to the worksite (e.g., the saplings for pegs). This division of duties and expertise is noted in 1793 during the building of the new Casas Reales (City Hall) on Main Plaza (BAMR 23:0310). Bonifacio Hernández, Xabier Músquiz, José Antonio Aguilar, Francisco García, and Manuel de Soto were employed to cut the wood required while the carpenters Pedro Huízar and Antonio Conar (Conas) constructed the doors and the other necessary woodwork for the buildings (BAMR 23:0310).

In addition to mission-related carpentry activities, wood was being cut by 1781 on the banks of the Medina River for the use of the presidio (BAT Vol. 107:6, 29). A ca. late-eighteenth-century or early-nineteenth-century document contains a list of 39 individuals from the missions of San José and Espada, as well as the lower ranches of the missions, the Medina River ranches, and from San Antonio de Béxar who sold wood to the General Provincial Army and were to be paid from the Treasury (DRT, John Smith Papers). Included in this list are landowners and ranchers such as Ygnacio Pérez, Justo Travieso, Domingo Losoya, María Calvillo, Manuel Becerra, José Antonio de la Garza, and Manuel Herrera; apparently landowners were not averse to selling wood from their lands for profit.

Ivey (n.d.a2:23) believes that most of the work pertaining to the missions was carried out under a *maestranza* contract in which a craftsman was paid to supply his skills as exemplified by the contract between Dionicio de Jesús Gonzáles and Mission Valero in 1767. Ivey (n.d.a2:23) also noted that the contracting party usually supplied the project labor and materials in such a *maestranza* contract. This practice seems to have continued, but somewhat modified with secular implications, well into the late-eighteenth to early-nineteenth centuries. In 1793, Pedro Huízar and Antonio Conar (Conas), who constructed the doors and other woodwork for the new Casas Reales (City Hall), did not charge for their work because it was for the benefit of the community

(BAMR 23:0310). After the church of San Fernando burned in 1828, Francisco Herrera offered to make a new door for the church of San Fernando if supplied with the lumber and Esteban Gonzáles offered to contribute both the material and the labor for one door and also a door for the sacristy (BAMR 118:0732).

A document dated March 31, 1801 and signed by Pedro Huízar, provides information concerning the materials, costs, and labor associated with the manufacture of three mesquite doors (BAMR Blue Books 1801, with translations by Ivey n.d.a2:30-31):

*30 palos de Mesquite para tres Puertas de 2-1/4 v. s. de alto cada una y vara de ancho a ' 4 rr. s.#.15.* [30 posts of mesquite for three doors each, 6 1/4 ft. high and 2 3/4 ft. wide at 4 reales]

*12 Tablas a ' 1 p. o #.12.* [12 Planks at 1 peso]

*18 libras de Fierro para 12 Gosnes de a pulgada de grueso a ' 5 rr. s. cada libra. #.11.2.* [18 pounds of Iron for 12 Snipe-hinges of 1 inch in thickness at 5 reales each pound]

*Por hechura de los gosnes a ' 4 rr. s. #.6.* [For the making of the snipe-hinges at 4 reales each]

*Por 100 clavos de Fierro para dichas Puertas constantes todos de 20 L. s. de Fierro a ' 5 rr. s. #.12.4.* [For 100 nails of Iron for the said Doors containing a total of 20 pounds of Iron at 5 reales each]

*Por hechura de los clavos a ' 1 rr. 1 #.12.4.* [For the making of the nails at 1 real each]

*Por construction de las tres Puertas a ' 15 p. s.#.45.* [For the construction of the three Doors at 15 pesos each]

*Por 33 Libras de Fierro para tres chapas con tres cerrojos, seis armellas, y tres arpones a ' 5 rr. s. lib. a. #.20.5.* [For 33 Pounds of Iron for bars with hasps, six eye-bolts and three slide bolts at 5 reales each pound]

*Por la hechura de cada chapa con cerrajo, dos armellas, un Arpon, y 4 clavos de Garbanzo a ' 10 p. s. #.30.* [For the making of each lock with a crossbar and hasp, two eye bolts, one Slidebolt, and 4 nails de garbanzo at 10 pesos each]

*Ajo a ' la g. ta de m. tro Antonio: Por 30 Vigas a ' 3 #.90. p. s. Por 800 Raxas a ' 4 rr. s. el ciento #. 4.* [Attention: to the account of *M[aes]tro Antonio*: For 30 logs at 3 pesos each; For 800 Shingles at 4 reales the hundred]

*Por 10 cañales a 1 p. o. con costo madera #.10.* [For ten gutters [spouts] at 1 peso including the cost of the wood]

*Por 6. Morillos para 30 v. s de saleras y su manufactura #.15.* [For 6 Logs for 83 feet of beam and its manufacture]

*Por 2 Morillos y dos tablonas para los lugares comunes a 1 p. o cada Pieza y dos p. s por la construccion (Total # .289.7)* [For 2 Logs and two planks for the common privy at 1 peso each Piece and two pesos for the construction]

This document verifies that by 1801, Pedro Huízar was using mesquite for door construction; however, the size of Huízar's doors is too small for the gate under study. The craftsman of the Herrera Gate would have to have been extremely knowledgeable about the properties of mesquite as well as having had experience working with the wood. The physical properties of mesquite make it difficult to work with and such effort requires a great deal of expertise (Robert Hensarling, personal communication 1986). This document shows that Huízar apparently had this expertise and other carpenters probably possessed this knowledge as well.

The description of the iron hardware is very similar to what was probably utilized on the Herrera Gate: *clavos*, nails; *chapas con cerrojo*, a lock with a crossbar with hasp; *armella*, eye-bolt (one eye-bolt survives on the Herrera Gate); and *arpones*, slide bolts. The iron hardware may have been contracted out to a *herrero* or blacksmith, sent on the supply trains, or forged by Huízar. These items were arriving on supply trains as early as 1745 (Cuentas 1745-1772).

A second document from the Béxar Archives, dated March 18, 1801 and signed by Antonio Salazar, the master mason, appears to relate to the same project. It is a receipt for building materials including 200 cart loads of rock at 125 pesos; 400 cart loads of sand at 200 pesos; 400 beams at 56 pesos; 800 raxas (shingles) at 4 pesos (BAMC, Blue Books 1801). Huízar and Salazar may have been working on the former mission of Valero in preparation for the soon to arrive *Compañía Volante*, but this is not positively known.

### Conclusions

During the eighteenth and nineteenth centuries, both local and nonlocal carpenters practiced their profession in San Antonio de Béxar. Many of them were highly skilled individuals responsible for the wooden architectural components of the missions, the presidio, and the villa. Obviously, the expertise to construct a gate such as the Herrera Gate was available.

### MISSION TOOL INVENTORIES AND DESCRIPTIONS

A brief examination of mission inventories, in particular the tool inventories as well as the mission supply accounts (Cuentas 1745-1772) of the San Antonio missions, was done in connection with the study of the Herrera Gate (see Appendix III). The *Cuentas*, or mission supply train lists, are detailed inventories of the material goods being sent to the interior provinces, including the San Antonio missions. These lists can be found in the microfilm records at the Old Spanish Missions Historical Research Library, Our Lady of the Lake University, San Antonio.

A knowledge of the tools available to the carpenters enhances our understanding of the construction of a piece such as the Herrera Gate. The mission inventories and *Cuentas* were appropriate for our study for three reasons: (1) it was known that these inventories and *Cuentas* contained itemized lists of specific carpenter tools; (2) since the Herrera Gate might have been intended for a mission, these lists would surely give tool forms used in the gate construction; and, (3) even if the gate was intended for secular use, surely the same tool types as those in the mission lists would have been employed.

Other researchers, notably Ivey (n.d.a) and Schuetz (1980, 1983) have established that the craftsmen of the San Antonio missions were not working with totally primitive concepts, methods, or tools. The carpenters of the San Antonio missions were working in a frontier area, where the specifications for their products were likely less elaborate than specifications for items produced in Madrid, Spain, or even Mexico City. The requirements of frontier life were doubtless more Spartan than those of the more cosmopolitan locales, but it would be wrong to think of these carpenters as rude rustics, barely capable of nailing two planks together. The carpenter(s) of the Herrera Gate worked in a tradition that required no small degree of skill, as is evidenced by the immensely complicated assembly of the gate. Postsecularized craftsmen were equally adept. No fewer than 40 different carpenter's tools are now known to have been present at the missions at one time or another. These tools included a pit saw for the preparation of the heavy timbers, various planes (i.e., a jointer's plane, a jack plane for smoothing, and a rabbet plane for the rabbet cuts and joints), augers and drills for the dowel holes, chisels and gouges for the mortise and tenons, a plumb bob for leveling the surfaces, a lathe for cutting the wooden pins or dowels, and a square, among others.

Individual craftsmen probably owned some of their own tools (Ivey n.d.a) which would not appear in inventory lists. Secularized craftsmen and nonmission craftsmen certainly owned their own tools. In 1803, the carpenter Juan Gaspar was delayed in Nacogdoches because he had not been able to obtain all the tools that he would need in San Antonio, his destination (BAMR 31:0298). In 1809, the shop of Victor Blanco, mason and *mayordomo de obra*, (work superinten-



dent) of the rebuilt San Fernando Church, was robbed of its contents (BAMR 41:0049).

The 1760 and 1761 *Cuenta* lists for Mission Espada show that at least seven chisels (*escoplos*), eight gouges (*gurbias* or *gubias*), nine augers (*barrenas*), six chisels (*formónes*), three compasses (*compázes*), one hammer (*martillo de carpintero*), one frame pit saw (*sierra bracera*), two vises (*tornillos*), and six trowels (*cucharas*) had been sent to Mission Espada (Cuentas 1745-1772 MR 15:4600-4724). The large number of tools appears to correspond to a building/rebuilding phase at Mission Espada, as well as at Mission San Juan, during the 1760s to 1770s.

An examination of the *Cuentas* reveals that, while a great number of tools were probably forged in frontier smithies (Simmons and Turley 1980), an equally large number were being sent from supply points in Mexico such as Saltillo and Zacatecas. Additionally, by 1794, tools of French and English manufacture were in the mission shops at San José, San Juan, Concepción, and Espada (Habig 1968a; Muñoz 1794b; Muñoz and Pedrajo 1794).

### Tool Inventories

Periodic inventories of the San Antonio mission properties, taken between the mid-1700s and secularization in 1793, confirm the presence of a substantial variety of woodworking tools at each of the religious communities. Missions Valero, Concepción, San José, San Juan, and Espada were all built as similar but independent complexes along the San Antonio River and each boasted a well-equipped carpenter's shop.

Hammers and anvils were present in these shops, along with iron bar stock and other equipment for making and repairing tools. Barrels of nails were listed, along with rolls of drawn wire that could be used to make various types of nails and other fasteners. Augers, listed in the earliest inventories, and drills were also available to the carpenter.

Mission San José had a well-equipped carpenter's shop as early as 1755. "For the carpenters and masons," wrote Fray Dolores y Biana (1755), "there are the tools needed for their work." This earliest extant inventory lists axes, adzes, augers, chisels, saws, and planes among other items. The Mission San José inventory of 1794 (Muñoz and Pedrajo 1794) lists an "English saw" (*aserrucho Yngles*), perhaps a tool developed in the shipbuilding culture of the British Isles (Eugene George, personal communication 1987). A "large French auger" (*barrena grande francesca*) noted in the same audit might have had its design origins with cathedral-building carpenters in Gothic France. These metal tools have their origins in the Old World and their prototypes were brought to the New World by guild craftsmen. Several carpenters are known to have lived and worked there in the 1790s prior to secularization (see Table 2) and some of them were probably there much earlier.

Mission Espada, in 1772, had an extremely well-stocked carpenter's shop as well as another room with carpenter's tools, although the Mission Espada census lists do not specify occupations, thereby hindering comparative analysis. Mission Concepción had an equally well-stocked carpenter's shop in 1772 to 1794. By 1792, the *carpintero* Pedro Huízar was living at Concepción and at least two other carpenters were there also (see Table 2). Mission San Juan, too, had a well-equipped shop in 1772 including a large number of specialty tools.

Mission Valero seems to have suffered in quantity and quality of carpenter's tools throughout time even though the *carpintero* Pedro Charli was there as early as the 1770s. This fluctuation could also result from the expertise/diligence of the person conducting the inventory, but the *Cuenta* lists would not be so afflicted; therefore, they can be considered to be a fairly accurate predictor.

A correlation exists between four factors and the final product of the craftsman or carpenter: the level of expertise of the carpenter, the availability of tools, the natural resource, (e.g., wood species), and the variation of functional tool forms. For example, at Mission San José, an extremely large number of wooden architectural items were turned (Dolores y Biana 1755; Habig 1968a; Leutenegger 1985; Leutenegger and Habig 1978; Lopez 1786; Marmolejo 1757; Muñoz and Pedrajo 1794; Músquiz 1823; Salas 1785)—this was directly related to the presence of the lathe at the mission and the large number of carpenters present at the mission.

### Tool Descriptions

#### Introduction

The Herrera Gate, to be understood in its historical context, cannot be viewed from an artifact-specific or descriptive perspective. The carpenters or manufacturers, the extent of their expertise, and the available tools must be considered in order to view the gate as the product of a highly structured and oftentimes relatively sophisticated woodworking industry. Its contribution, other than its architectural uniqueness and physical attributes, is primarily as an original example or product of a specialized craft.

A brief glossary of the specific tools available to the area's Spanish Colonial carpenters is presented below. All items are mentioned in primary sources (or their transcriptions or translations) and are listed alphabetically by their Spanish names. Velázquez (1974) was used as a translation source.

#### Descriptions

*Achas (hachas)*: axes. The ax was principally used for felling trees and for chopping, surfacing, paring, and splitting wood (Simmons and Turley 1980:69-70). Two basic types of axes, the broad ax (*hacha de carpintero*) and the felling ax

(*hacha de carbonero, hacha de monte*), are known. The broad ax was a broad-bladed, short-handled tool that was beveled on one side; it was used to square logs for beams. The Viscayan (Biscay) felling ax, originally manufactured in the Basque provinces of Spain, later produced in Mexico City during the first half of the colonial period and used in England in the early eighteenth century, had a broad bit, a swept-back blade beveled on both edges, a round or oval eye, and lacked a pronounced poll. Two general styles of the Biscay ax may be distinguished: the heavy, two-handed felling ax and the lighter hand ax, or hatchet, used by carpenters, wainwrights, and other craftsmen for cutting, splitting, and smoothing wood (Simmons and Turley 1980:69-70). The inventory for Mission Espada lists four Viscayan axes, three large and one small in the carpenter's shop (Gumiel 1772d; Leutenegger n.d.a). Axes are also listed in the following inventories and *Cuentas*: Espada 1755, 1794; San José 1755, 1794; Valero 1772, 1793; Concepción 1762, 1794; and San Juan 1772, 1794. Axes were commonly sent to the missions on supply trains and were probably manufactured nonlocally.

**Alezna:** Leutenegger (n.d.a) translates this word as "awl" but this translation is not wholly satisfactory. Mission Espada had one three-edged awl (*una alezna de tres filos*) in 1772 (Gumiel 1772d). Presumably it was triangular in cross section. An awl is the simplest of boring tools and was used by eighteenth-century carpenters to pierce holes in thin lumber so that brads or broad-headed nails would not split the wood when driven through (Bealer 1972:122).

**Almineta:** Leutenegger (n.d.b) translates this as a "bin." Presumably, this is an open container, perhaps for supplies or materials. Mission Valero had an *almineta* in 1793 and Mission San Juan also had one in 1772 and 1794.

**Azuelas:** adzes. The adze served as an implement for hewing, surfacing, and hollowing. On the Spanish frontier they were used for dressing lumber, making plow frames, and hollowing out log troughs. Hand adzes were employed during delicate woodworking by carpenters, coopers, and even gunsmiths (Simmons and Turley 1980:74). Adzes were present in the following mission inventories and *Cuenta* lists: Espada 1772; San José 1755, 1785, 1794; Valero 1762, 1772, 1793; Concepción 1772, 1794; and San Juan 1772.

**Barrena:** auger, gimlet. Velázquez (1974:99) gives both "boring bit, auger" and specifies a *barrena grande* as an auger or borer while a *barrena pequena* is a gimlet. Simmons and Turley (1980:80) state that a gimlet (*barrena pequena*) was used for starting holes in wood which were to receive screws or spikes while augers (*barrena grande*) opened holes to receive dowels and started holes for square and rectangular mortises. These boring tools were made in a variety of sizes and weights. The carpenter's auger was forged, in lengths of from 1 to 2 feet. Cutting diameters were

as small as 1/4 inch up to 3 1/2 inches (Kebabian 1978:59). Augers or gimlets were listed in the following mission inventories and *Cuentas*: Espada 1772; San José 1755, 1785, 1794; Valero 1772; Concepción 1772 and 1794; and San Juan 1772, 1794. Six medium augers and several small ones were sent to Mission Espada in 1761 on the supply trains from Mexico (*Cuentas* 1745-1772 MR15: ff 4600-4724). From the tenth through the sixteenth centuries, the design of the auger had a short spiral twist, effective in removing chips as the tool was turned and forced through the wood (Kebabian 1978:59). By the seventeenth century, a semicircular, half-cylinder pattern found favor and was termed as a pod, nose, shell or spoon auger. Later, spiral twist augers with the addition of a lead screw point became the standard design by the 1800s (Kebabian 1978:59). Most of the augered holes in the Herrera Gate are 3/4 inches in diameter.

**Barreno:** borer or auger. Apparently, a *barreno* was an unusually large drill or auger (as compared to a *barrena grande*). The 1772 inventory of Mission San Juan compiled by Fray Gumiel (1772a) lists *barrenos*. Mission Concepción had at least one in 1794 and Missions Espada and Valero both had *barrenos* in 1772. *Barrenas grandes, medianas, and pequeños* were identified at the other missions. The term is also used in direct association with the making of carts at Mission San Juan.

**Bozel:** molding plane. In 1772, Mission Concepción and Mission Espada each had a *bozel*.

**Canalador:** grooving plane. Mission Concepción had a *canalador* in 1772.

**Cartabón:** a combination carpenter's square and rule. A *cartabón* is an instrument used to measure and form angles (Velázquez 1974:148). A carpenter's square was illustrated as early as 1703 by Joseph Moxon along with other tools used by joiners (Welsh 1966:181). Missions Concepción and San Juan both had a *cartabón* listed in their inventories in 1772.

**Cepillos (zepillos):** planes. Wood planes were used to level wood surfaces and in the joining or fitting of pieces (Simmons and Turley 1980:79). At least three types of planes are mentioned in the mission inventories: *guillemo, juntera, and garlopa* (see below for further discussion of these various planes). By the early nineteenth century bench planes, rebating planes, moulding planes, and grooving planes were available (Welsh 1966:185). Planes were listed in the following mission inventories and *Cuentas*: Espada 1772; San José 1755, 1794; Valero 1762, 1772; Concepción 1762, 1772, 1794; and San Juan 1772.

**Cigüeña (sihueña or sigüeña):** crank. The *cigüeña* was a forged iron crank used to propel a grindstone or a lathe.

Four of the five missions had a *cigüeña* at various times: Mission Valero 1772; Mission San José 1785; and Missions Concepción and San Juan 1794.

**Compas (compáz):** compass or divider. A compass was used by carpenters for scribing circles and transferring measurements from the rule to the work (Goodman 1964:200-201). Compasses were included in the following mission inventories: Espada 1772, 1794; San José 1755; Concepción 1772, 1794; and San Juan 1772. Three compasses were sent to Mission Espada in 1761 on the supply train from Mexico (Cuentas 1745-1772 MR 15:4600-4724).

**Cucharas:** masonry trowels. *Cucharas* are listed at Missions Valero and Concepción in 1762.

**Escantillón:** gauge, pattern, template, or rule (Velázquez 1974:306). Its use as pertaining to the San Antonio mission inventories is unknown at this time although such a tool would have had a wide range of applications. So general a definition could apply to several measuring instruments, all with many obvious applications to wood-working. Mission San José had an *escantillón* in 1755.

**Escoplos:** chisels. Although *escoplo* properly denotes a mortising chisel, it became a generic term used by the Spanish colonists to refer to any kind of chisel (Simmons and Turley 1980:77). Characterized by steel cutting edges, they were used extensively by furniture and cabinet-makers at the missions, and were used in the construction of *carretas* (carts). Chisels are mentioned in the following mission inventories: Espada 1772; San José 1755, 1785, 1794; Valero 1762, 1772, 1793; Concepción 1762, 1772, 1794; and San Juan 1772, 1794. Chisels were one of several tools being sent on supply trains to the San Antonio missions from Zacatecas (Cuentas 1745-1772 MR 15:4587).

**Formón:** chisel. A woodworker's firmer or forming chisel with a thin, wide blade used as an all-purpose cutter for both heavy and light work (Simmons and Turley 1980:78, 191). Six *formónes* were sent by supply train to Mission Espada in 1761 (Cuentas 1745-1772 MR 15:4600-4724). The following mission inventories listed *formónes*: Valero 1762, 1772; San José 1755; Concepción 1772; San Juan 1772; and Espada 1762, 1772.

**Garlopa:** jack plane. The jack plane was used for rapid planing of rough surfaces prior to more thorough finishing, and it was distinguished primarily by the beveled and slightly convex edge of its cutting iron (Welsh 1966:199). Missions Espada, San José, Concepción, and San Juan all had at least one *garlopa* in their tool inventories. Two jack planes were sent to Mission Concepción in 1772 (Cuentas 1745-1772 MR 15:4587) from Zacatecas.

**Graniles:** joiner's marking gouge? The term is found only in the 1772 Inventory of Mission San Juan (Gumiel 1772c).

**Guillemo (guillame):** rabbet plane. This was used to cut a groove of fixed width and depth on the edge of a board (Goodman 1964:106; Welsh 1966:199). The design permitted easy discharge of wood shavings as the plane moved over a fixed surface. Mission Concepción had a rabbet plane in 1794. It is possible that a rabbet plane was used to make the shiplap cuts on the Herrera Gate's bottom stiles, end rails, and the panel cuts.

**Gurbias (gubias, gurvias):** gouges. This is a half-round chisel employed mainly for making channels and hollowing (Simmons and Turley 1980:78). At the San Antonio missions, the *gurbias* were frequently used in the construction of *carretas* (carts). *Gurbias* were listed in the following inventories: Espada 1762, 1772; San José 1755, 1785, 1794; Valero 1762, 1772; San Juan 1772. Gouges were supplied to Mission Espada from Mexico by 1761 (Cuentas 1745-1772 MR 15:4600-4724).

**Juntera:** carpenter's plane, jointer plane. Jointers (or joiner) planes had a wooden stock of at least 22 inches or more with 36 inches being common (Bealer 1976:71; Goodman 1964:102-103). The jointer plane was used mainly by specialists who prepared intricate panelling and by house carpenters who used it under the name "floor plane" to smooth and level the surfaces of floors already fastened with wooden pegs (Bealer 1976:71). Missions Espada (1772), San José (1755, 1794), Concepción (1762, 1772), and San Juan (1772) all had jointer planes in their inventories.

**Malacates:** wheels for lathes (Simmons and Turley 1980:78). Six dozen *malacates* were sent to Mission Espada in 1750 (Cuentas 1745-1772 MR 15: 4626). *Malacates* were listed at Missions San José (1785), Concepción (1794), San Juan (1794), and at Espada (1772).

**Martillos:** hammers. The hammer was probably common on the frontier and in the San Antonio missions. Most were no doubt imported from Spain or central Mexico although frontier smithies must have been able to forge them. Carpenter's hammers (*martillo de carpintero*) were being sent on the supply trains to the San Antonio missions as early as 1761 (Cuentas 1745-1772 MR 15: 4600-4724). Some, such as those used at the missions, were called *azuelas con martillo*, combination adzes and hammers (Gumiel 1772d). Missions Valero (1762), Concepción (1762), San Juan (1794), and Espada (1772) had *martillos* in their carpenter's shop.

**Mazo:** mallet. Mallets, used for heavy pounding, were listed in the mission inventories. At Mission San José in

1785, the carpenter's shop and the blacksmith's shop shared the use of a single mallet as well as a large mallet of iron (*tamaños un mazo de fierro*) listed as belonging to the carpenter's shop (Salas 1785).

**Mollejone (mollejon):** grind stone or wheel used to sharpen various tools. In 1794 Mission Concepción had a *mollejone* of 1 *vara* (ca. 33 1/3 inches) in diameter (Muñoz 1794a). Missions Espada (1772) and San José (1755, 1785) also had grindstones in their carpentry shops.

**Niveles:** level. An instrument used to judge whether or not a surface is level. The level is a very ancient tool and was known to have been used as early as the Egyptians (Goodman 1964:199). The old Roman level consisted of three strips of wood joined together like the letter "A" with a plumb-bob and line suspended from the apex. The cross-bar had graduations to indicate by how much the string was out of plumb, therefore the degree of slope of the surface. A more elaborate pattern shown in medieval illustrations consisted of a long straight-edge forming the base, with a short upright plumb rule in the center with or without side struts. This type of level survived to the middle of the nineteenth century and is illustrated by Goodman (1964:200). Mission San Juan had two levels in its carpentry shop ca. 1772 (Gumiel 1772c). *Niveles* are also listed at Missions Valero (1772) and Concepción (1772).

**Picadera:** pick. A pick was listed in the carpenter shop at Mission San José in 1755 (Dolores y Biana 1755). Typically, the pick was utilized on the borderlands by masons and farmers (Simmons and Turley 1980:81, 86).

**Picos:** pick-ax. A pick-ax was listed in the carpenter's shop at Mission Valero in 1762 (Leutenegger 1985:333).

**Pies de cabra:** crowbar. The crowbar was one of the principal tools of the carpenter (Welsh 1966:182, 188). The crowbar also appears in the inventories as a *barra* which Velázquez (1974:98) defines as an "iron claw or lever." Missions San José (1755, 1794) and Espada (1794) both had a *pies de cabra* in their carpenter's shops.

**Plomas:** plumb bob. A plumb bob was an essential tool used by carpenters to attain a true perpendicular when framing. The carpenter tested the vertical alignments with his plumb bob, a lead, or other weight suspended from the top of the frame (Kebabian 1978:109). Mission Valero's carpenter shop had at least one plumb bob in 1762 (Leutenegger 1985:333).

**Raiador:** marker (Leutenegger 1977). Perhaps it was used with chalk or some other substance to mark straight lines on timber before planking. Mission San José had a *raiador* in 1755 (Dolores y Biana 1755).

**Serrucho (aserrucho):** hand saw. According to Simmons and Turley (1980:76) a *serrucho* is a common wood saw or "farm" saw that was probably made in frontier smithies. Goodman (1964:139-140) shows an illustration from an English saw yard which was originally published in an eighteenth-century Spanish manuscript describing the tools and methods used in Spanish naval dockyards. The inscription which accompanied the illustration described the saw as an "*azerrucho* for two hands above and below." The procedure used for the saw is similar to that of an unframed pit saw (see *sierra bracerá* below). The saws shown in use in the pit were probably English in origin, broad-bladed, with two large tiller handles and possibly obtained from Sheffield (Goodman 1964:140). It is interesting to note that in 1794, Missions San José, Espada, and San Juan all had an *aserrucho Yngles* or an English saw. Mission Concepción had an English saw in 1772. These may have been two-man pit saws appropriate for planking heavy timbers.

**Sierras (zierras):** saws. Saws have been in use since the Egyptians (Simmons and Turley 1980:76). Some saws were made by blacksmiths in Europe for export to the New World colonies, and others were produced by frontier blacksmiths. Several different types of specialty saws are known to have existed, but generally the San Antonio mission inventories list simply *sierras*. *Sierras* are listed at Missions Valero (1762, 1772), San José (1755, 1785), Concepción (1762), and Espada (1794).

**Sierra bracerá (sierra brazera):** framed or pit saw. A *sierra bracerá* is a two-man saw used for cutting planks from timbers (Simmons and Turley 1980:77). Sometimes the logs were positioned over a deep pit, hence the name of the saw and the technique, but generally the log was placed on a scaffold or trestle with the pitman on the ground and the sawyer on the log (Bealer 1976:54). Early pit saws were all mounted in a frame; however, toward the end of the eighteenth century, saws were made without a frame with a "T" handle riveted to one end of the long blade (the tiller) and a slotted block of wood fitted over the blade (the box) to serve as an easily removed handle on the lower end (Bealer 1976:54). In the framed pit saw, the blade was held in tension by a rectangular wooden frame with handles at each end (Kebabian 1978:209). The mission inventories appear to make distinctions between the framed pit saw and the handled pit saw; the 1794 Mission San José inventory lists "*cuatro sierras brazeras, la una armada*" or four pit saws, one of which is framed/ mounted (Muñoz and Pedrajo 1794). In 1772 at Mission San Juan "*dos sierras brazeras armadas*" and "*otra sin armor*" were present (Gumiel 1772c). This likely means that two pit saws with a frame (or a frame pit-saw) and another without the frame (a handled pit saw) were present. Mission San Juan also had a *sierra bracerá* in 1794,

perhaps the same one as listed in 1772. Mission Espada also had a *sierra bracer* in 1772 (Gumiel 1772d). It is interesting to note that Fray Gumiel did both Mission San Juan and Mission Espada inventories and appears to make a careful distinction between the types. Missions Valero (1793), San José (1794), and Concepción (1772, 1794) also had pit saws in their inventories. The heavy timbers used for the construction of the Herrera Gate may have been cut by a pit saw.

**Sierra manuales:** hand saws (see *sierras* above). All five missions had *sierra manuales* in their inventories: Valero (1793), San José (1794), Concepción (1772, 1794), San Juan (1772), and Espada (1772).

**Taladro:** drill, auger. The *taladro*, made of steel or steel edged, was a tool used by blacksmiths and in Texas and New Mexico was used as a pump or bow drill (Simmons and Turley 1980:51). This factor distinguished them from a *barrena*. A *taladro* was listed in the carpenter's shop at Mission San José in 1755 (Dolores y Biana 1755).

**Talon:** unknown. The term is used with reference to a chisel at Mission San Juan in 1794: *un talon con escoplo* (Muñoz 1794b). *Talon* is a Middle French word derived from the Latin *talus*. Its most common meaning was the claw of an animal (bird), but it might also refer to a part or object shaped or suggestive of a heel or claw. A specialized crowbar is one possibility.

**Tenazas:** tongs. *Tenazas* were generally utilized by blacksmiths for handling hot metal. The most common were flat-jawed tongs for gripping square, flat, and round stock (Simmons and Turley 1980:51). Another tool, the bolt tongs (*tenazas curvas*), had half-round jaws for holding round and square stock (Simmons and Turley 1980:51). It is clear from the inventories that tongs were present in the carpenters' shops. Tongs were present in the shops at Mission San José in 1755 (Dolores y Biana 1755), at Mission Espada in 1772 (Gumiel 1772d), and at San Juan in 1772 (Gumiel 1772c). The pincers were listed as one of the tools most useful to the carpenter (Welsh 1966:187). It is probable that in the case of carpenter's tools, pincers and tongs were similar in usage and function.

**Tornillo:** vise. A wooden vise was sent to Mission Concepción in 1772 from Zacatecas (Cuentas 1745-1772, MR 15:4587).

**Torno:** lathe. Wheel lathes of simple construction were one of the earliest machines brought to the New World by the Spaniards (Simmons and Turley 1980:78). The lathe allowed wood or metal to be shaped into round or oval figures. Mission San José had a lathe in the carpenter's shop by 1755 (Dolores y Biana 1755). A lathe, perhaps the same one listed in the 1755 inventory, was also present in 1785. It is interesting to note that Mission San José, as compared to the other missions, had a great number of wooden items which were described as being turned on a lathe (*torneada*).



## CHAPTER 5

# CONSERVATION AND ANALYSES

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### INTRODUCTION

The conservation studies conducted on the Herrera Gate have been previously published (Storch 1989). The following section summarizes the studies, and the reader is referred to Storch (1989) for treatment specifics.

Gate B was in a state that required no treatment other than cleaning, while Gate A was in an advanced state of decay and required immediate treatment. The advanced decay that affected Gate A was similar to the deterioration found in nonwaterlogged wood recovered from subsurface archeological contexts. The conservation project included the following components: (1) identification of the wood species; (2) examination of the nails associated with the gate to determine any chronological information; (3) stabilization of the wood by the use of consolidants and structural filling materials; and (4) placement in an upright position in a display frame for exhibit. The approach was pragmatic involving minimal restoration and then only when necessary for stabilization.

### CONSERVATION TREATMENT

Because of the advanced deterioration of Gate A, it was decided to commence treatment on it first, necessitating transport to the MCL at J.J. Pickle Research Campus (formerly the Balcones Research Center) in Austin, Texas. Gate B remained at the ITC and required approximately eight hours of treatment, consisting mainly of surface cleaning and areal consolidation. Insects were present on the gate when found. Therefore, in order to control these insects, gauze bags filled with naphthalene crystals were placed in the packing cases when the leaves were transported from the field. Subsequent and frequent inspection of the gate revealed no insects or insect activity, so no additional fumigation was indicated.

Since the gate had been stored out-of-doors, earth and plant materials had accumulated in the interstices between the muntins and rails. Large "ears" of a brown fungus had attached themselves to the outer surfaces (as found) of the block and beams, and other types of fungus were evident

closer to the surface. The most important destructive agent, besides moisture, was insect activity. Insects of several varieties had penetrated both into the inner muntin spaces and into the wood tissue itself. Several mud dauber wasp nests, composed of dried clay, were found attached to the wood. Channels eaten into the wood transformed the surface into a fibrous and friable surface on the tongues of three of the muntins in the row nearest to the bottom (Figure 11).

The first priority in treatment of Gate A was to remove as much extraneous material as possible. After the packing case was opened and the naphthalene bags were removed, the exposed surfaces were lightly wiped with a 10% 1/1 solution of Mystox LPL 40S in Stoddard's solvent to destroy any live fungal spores. The active ingredients of Mystox LPL 40S are the fatty acid esters of pentachlorophenol.

During the course of preparing a scale drawing of Gate A, an attempt was made to straighten the beams and spacer blocks in order to obtain a more accurate illustration. Since the wooden pegs in the rest of the tongues were no longer present it was possible to disassemble the door down to the third rail from the bottom. No attempt was made to dislodge intact pegs or partial pegs from their holes. Disassembly allowed the opportunity to remove insect debris, fungus, plant roots, and dirt from the spaces between the block and beams. Before reassembly, consolidation of the most severely deteriorated ends of the muntins, rail tongues, and other damaged areas was deemed necessary.

It should be noted that the consolidation of wood is a controversial subject and was approached with deliberation and caution in this project. Regardless of the reversibility of the consolidant itself, once it is introduced into a porous and permeable matrix such as deteriorated wood, it becomes impossible to remove completely. Recent studies that consider the problem of the consolidation of deteriorated and dry wood in a practical manner were consulted (Barclay 1981:133-139; Nakhla 1986:38-44). The properties required for a consolidant in this case were ease of penetration, low molecular weight, low toxicity, low weight gain in the treated wood, long-term light stability, and theoretical reversibility.

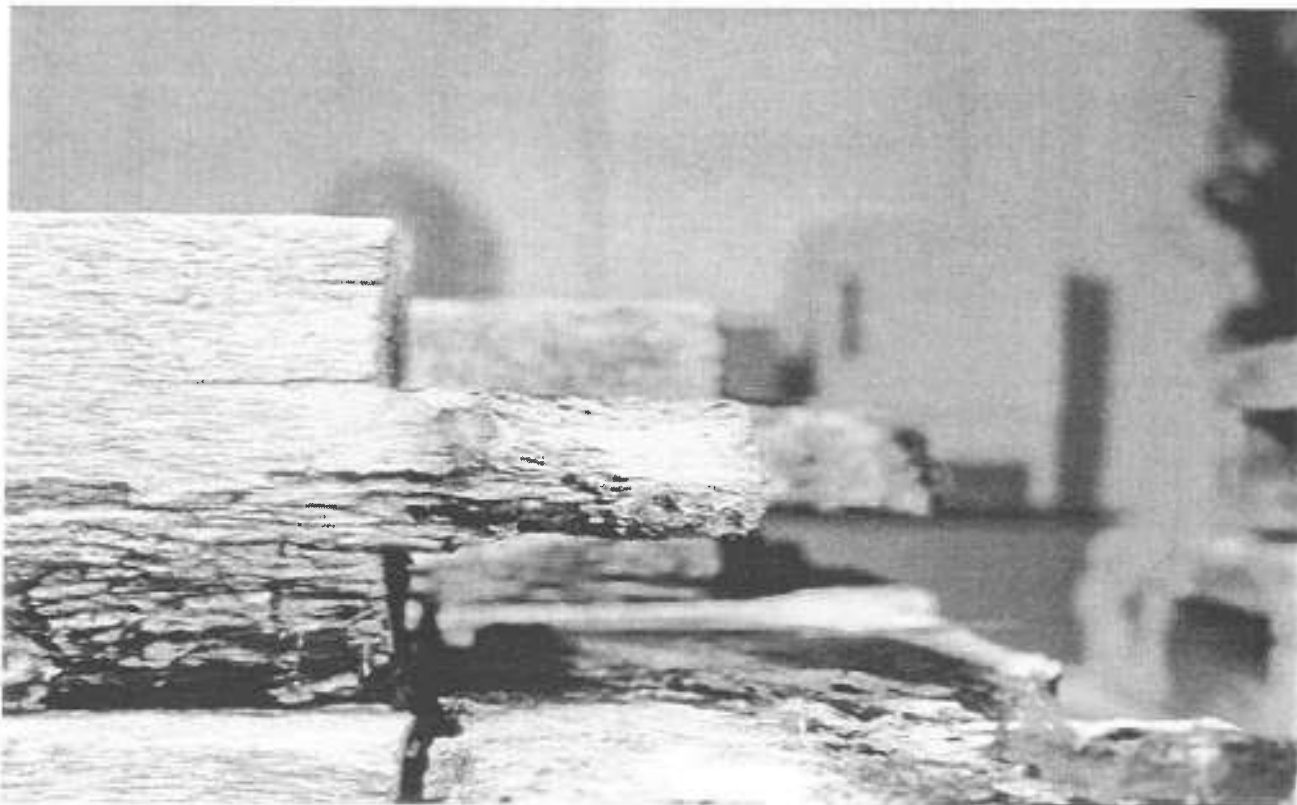


FIGURE 11. Muntin showing insect damage on the tenon. Casings from solitary bees were found in the mortise area into which this block was inserted.

Butvar B-98, a polyvinyl butyral resin manufactured by the Monsanto Corporation, was chosen as the consolidant because it possessed these properties and had performed well in previous studies. The molecular weight of the Butvar B-98 ranged from 30,000 to 34,000, and it had the glass transition temperature range of 62-68°C (T<sub>g</sub>). Its tensile strength of 5.6-6.6x10<sup>3</sup> p.s.i. gives Butvar resistance against cold flow, a problem which is characteristic of the polyvinyl acetate resins series (Schniewind and Kronkright 1984:149). A test conducted on a loose component of the gate showed that a 5% g/l solution in denatured ethanol, with 5% butanol added to prevent clouding, was effective in preventing further powdering and breakage of the wood fibers in exposed areas. The weight gain was approximately 5%. Most of the tongues of the muntins and rails were treated by dripping the solution on with a brush. Two coats were applied, with three coats being used on the upper muntins because of their advanced state of decay from insect infestation.

Four of the muntins were previously repaired during the use of the gate by adding a rectangular piece of wood to one side of the block and pegging it with thin wooden dowels. These dowels had broken because of deterioration and the repair pieces had fallen out of the blocks. On three of the rails, the tenons were cracked and/or broken off completely. These broken areas and previous repair pieces required mending to regain their structural strength and to retain some of the integrity of the gate. Titebond Wood Adhesive, a poly-

vinyl acetate emulsion commonly used in furniture conservation, is manufactured by The Franklin Chemical Company. It was chosen due to its strength and compatibility with wood. As an emulsion, it becomes somewhat intractable after it has dried completely; however, solvents such as acetone will swell it and allow any repairs to be reversed. The adhesive was introduced to the mend area and clamped for a minimum of twelve hours. Excess adhesive was removed from the crack margins before it dried with acetone on cotton swabs.

The next major concern in the stabilization of Gate A was the strengthening of the deteriorated portions of wood in both the muntins and rails. It was felt that, if not filled, these gaps would allow the muntins to push outward when the door was placed in the upright position. There was also a large loss to the inner surface of the mortise in the right side stile near the bottom surface of the door. This would have allowed the lateral tongue of the penultimate rail to shift. The exposed surfaces inside the gaps were channeled by insects and did not present an esthetically pleasing appearance, another consideration, however minor, which entered into the in-filling decision.

Epoxy formulations have been used in recent years in the restoration of wood in historical buildings (Phillips and Selwin 1978) where the wooden members are subjected to constant stress such as supporting the weight of visitors. Epoxies, although there is a solvent formulation available



which will swell them and allow removal, must be considered to be irreversible since they cure by means of a chemical reaction resulting in polymerization and cross-linking between the component molecules. An alternative to epoxies as a fill are the silicone RTV resins. They are chemically and physically stable, have a compression modulus which is less than that of wood, and are easily removed from the wood since they do not penetrate into the fibers in the fill area (Grattan and Barclay 1984). Containing only the elements silicon, oxygen, carbon, and hydrogen, the silicone RTV's are classed as polydimethyl siloxanes and have no reactive double bonds. They cure by the evaporation of either methyl alcohol (alkoxy curing, a noncorrosive process) or acetic acid (acetoxy curing, a corrosive process) and cross-linking at room temperature. Various formulations of RTV silicone have been used, with RTV 738, a noncorrosive example manufactured by Dow-Corning, being the most commonly chosen product. It has been used in thin applications as an esthetically pleasing fill for cracks in wooden objects, such as totem poles (Sonja Fogle, personal communication 1987). In this case, a crack was filled with crumpled acid-free tissue paper, leaving a gap of from 1/4 inch to 1/8 inch from the top of the paper fill to the surrounding surface of the wood. The silicone was then applied and allowed to cure. After curing, it was colored by painting with a mixture of the silicone, glass microballoons, and dry pigments.

This method was also used on Gate A to fill missing areas on the sides of deteriorated muntins. Figures 12-14 illustrate the steps required in the procedure. A constraining dike consisting of 4-ply matboard covered on its interior surfaces with silicone-release film was constructed around the missing area and held in place with masking tape. The margins of the wood around the fill were masked off with tape. The gaps were then filled with crumpled acid-free tissue paper to 1/4 inch below the wood surface and RTV 738 was applied from the tube and spread. When completed, the fill was colored and applied evenly with a superficial application of RTV 734, a self-leveling compound colored with iron-oxide pigments. In order to give a final, matte finish to the surface, blends of dry earth-tone iron oxide pigments were brushed and rubbed into the surface. From a normal viewing distance, the fills appear to be rough, weathered wood.

This treatment method was also used in the structural filling of deteriorated areas. The top of the tenon of rail C was covered with a sheet of silicone-release film in order to keep the beam from adhering to the fill material. The dowel holes were not reproduced in the fill in stile II, but they may be relocated from the posterior surface of the beam.

The main modification of this method was to use RTV as a free-standing bridge. It is keyed into the margins of the

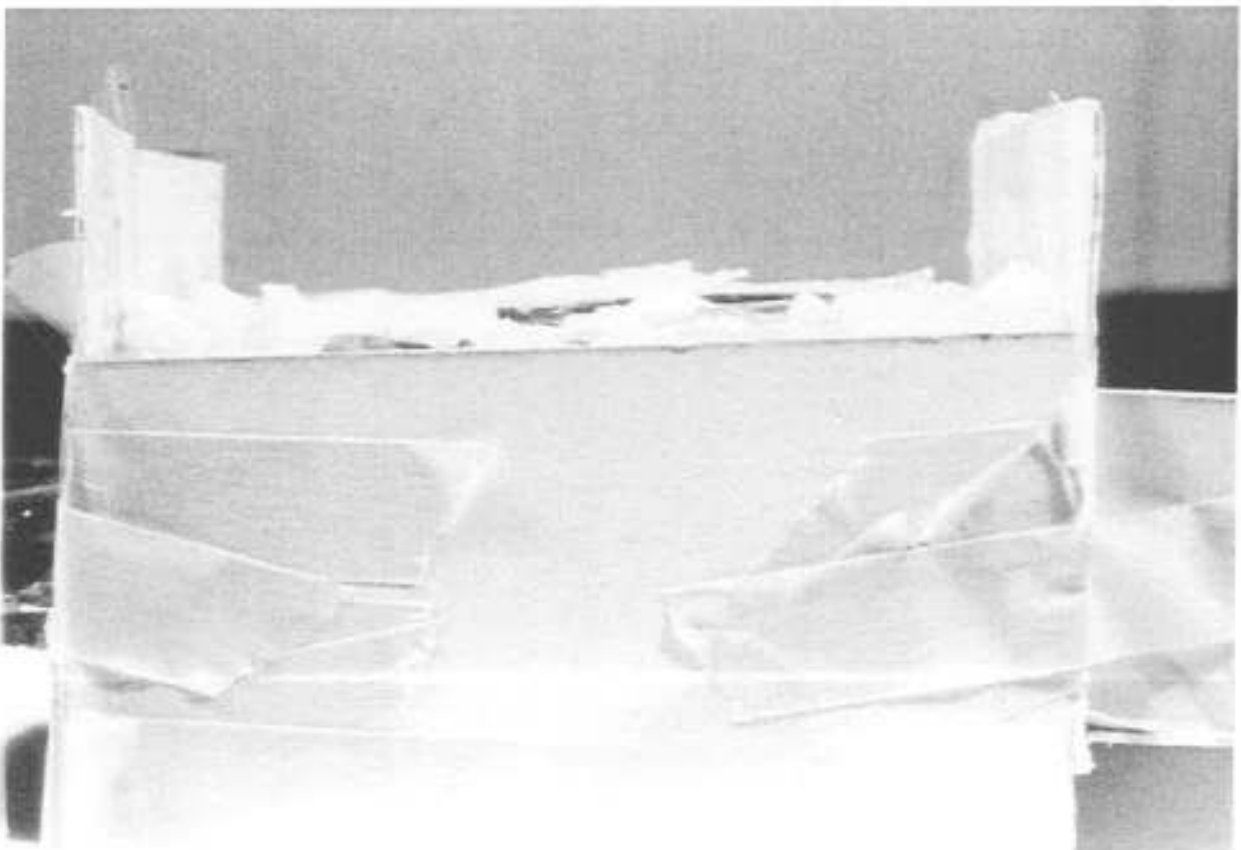


FIGURE 12. Mat board dike around the area to be filled on a muntin.



FIGURE 13. Top view of the void area in the muntin filled with acid-free tissue paper prior to infilling with RTV738.

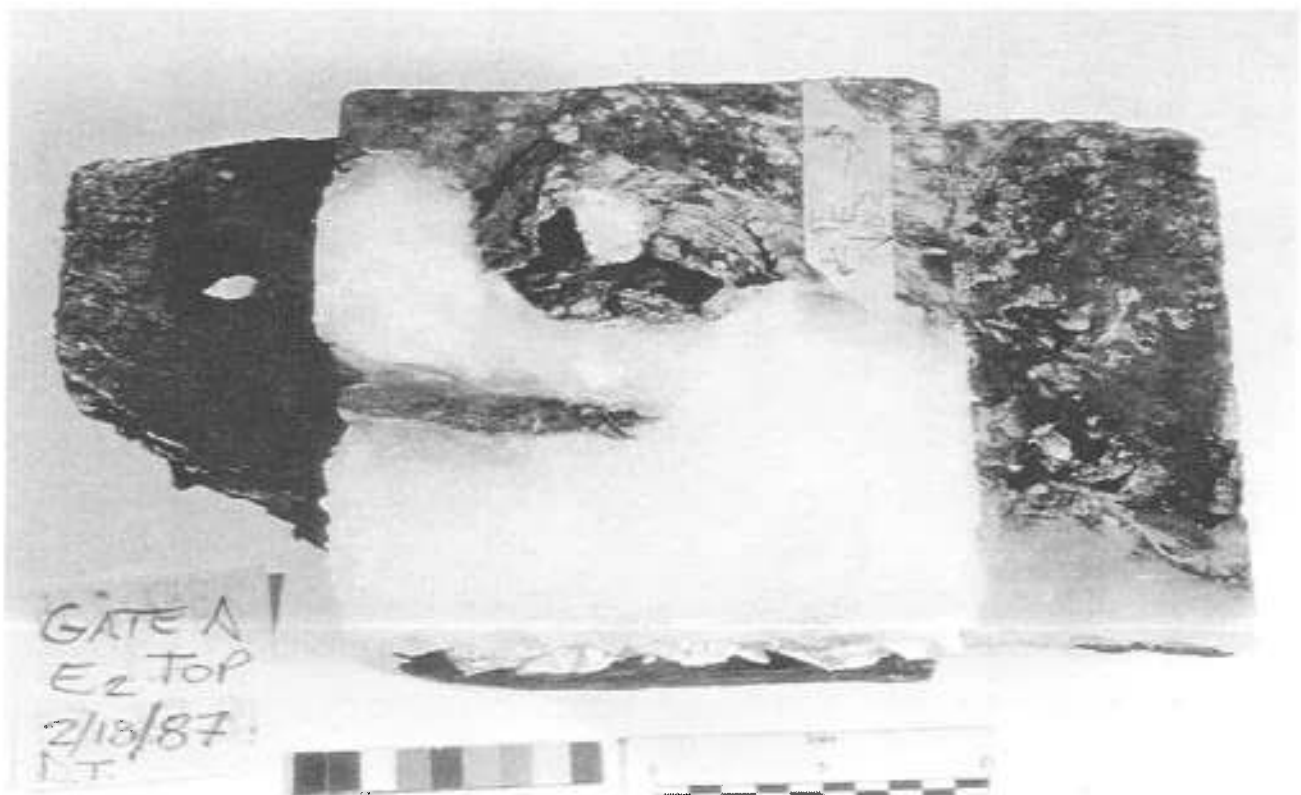


FIGURE 14. Addition of the viscous silicone, RTV738, to the gap and removal of dike.

break mechanically and if not stressed beyond the normal load, it will not give way. If removal of the bridge fill is desired, it can be easily removed by carefully peeling the fill back from the wood. The more fibrous wood areas were consolidated with two to three coatings of Butvar B-98 before the fill was applied. Figures 15-17 show the procedure followed in this fill. Supports were built across the groove gap using silicone-release film covered with 4-ply mat board bases held up by plasticene pylons. When the fill had cured enough to support its own weight, the supports were removed and the fill was allowed to cure fully on all sides. It was then colored as described for the spacer block fill above. Figure 17 illustrates a finished structural bridge fill. When held in the upright position, the fill flexed slightly but kept the muntins from falling out.

When a more fluid fill material was required, but not as fluid as the self-leveling type, RTV 734 was mixed with fiberglass powder that is often used in making repairs in boat hulls. The powder served to increase the viscosity of the RTV while allowing it to penetrate into folds and voids of the underlying, dried RTV 738.

After the fills were completed, the components were reassembled, with the exception of the partially deteriorated side stile designated as stile I. This was once the pivot assembly that fit into the wall of the gate. Since it is no longer

possible to determine how many components comprised this side assembly, or their exact configuration, this side was replaced with a substitute beam. A beam of 3/8-inch-thick clear Acrylite acrylic sheeting (with spaces for the existing tongues on the rails) was fabricated (Figure 18). This fabricated stile gives stability to the side and prevents the door from possibly collapsing from its own weight. It also allows viewing of the mortise and tenon construction. The rails rest on the beam of plastic that now serve the same structural purpose as did the original muntins and jamb stile.

### METAL ANALYSIS AND TREATMENT

Metal objects can provide information regarding construction/manufacturing dates and other pertinent data. The metal components of the Herrera Gate were analyzed and treated as part of the current studies (Table 3). This was done by sampling representative brads and spikes, preparing them as metallographic samples, and analyzing the grain structure of the metal in order to determine the manufacturing technique used. The appearance of the metal in section will depend upon the type of metal used, (i.e., wrought or low-carbon steel) and the method of working such as hammering, machine cutting, or wire drawing.

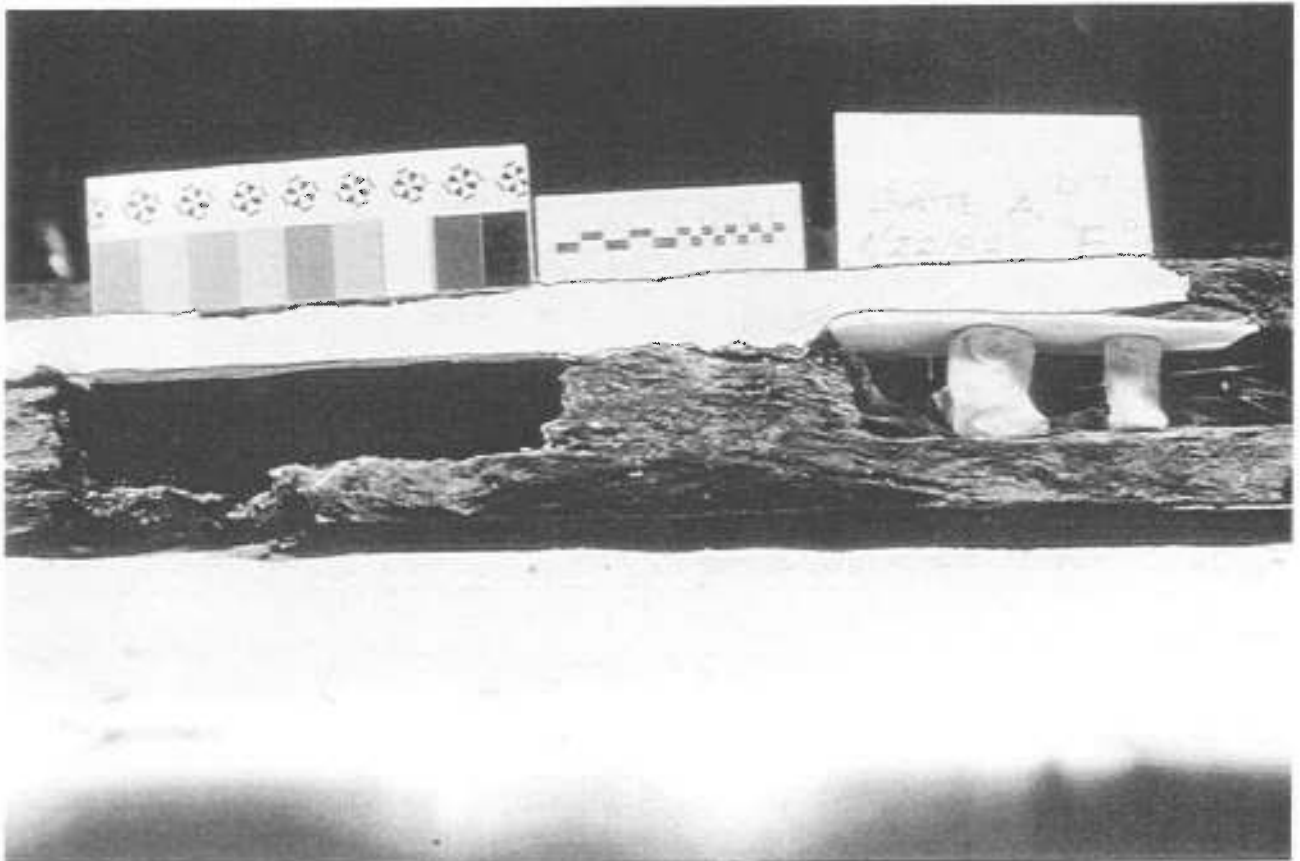


FIGURE 15. The broken mortise area being filled by the structural bridge fill method. The right mortise has a mat board support held up by plasticene pylons.

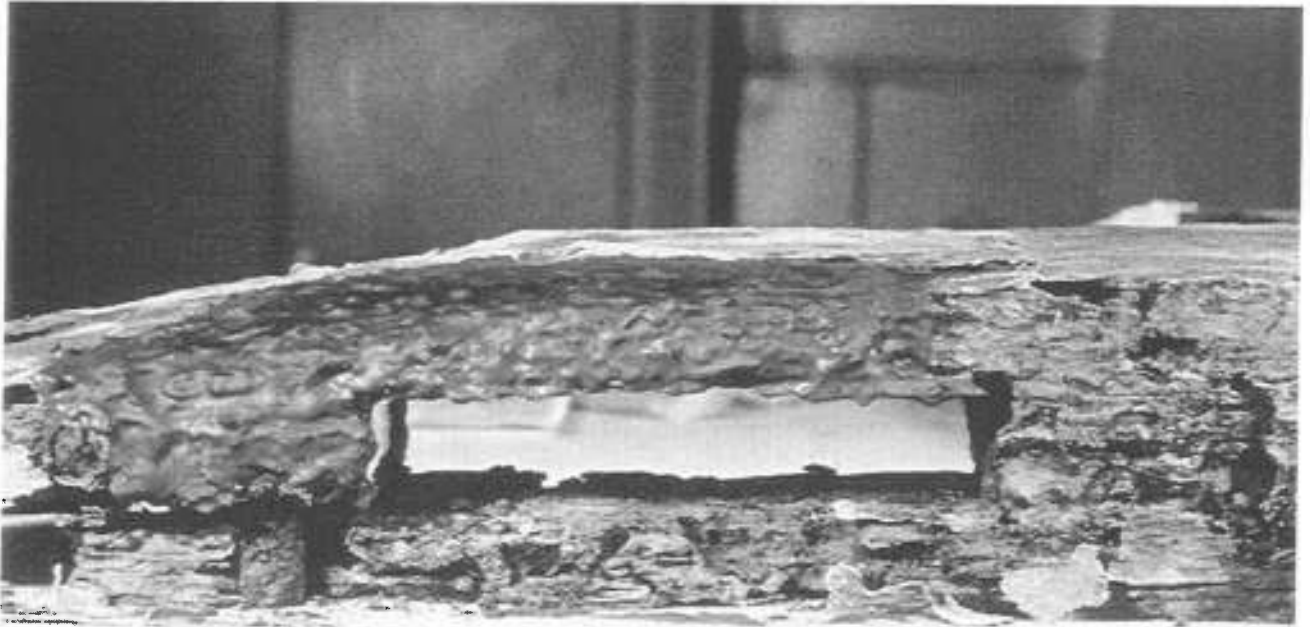


FIGURE 16. Intermediate stage in the reconstruction of a mortise on stile. The RTV has been colored with dry pigments.

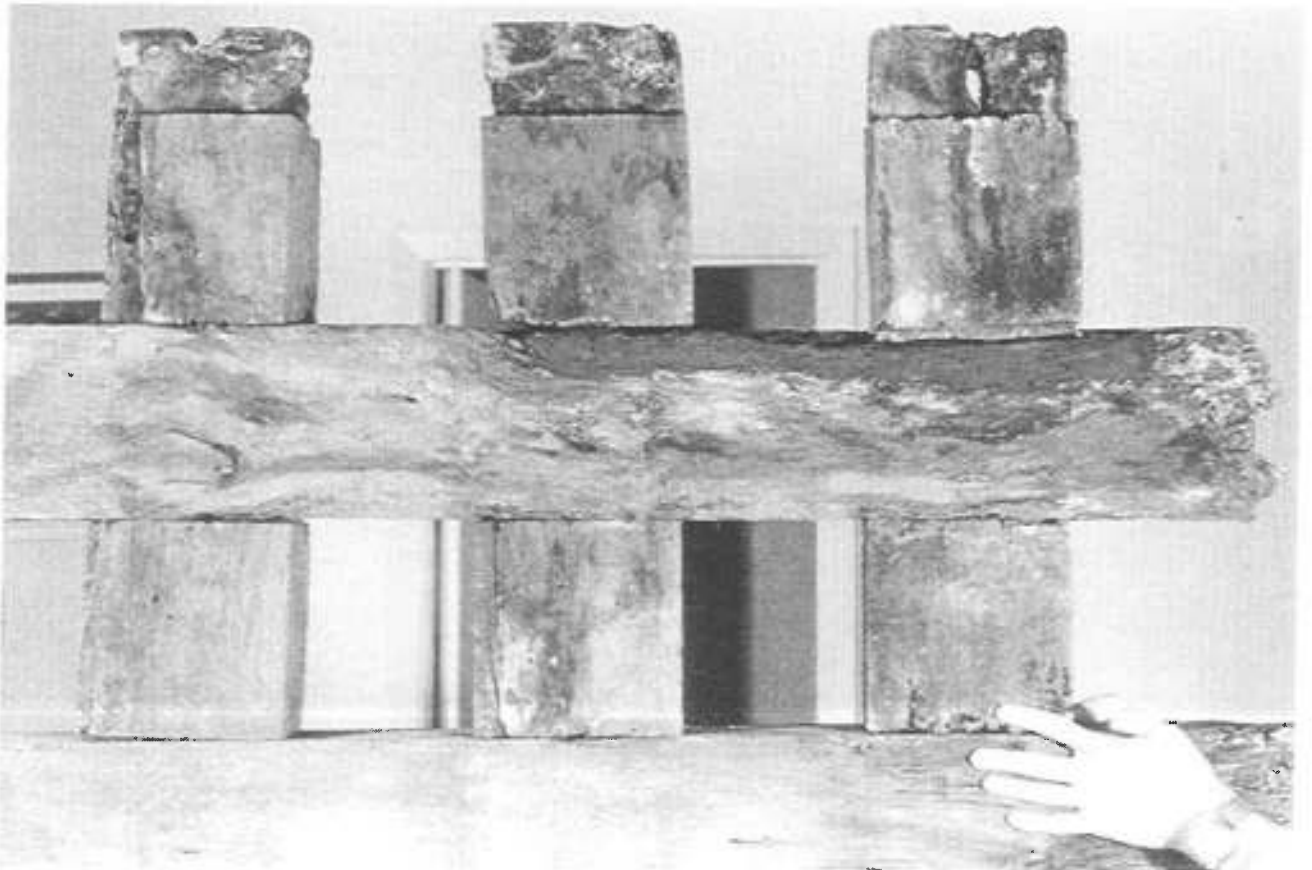


FIGURE 17. Completed reconstruction of broken mortise areas being tested for stability by placing the muntins back in them.

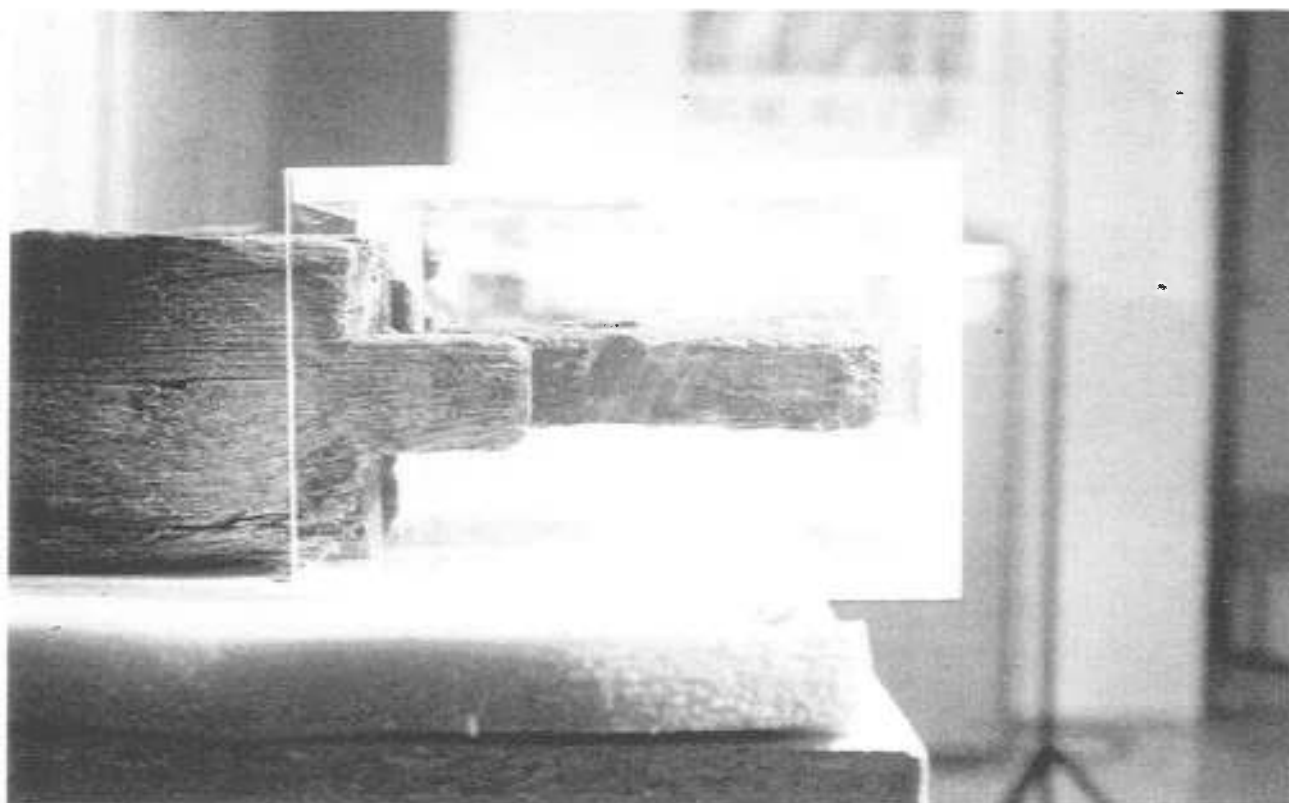


FIGURE 18. View of completed Acrylite beam on Gate A through the plastic beam.

TABLE 3  
Nail Specimens for Metallographic Examination

Sample Number	Description	Provenience
1	brad	Tremont Nail Company, Wareham, Mass.
2	spike	Tremont Nail Company, Wareham, Mass.
3	tack	41BX677, P-5 (La Villita Earthworks Site), B��xar County, Texas
4	tack	41BX677, F.21-2-10 (La Villita Earthworks Site), B��xar County, Texas
5A	common siding	O'Connor Ranch, 1870-1880, La Salle County, Texas
5B	box	O'Connor Ranch 1870-1880, La Salle County, Texas
6	rose-head, wrought	3676, Presidio La Bah��a, Room J D-E, Goliad, Texas
7	cut	41BX274, P��rez Ranch, 1790-1850, B��xar County, Texas
8	firedoor or clinch, cut	41BX672, surface collection, B��xar County, Texas
9	brad	Gate A, rail 5
10	brad	Gate A, rail 6
11	spike	Gate A, left end, interior surface, rail 5
12	modern wire	Hardware store, nail 6d

Subsequent to the preliminary work, 13 other nail samples with relative known dates of manufacture based on temporal association with archeological sites were obtained and sectioned. Some comparative samples were obtained from the Tremont Nail Company in Wareham, Massachusetts. Tremont manufactures cut nails using nineteenth century machinery and methods, but performs the operations on modern rolled steel stock. The Tremont nails were useful,

however, to observe the effects of cutting, such as shear marks and burrs on diagonal corners of the nails. Table 3 lists the samples and their proveniences. All samples were embedded in phenolic premolds, ground and polished, and etched with 2% nital etchant. Observations were made using a binocular metallographic reflected-light scope at 100X.

The methods of nail manufacturing and their correlation with historic time periods in the United States of

America has been presented elsewhere (Nelson 1968). Prior to 1790, wrought nails were used exclusively. With the invention of the nail cutting machine in Massachusetts in 1790, nails cut from flat stock began to be used, along with wrought nails. Due to their strength and flexibility, which is required in certain situations, wrought nails continued to be used despite technological change and innovation.

After 1840, machine cut nails were made with the metal grains oriented parallel to the long axis of the nail which allowed for clinching. Also the head-making processes were perfected and the heads were no longer made by hand. During the 1850s, wire drawn nails were first manufactured, were perfected in the 1870s, and are the most commonly used nails today (Figure 19).

A preliminary study was carried out in October 1986 on two brads which fell out of voids in the door during disassembly (Figure 20). These were labeled specimens 9 and 10. Observations showed that they were wire drawn due to the longitudinal orientation of the small grains and squeezed appearance of the metal, especially at the tip. Specimen 9 showed small spaces between the grains, deformation of the head showing formation of the striking surface, with the grain direction turned and twisted back onto itself. Specimen 10 had a similar appearance. A third specimen, Specimen No. 11 (Figure 21) came from Gate A, rail 5. It was taken from the point of a spike. The unused

portion was treated and replaced in the original hole in the wood. Specimen 11 was found to be wrought having large grains with parallel slag inclusions or oxide. Based on surface appearance, the two brads pulled from the rabet cuts in the gate are wire drawn.

The metal that was exposed above the surface of the wood was cleaned mechanically using WD-40 oil on cotton swabs. The WD-40 was then removed with mineral spirits and the metal was coated with a 3% 1/1 solution of Acryloid B-48N in toluene. B-48N is a methyl-methyl methacrylate copolymer manufactured by the Rohm and Haas Company and distributed by Conservation Materials, Ltd. The eye-bolt was removed from the hole in Gate A, beam 5, since the wood around the hole was mended with the silicone filler in order to stabilize it. The removal allowed for the complete treatment of the bolt. It was then replaced in the hole. On Gate A, the 30 exposed wire-cut brads were treated. Five wrought spikes and the eyebolt were also treated. On Gate B, 12 wire-cut brads were treated as described above, along with 11 wrought nails and an iron crossbar.

#### PAINT ANALYSIS

During a preliminary examination of the Gate A, small fragments of what appeared to be paint flakes loosely adhering to the wood in several areas were noticed. The exterior



FIGURE 19. Metallographic cross section through a modern wire-drawn nail. Large grains have been compressed and are seen here as elongated areas of light and dark shades.

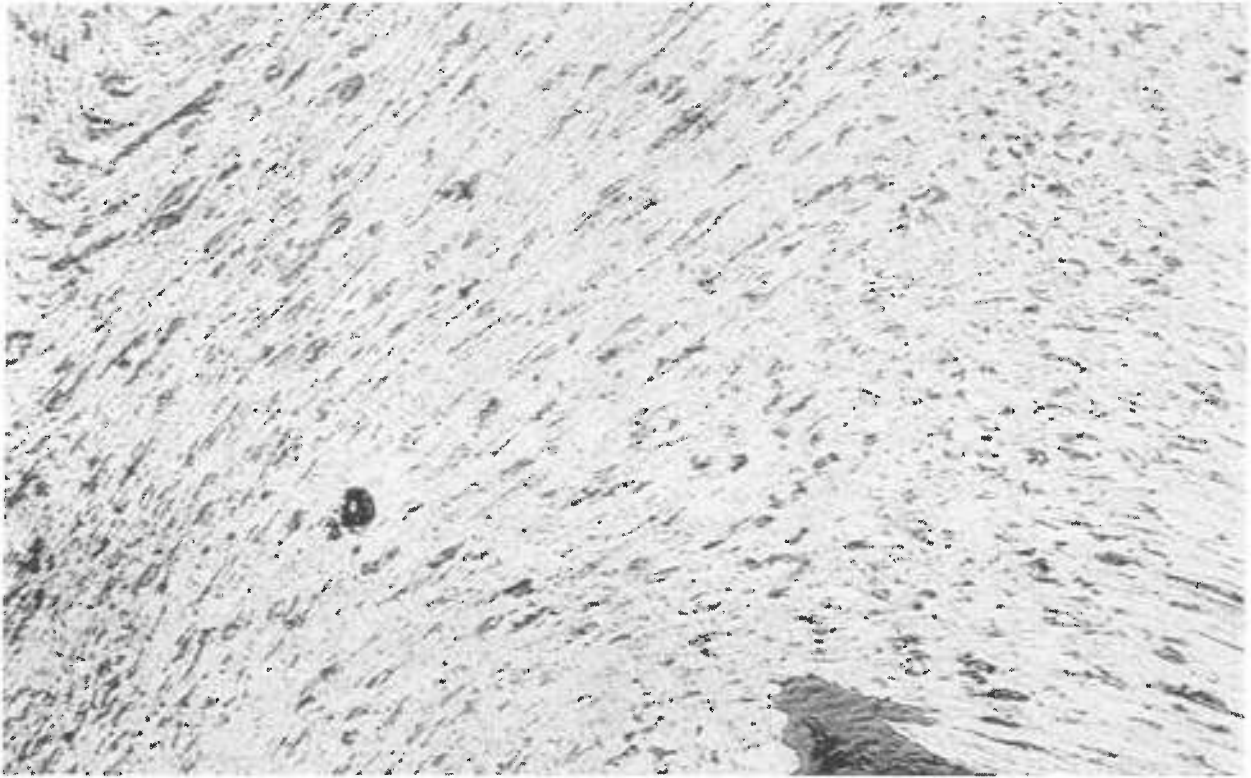


FIGURE 20. Metallographic cross section of a brad from one of the rabet cuts on Gate A. Notice the grain elongation, squeezing, and deformation due to wire drawing. The dark gray area at the bottom is ferric oxide corrosion.



FIGURE 21. Metallographic cross section through a spike from Gate A. The ferrite grains are visible as faint outlines of irregularly shaped areas.

surfaces of the flakes were a dull blue-green in color (Munsell 5G 5/2), with the interior surfaces almost black (Munsell 10YR 2/1). Polarized light microscopy showed the particles to resemble malachite. Several small flakes of this paint were sampled and subjected to energy composition. The specimens were adhered to the brass sampling stage with graphite paste and 20 angstroms of gold coating applied in a vacuum sputter coater device. The spectra obtained showed that the green side of the flakes contained titanium, arsenic, calcium, silicon, aluminum, and some iron.

The black side of the paint flakes is essentially the same composition with an increase in the percentage of iron. The composition is consistent with modern paint formulations. Titania pigments came into use after 1916. The percentage of titanium varies from 3% to 30% in different samples, which indicates that it is present in more than accidental trace quantities. The possibility exists that the green paint is the remnant of a Paris green application which would have been used as an insecticide (Donald P. Lewis, personal communication 1986). The SEM/EDXRA analysis does not distin-

guish between the different oxides of metals. If the titanium is present as titanium dioxide, then this would confirm that the paint is modern.

#### SUMMARY

This section has provided an general overview of the analysis and treatment of an archeological architectural object. The treatment has combined restoration and stabilization with minimal treatment in order to make the object more accessible to the public. More project-specific data has been published elsewhere (Storch 1989).

The adjunct analyses carried out during the project will also add to the knowledge of construction methods and architecture during the late Spanish Colonial period of Texas history. A small sample of wood from Gate A has been submitted to Cassia Freedland, a research assistant at the U.S. Forest Products Research Lab in Wisconsin, for use in a long-term study on the quantification of the affects of aging on different species of wood. Results from this study will be reported at a later date.



## CHAPTER 6

# SUMMARY, INTERPRETATIONS, AND RECOMMENDATIONS

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### SUMMARY AND INTERPRETATIONS

The Herrera Gate project has documented an extremely rare example of a late Spanish Colonial wooden gate or *portón*, a massive gate of two leaves which led into or out of a *plaza* or *patio*. The assessments and interpretations of the gate derive from both a synthesis of the topic areas as well as a cumulative process of documentary evidence. Basic research topics involved archival, architectural, and archeological investigations. The project also provided for the stabilization and conservation of the gate.

The historical and archival research provided an evaluation of the context and possible origins of the gate as well as its historical and architectural significance. Primary and secondary documentary sources were used.

The specific origins of the gate have not been determined. The primary evidence for its original provenience remains the oral history tradition of the Herrera family that states that the gate "came from one of the missions" (Adolph Herrera, personal communication; notes and tape on file, CAR-UTSA). Research has substantiated that the family owned property at two of the San Antonio missions, including Mission San Antonio de Valero and Mission San José y San Miguel de Aguayo, at least by the early 1800s. José Francisco Ruiz, the great-great grandfather of Adolph Herrera, purchased portions of the Alamo compound in 1827, but the evidence linking the gate to Mission Valero (the Alamo) remains circumstantial. Work to date, including architectural, archival, and archeological studies, strongly suggests that the gate did indeed come from one of the San Antonio missions.

Dimensions given at four of the missions for gates/openings that are close to the size of the Herrera Gate are as follows: Mission Valero's splayed south wall inner gate was 9 feet 3 inches; Missions Espada's south wall arched gate (ca. 1780) was 9 feet 8 inches and the south wall gate as shown by Corner (1890) was 9 feet; Mission San Juan had two gates/openings that were 10 feet, the north wall gate and the *convento* entrance; at Mission San José, the

west wall gate was 10 feet. No measurements for the gates/openings at Mission Concepción were found, but we know that they were "*portónes*" which implies a large gate with two leaves of a size similar to the Herrera Gate. Depending on the type of framing/mounting system utilized, the Herrera Gate could have fit any of the preceding.

The wood resources needed by the early civilian, military, and missionary settlers in San Antonio de Béxar, included approximately 16 different varieties of trees. Cypress (*savine*), which may also have been red cedar or juniper, walnut (*nogal*), black walnut (*nogal prieto*), oak (*encino*), cedar (*cedro*), and mesquite (*mesquite*) were utilized at the San Antonio missions, reflecting the resources along the rivers and in the San Antonio vicinity. Rules regulating the use of these resources were instituted. Wood intended for use in an architectural project required specific procurement and treatment: wood was to be cut when the sap was down; trees within 5 leagues of the city were not to be cut, and permission to cut lumber had to be sought from officials; green wood was not to be utilized, but it should be cured over a fire or dried for 8 months; and the wood should be stored away from moisture to prevent rot. Antecedents of these regulations originated as early as the sixteenth century in Mexico and were transported to the frontier by the eighteenth century.

Mesquite and cypress could withstand heavy use and were appropriate for exposed structures. Walnut and oak appear primarily to have been used for interior purposes. Many of the carved (*talla*) and turned (*torneado*) items at the missions were of oak and walnut. The use of mesquite is mentioned in particular at Missions San Juan, Valero, and Espada, but no doubt was used at the other missions as well as outside the mission systems.

Some wooden architectural elements at the missions were painted, (*pintado* or *pintura*), lacquered (*maqueada*), or gilded (*dorada*). Others, such as mesquite and cypress, were frequently used with untreated surfaces. The basic properties of these two woods dictate that the wood, if cured correctly, is very stable. Mesquite was used extensively in the area of the Falcón

Reservoir during the period of Spanish Colonial occupation in this border area (George 1975). Here, doors and windows as well as their frames were made of mesquite. In San Antonio, the earliest archival date found for the use of mesquite for a door is 1801 (Ivey n.d.a 2:30), but the wood was used earlier in time for a variety of purposes.

The careful workmanship of the Herrera Gate reflects a high level of expertise. Even though San Antonio de B́exar was in the remote northern frontier of New Spain, a sophisticated woodworking industry existed. Thirty-one carpenters from five different areas have been identified in the San Antonio area from the early-eighteenth through the early-nineteenth centuries. Some of these were guild trained and were knowledgeable and capable craftsmen who worked with standard tools utilized by their European counterparts.

This sophisticated woodworking industry is reflected in mission inventories and inspections of the missions. A preliminary analysis of only three inventories has identified over 30 terms or combinations of terms in the archival records in reference to wooden products of the carpenters. These include turned work (*torneada*), carved work (*talla* or *talado*), gilded work (*dorada*), "worked" wood (*labrada*), and moulded work (*moldura*), among others.

This woodworking industry relied heavily on tool availability and variety. An examination of the archival records indicates that an extensive number of common tools were available to carpenters with some specialty tools included. The tools necessary to construct the Herrera Gate were present at the missions. As Appendix III shows, none of the shops had all of the known carpenter's tools at all times, but most of them were well stocked. Spatially and temporally, fluctuations occurred in the presence or absence of tools. This seems to be directly related to two factors: the presence or absence of carpenters at the missions and the known/postulated construction periods for the individual missions. Fluctuation could also have resulted from the inaccuracy or negligence of the individuals conducting the inventory, but the *Cuenta* lists (*Cuentas* 1745-1772) were not so affected; the *Cuentas* are relatively accurate predictors of existing tool forms.

Gates were located in either single walls (generally uncovered and without corresponding structures) or double walls (covered or uncovered and generally with structures). In some instances, the double wall gates were contained in a splayed wall. The double-walled gates implies that an inner and outer gate/opening were present.

Standard dimensions for openings, gates, and walls existed in the Spanish Colonial period. Single walls at the San Antonio missions were generally 2 *varas* high (5 feet). Double walls, or walls containing one-story masonry buildings were frequently 3 *varas* (8 feet 3 inches) in height, and this height appears most often in association

with walls containing gates. Frequently, the 3-*vara* height increased 3 feet over the gate or to ca. 11 feet when the gate was fortified as at Mission San Antonio de Valero in 1793. Widths of gates appear to vary from ca. 5 feet for small gates, such as the *pasadisos*, up to ca. 12 to 15 feet for the larger gates. It is probable that most of the smaller gates consisted of one leaf while the larger gates, such as the Herrera Gate, contained two leaves. A pivot style construction, a feature of some gates as well as doors reflected use in a substantial structure (general masonry). Frequently wooden pivots integral to the stile were utilized due to the scarcity of iron hardware.

Artifacts similar to the Herrera Gate that would have provided comparative evidence of construction techniques are nonexistent on an areal and regional basis. The few examples of mission compound gates are replicated, not originals, thereby hindering comparative analysis. Several surviving Spanish Colonial doors provided some information; however, no substantive comparisons can be made between doors and large gates. No eighteenth century *portóns* are known to have survived in New Mexico. The Herrera Gate provides, for the first time, an opportunity to examine an extremely rare example of a Spanish Colonial *portón* on a local, areal, and regional basis. Consultation with historians and archeologists in the adjacent borderland regions as well as archival research revealed that few known original examples of a main compound gate or gates survived. Probable examples may be located in Mexico, but preliminary attempts to locate such information proved unsuccessful.

The gate construction obviously followed some type of predetermined method of construction. The process of assembling the gate was a precise and accurate, as well as time consuming, procedure.

The conservation analyses revealed that some metal components such as brads, spikes, and an eye-bolt found in Gate A are wrought. The presence of cut and wire drawn nails, particularly in the rabbet cuts, suggest that a later series of renovations and adaptations took place as secondary use of the gate occurred. Other renovations include the later addition of locking systems, the repair of muntins as well as possible repairs or replacements of stile sections, the addition of wedges in mortises, and the possible addition of panel insets.

The enclosure of the missions in response to Native American hostilities began in 1745 at Mission Concepción. The other four missions were enclosed between 1756 and ca. 1770s. Mission Concepción's walls (including its gates) were in ruins by the 1820s with the walls and gates of Missions San José, San Juan Capistrano, Espada, and Valero at least partially intact to about the 1830s to 1840s. The lines of evidence for each of the missions is presented below.

Mission Valero had two large entrances: the *convento* entrance in the west wall of the *convento* and the south

wall entrance. These entranceways appear to have been present throughout the occupation of the compound by the *Compañía Volante*.

The presence of carpenters has been documented at Mission Valero, including Pedro Charli, Manuel Arenales, and José Antonio Conas (Conar). Carpentry tools were available, but the inventories and inspections either appear incomplete or the mission did not possess a carpenter's shop that was as well equipped as the other mission workshops. Utilization of mesquite has been documented at Mission Valero.

The oral history tradition of the Herrera family has been substantiated regarding the purchase of property at Mission Valero. In 1825-1827, José Francisco Ruiz purchased property from the descendants of some of the original claimants at the old mission through public auction.

Mission San José had at least five large gates (*puertas de madera labrada*) in 1786. One, the northernmost west wall gate appears to have been similar to a portcullis. Mission San José possessed a well-stocked carpentry shop by 1755, including a lathe. Numerous carpenters were in residence, with seven there during the late 1700s to early 1800s, including Pedro Huízar, Manuel Arenales, Juan José Mireles, Fermín Argueyo, José Antonio Conas (Conar), José Luis Espinosa, and Nicolás Pru. Additionally, José Francisco Ruiz owned property including a large section of the north wall with the *pasadiso* at Mission San José at least as early as 1823.

Mission Concepción's walls contained three to four large gates described by Fray Lopez in 1786 as *portónes*, or large entrance gates having two leaves, as does the Herrera Gate. The Ruiz family appears to have lived at Mission Concepción in the early 1800s. The mission possessed a well-stocked carpentry shop by 1772. Four carpenters, Pedro Huízar, José Geronimo Huízar, son of Pedro Huízar, the Indian Bentura Billegas (or Villegas), and Manuel Soto, lived at Concepción in the 1790s to the

early 1800s. No record of the use of mesquite has been located at Mission Concepción, but this preliminary evidence is not conclusive.

The exact number of large gates at Mission San Juan Capistrano is not clear. Possibly as many as three to four could have been over 8 feet. No record of land ownership or purchase by the Ruiz-Herrera families has been documented to date. Mesquite was used for roofing at the mission. Mission San Juan possessed a well-stocked carpentry shop by 1772, but records of occupations of the residents have not been found or do not exist.

Mission Espada had approximately four to five large gates over 8 feet. This included the ca. 1780 arched south wall gate that was 9 feet 8 inches wide. By the 1820s, this gate was loose or warped which could have led to a wear pattern similar to that on the Herrera Gate. The north wall gate, enclosed within a structure, was known as the *zaguán nacional*, or national gate. The mission received a large number of carpentry tools during the 1760s, and by 1772 had a well-stocked carpentry shop. Three hundred mesquite logs, stored here in 1772, would have been sufficient for the construction of the Herrera Gate. No Herrera family connection to Mission Espada has been located at this time.

## RECOMMENDATIONS

Work to date has not identified the specific origins of the Herrera Gate but has provided assessments and interpretations of its provenience and architectural significance. The possibility exists that further archival research could provide information on the origin of the gate and that comparative data would clarify the architectural significance. Specific sources that might yield further information are considered to be the Bexar Archives, material from the Archivo General de Mexico (including the Provincias Internas), the Misiones, the San Antonio Archives and City Records, and the City Records Journal.



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**APPENDIX I: A BRIEF HISTORY OF THE RUIZ  
AND HERRERA FAMILIES**



## INTRODUCTION

The following information on the Ruiz and Herrera families is extracted from McGraw and Hinds (1987). Adolph Herrera, the owner of the Herrera Gate is a direct descendant of José Francisco Ruiz, one of two native Texans to sign the Texas Declaration of Independence, and Blas Herrera, messenger to Colonel William Barrett Travis at the Alamo in 1836 (see below). His great-grandmother's brother was Francisco Antonio Ruiz, the acting *alcalde* of Béxar in 1836, who was ordered by Santa Anna to construct the funeral pyre which consumed the bodies of the Alamo defenders. These two families have owned the property where site 41BX672 is located for over 150 years. Mr. Herrera currently owns this Medina River ranch.

## RUIZ FAMILY

Juan Manuel Ruiz was born in Queretaro, Mexico in 1726 or 1737 (Chabot 1937:198; McGraw and Hinds 1987:131). He married Manuela de la Pena, born 1745, in Saltillo, Mexico. To this union, 12 children were born: (1) María Gertrudis Joséfa, born November 22, 1766, married Angel Navarro; (2) Ana Petra, born July 23, 1769, died August 2, 1769; (3) Ana Petra, baptized September 11, 1770, died September 11, 1770; (4) María Antonia, born October 24, 1771, first marriage to Francisco Calvillo, second marriage to Marcós de Ybarbo, August 21, 1788; (5) José Antonio, born March 9, 1774, died March 13, 1774; (6) José Antonio Pablo Longino, born March 13, 1775, died February 13, 1812; (7) María Ygnacia, born September 26, 1779, died October 8, 1779; (8) José Antonio Francisco Victoriano, born August 31, 1780, married Josepha Hernández, March 8, 1804, died January 20, 1840; (9) José Francisco, born January 29, 1780 or 1783; (10) María Gertrudis, born November 21, 1786; (11) José Francisco, born March 8, 1789; and (12) Juan Francisco, twin of José Francisco (BCA, Ruiz Files; McGraw and Hinds 1987:131). Juan Manuel Ruiz died on July 30, 1797 and was buried in San Antonio (Chabot 1937:198).

José Francisco Ruiz, the son of Juan Manuel Ruiz and Manuela (de la Pena) Ruiz, was born on August 31, 1780, in San Fernando de Béxar (Chabot 1937:198; McGraw and Hinds 1987:131). Sent to Spain in his youth to acquire his education, he returned home at the completion of his studies and joined his father in a business enterprise (McGraw and Hinds 1987:199). In 1803, Ruiz was appointed as a school teacher by the order of the town council (Santos 1966:5). On March 7, 1804, he married María Josepha Hernández, the granddaughter of Andres Hernández (McGraw and Hinds 1987:135). The marriage was witnessed by Juan Ygnacio Pérez and Clemencia (Hernández) Pérez, sister of Josepha (BCA, Ruiz Files; McGraw and Hinds 1987:135).

Three children were born to this union: María Lugarda de Jesús, born June 15, 1804; María Antonia Paula de la Concepción, born June 14, 1809; and Francisco Antonio,

born 1804 or 1811 (McGraw and Hinds 1987:135). In 1811, Ruiz participated in the counterrevolution against Juan Bautista de las Casas led by Juan Manuel Zambrano (McGraw and Hinds 1987:135; Santos 1966:6-7).

In 1813, Ruiz fought under General José Alvarez de Toledo at the Battle of the Medina where Royalist General Joaquín de Arredondo's forces soundly defeated the insurgents (McGraw and Hinds 1987:135). José Francisco "found refuge among the Comanche...and their allies..." (Berlandier 1969:11-12; McGraw and Hinds 1987:135). His family was forced to flee from Texas to the United States, along with other leading families, to escape the wrath of Arredondo.

In the fall of 1821, Ruiz was living in Natchitoches, Louisiana (McGraw and Hinds 1987:135). After Mexico gained her independence from Spain, Gaspar Lopez, Commandant General of the Eastern Interior Provinces, offered him a full pardon in return for utilizing his influence with the Comanche and Lipan Apache as a Commissioner of Mexico. Ruiz accepted the offer and in March 1822, he convinced Pitsinampa, a Comanche chief, to hold a council of their principal chiefs, captains, and elders. It was attended by 5000 persons and, on the advice of Ruiz, they resolved by unanimous vote to send a delegation to Mexico City to make a peace treaty with Emperor Augustin de Iturbide. Ruiz acted as interpreter for the meeting. On December 14, 1822, the treaty was affirmed and on January 19, 1823, Ruiz signed the treaty at the request of Chief Gounique, Comanche representative (McGraw and Hinds 1987:135; McLean 1974:33).

By 1826, Ruiz was serving with the Mexican Army in Texas. He requested the command of a post, was sent to Nacogdoches to help quell the Fredonian Rebellion, and he became commandant of the detachment at Nacogdoches in 1827. Ruiz accompanied a delegation of Waco and Tahuacano Indians from Nacogdoches to San Antonio in 1827 where General Anastasio Bustamante concluded a treaty with them as well as with the Comanches (McGraw and Hinds 1987:135; McLean 1974:35). From 1832 to 1836, Ruiz lived at Ygnacio Pérez's "Stone Rancho" (41BX274) on the Medina River (McGraw and Hinds 1987:135; TGLO Paul vs. Pérez).

In 1836, Ruiz was elected as a representative to the Convention at Washington-on-the-Brazos, where on March 2, 1836, he signed the Declaration of Independence—one of only two native Texans to do so. He served as the first senator from San Antonio de Béxar to the First Congress of the Republic of Texas (McGraw and Hinds 1987:135; Santos 1966:9). José Francisco Ruiz died on January 20, 1840. He was buried in San Fernando Cemetery (BCA, Ruiz Files; McGraw and Hinds 1987:135).

Francisco Antonio Ruiz was born in 1804 (or 1811), the son of José Francisco Ruiz and Josepha (Hernández) Ruiz (McGraw and Hinds 1987:135). Francisco Antonio married Concepción Soto, and to this union four children were born: (1) Francisco Antonio, born 1840, lived in El Paso; (2) Alejandro Modesto, born 1841; (3) Eugenio, who married

Carlota García; and (4) Francisco, who lived in El Paso (Chabot 1937:200; McGraw and Hinds 1987:135).

In 1836, Francisco Antonio Ruiz was a member of the City Council and *alcalde* pro tem due to the absence of the first and second *alcaldes* and most of the council (BCA, Ruiz Files; McGraw and Hinds 1987:136). He remained in San Antonio when the Mexican Army under General Santa Anna approached and was subsequently held under house arrest until the fall of the Alamo on March 6, 1836 (McGraw and Hinds 1987:36; Santos 1966:10). On March 5, 1836, Santa Anna ordered Ruiz, Don Ramón Músquiz (political chief), Don Refugio de la Garza (curate), and others to assemble at a temporary fortification erected at Potrero Street to attend to the wounded once the storming of the Alamo commenced. Ruiz wrote the following about the events:

As soon as the storming commenced we crossed the bridge on Commerce street with this object in view, and about 100 yards from the same, a party of Mexican dragoons fired upon us and compelled us to fall back on the river and place we occupied before. Half an hour had elapsed when Santa Anna sent one of his aide-de-camps with an order for us to come before him. He directed me to call on some of the neighbors to come up with carts to carry the dead to the Cemetery, and also to accompany him, as he was desirous to have Col. Travis, Bowie, and Crockett shown to him. On the north battery of the fortress lay the lifeless body of Col. Crockett. Col. Bowie was found dead in his bed, in one of the rooms of the north side. Santa Anna, after all the Mexicans were taken out, ordered wood to be brought to burn the bodies of the Texians. He sent a company of dragoons with me to bring wood and dry branches from the neighboring forest. About 3:00 in the afternoon they commenced laying the wood and dry branches upon which a pile of dead bodies was placed; more wood was piled on them, and another pile brought and in this manner they were arranged in layers. Kindling wood was distributed throughout the pile and about 5 o'clock in the evening it was lighted. The dead Mexicans of Santa Anna were taken to the grave-yard but not having sufficient room for them, I ordered some of them to be thrown in the river, which was done on the same day [Behrends 1859:80-81; McGraw and Hinds 1987:136].

On December 27, 1836, José Francisco Ruiz wrote a letter from Columbia, Texas to his son-in-law, Blas Herrera, asking that some cattle and other supplies be sent to him (McGraw and Hinds 1987:136; Santos 1966:15-16). These cattle, no doubt, were to be sent from the Medina ranch. The 1840 census of the Republic of Texas lists Francisco Ruiz, attor-

ney, as owning 794 acres of land under survey but without a completed title from the Texas General Land Office and five town lots; he was also administrator of an estate with 8856 acres and one town lot (McGraw and Hinds 1987:136; White 1966:16).

Francisco Antonio served as San Antonio City Alderman from 1837 to 1851. Opposed to annexation with the United States, Ruiz argued that only those who had fought in the Revolution should decide the issue. Sometime around 1845, Ruiz chose to leave San Antonio de Béxar to live among the Indians on the frontier (McGraw and Hinds 1987:136; Santos 1966:11). He returned to the area ca. 1849. Ruiz died on October 18, 1876 and was buried at the Ruiz-Herrera Cemetery (41BX543) on the Medina River (McGraw and Hinds 1987:136).

### HERRERA FAMILY

Blas Herrera, messenger to Travis at the Alamo, was born on February 2, 1802 to Benito Herrera from Punta de Lampasas, Mexico and Jacoba Herrera de las Fuentes from San Fernando de Béxar (BCA, Ruiz Files; McGraw and Hinds 1987:245-246). He married María Antonio Ruiz, born 1809, the daughter of José Francisco Ruiz and Josepha (Hernández) Ruiz (Chabot 1937:199; McGraw and Hinds 1987:245-246). In 1835, he joined Juan Seguín's company of volunteers. He participated in the "Siege of Béxar" and the "Storming of Béxar" in 1835 (BCA, Ruiz Files, Pension Claim; McGraw and Hinds 1987:246). Seguín sent Herrera to scout Mexican troop movements along the Mexican border and in mid-February of 1836, he reported that a large force of Mexicans was crossing the Rio Grande and marching to the interior. Seguín reported this to Travis and vouched for the integrity of his messenger (McGraw and Hinds 1987:246; Williams 1933:387).

Herrera escorted his father-in-law, José Francisco Ruiz, and José Antonio Navarro to the convention at Washington-on-the-Brazos (BCA, Ruiz Files, Pension Claim; McGraw and Hinds 1987:246). Seguín later sent Herrera with a dispatch to General Sam Houston asking Houston to revoke an order by General Felix Huston to destroy San Antonio. He was detained at Camp Preston by General Felix Huston, where he performed a number of missions for the Texian army (McGraw and Hinds 1987:246).

Blas and María Antonia lived on the grant made to her brother, Francisco Antonio Ruiz (BCA, Ruiz Files). This is the Medina River property. Blas and María Antonia had nine children: (1) Jacoba, married Miguel de la Garza in 1850; (2) Francisco, married Luisa Ramírez; (3) Benito, married Narcisa Calderon; (4) Antonia, married Josiah Cass; (5) Blas, Jr., married Sabina Salinas; (6) Juan José, died in San Antonio; (7) Manuel, married Refugia Tijerina; (8) José María, married Joséfa Pérez; and, (9) Joséfa, married Fernando Sandoval (Chabot 1937:199-200; McGraw and Hinds 1987:247).



Blas Herrera died on July 9, 1879, at the age of 77 years (McGraw and Hindes 1987:247). He was buried at the Ruiz-Herrera Cemetery (41BX543) on the Medina River.

Adolph Herrera is a great-great grandson of José

Francisco Ruiz and a great-grandson of Blas Herrera. As stated earlier, Mr. Herrera continues to own and operate portions of the original land grant. This includes site 41BX672 where the Herrera Gate was found in 1984.

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## **APPENDIX II: PROPERTIES OF MESQUITE**



## PROPERTIES OF MESQUITE

Mesquite, due to its physical, chemical, and mechanical properties, is as good or better than other hardwoods for many woodworking uses. The following discussion is extracted from a work on mesquite compiled by Los Amigos Del Mesquite (Lee 1986), an association founded in the early 1980s to promote mesquite wood utilization, development of new uses for mesquite, the coordination of producers and users, and to inform the public of the value of mesquite.

Mesquite possesses an approximately 1/2-inch-wide band of sapwood which remains this approximate width regardless of the size of the trunk's diameter. The sapwood is yellowish white while the heartwood is either a yellowish brown or deep reddish brown hue. The heartwood is hard, brittle, close-grained, oftentimes cross-grained, and durable. The brittleness and the cross-grain makes it lacking in bedding strength (leading to wind shake cracks in the interior) and toughness. The dense grain permits a beautiful polish. A chemical analysis of mesquite is given in Table 4.

Dimensional stability is one of the best properties of mesquite. When dried correctly, it shrinks and warps very little and shrinks equally in both the radial and tangential directions, thereby avoiding the severe warpage, cupping and twisting in other hardwoods (Lee 1986:109). Tables 5 and 6 give the radial and tangential shrinkage values for mesquite compared to other hardwood species.

Mesquite is also extremely durable and in modern times, is often used in application when hardness is important. This hardness no doubt also originally contributed to its desirability in the Spanish Colonial/Mexican periods where strength and durability were desired. The quantitative strength properties of mesquite are shown in Table 7.

The density, or specific gravity, of mesquite is greater than hickory. Due to its weight and cellular structure, mesquite, next to the ebonies, is the densest wood found in the United States. It is twice as hard as hickory or white oak and is able to withstand extensive abrasion and scratching. Mesquite's brittleness (or cleavage) is approximately one-half that of the oaks and other dense hardwood species. Table 8 shows the comparative strength values of mesquite.

While we know that the early Spanish colonists did not have advanced tests such as the above to measure the physical, chemical, and mechanical properties of wood, rudimentary tests were known as early as the Roman period. Testing of the strength of the full-sized timber beams, using cannonballs as weights, was illustrated in 1817 by Peter Barlow (Cowan 1977:223). The Romans were well aware of the properties of some woods (although chemically described in terms of the four elements of fire, water, earth, and air) and their practice of specifying that timber of a particular species be utilized has continued into the twentieth century. Their conclusions concerning wood properties would still have been acceptable in the seventeenth and perhaps the eighteenth centuries. A Roman-period description of timber (using the above four elements) is conclusively sound:

To begin with fir: it contains a great deal of air and fire, very little moisture and the earthy, so that, as its natural properties are of the lighter class, it is not heavy. Hence, its consistence being naturally stiff, it does not easily bend under the load, and keeps its straightness when used in the framework. But it contains so much heat that it generates and encourages decay, which spoils it; it also kindles fire quickly because of the air in its body, which is so open that it takes in fire and gives out a great flame.... Oak, on the other hand, having enough to spare of the earthy among its elements, and containing but little moisture, air and fire, lasts for an unlimited period when buried in underground structures. It follows that when exposed to moisture, as its texture is not loose and porous, it cannot take in liquid on account of its compactness, but, withdrawing from the moisture, it resists it and warps, thus making cracks in the structures in which it is used [Cowan 1977:79-80].

The Spanish settlers in the San Antonio region would have had approximately two centuries of experience in New World wood species, including mesquite, prior to their founding and settlement of San Antonio de Béxar.

TABLE 4  
Chemical Analysis of Mesquite\*

Moisture		5.49	Methyl pentosan	0.70	
Ash		0.54	Cellulose		45.48
Solubility in			Lignin		30.47
	Cold water	12.62	In cellulose		
	Hot water	15.09		Pentosan	17.75
	Ether	2.30		Methyl pentosan	0.81
	1% NaOH	28.52		Alpha cellulose	76.48
	Acetic acid	2.03		Beta cellulose	2.35
	Methoxy	5.55		Gamma cellulose	21.17
	Pentosan	13.96			

\*Results in percentage of oven-dry (105°C) samples (Lee 1986:104-105).

TABLE 5

Comparison of Shrinkage Values of Mesquite and Selected Hardwoods (Dried to 0% Moisture Content)\*

Species	Radial Shrinkage (%)	Tangential Shrinkage (%)	Volumetric Shrinkage (%)
Mesquite	2.2	2.6	4.7
White Oak	5.3	9.0	15.8
Pecan	4.9	8.9	13.6

\*Taken from Lee (1986:110).

TABLE 6

Select Properties of Several Hardwood Species\*

Species	Percent Radial	Shrinkage		Hardness		Cleavage Psi	Specific Gravity
		Tangential	Volumetric	End Pounds	Side Pounds		
Beech	5.1	11.0	16.3	970	850	410	.64
Sugar	4.9	9.5	14.9	1,850	1,450	-	.56
Maple	-	-	-	-	-	-	-
Hornbeam	6.6	9.3	15.8	520	410	230	.37
Sycamore	5.1	7.6	14.2	920	770	400	.46
Basswood	6.6	9.3	15.8	520	410	230	.32
Ebony	-	-	-	1,350	1,780	-	.62
Mesquite	2.2	2.6	4.7	2,242	2,336	259	.70

Oven-dry weight and green-volume basis (Lee 1986:110).

-Information not available.

TABLE 7

Strength Properties of Mesquite\*

		65	10%	Units
	Fiber stress at proportional limit	6214	8765	psi
Static bending	Modulus of rupture	11700	15954	psi
	Modulus of elasticity	1141419	1380954	psi
Compression parallel to grain	Maximum crushing strength	6266	8216	psi
Compression perpendicular to grain	Fiber stress at proportional limit	2799	3356	psi
Sheer parallel to grain	Maximum shearing strength	1387	2618	psi
Tension perpendicular to grain	Maximum tensile stress	-	703	psi
Cleavage	Maximum cleavage stress	146	259	lbs./in
End hardness	Load required to embed a 0.444 inch ball to ½ its diameter	2242	2336	lbs.
Side hardness	Load required to embed a 0.444 inch ball to ½ its diameter	2132	2354	lbs.

\*Taken from Lee (1986:111).

TABLE 8  
Comparative Strength Values of Mesquite

Wood	Actual Values for Green Mesquite	Published Values for Bitternut	Published Values for White Oak	Change per 1% change in R.C. Below F.S.P. (%)
Specific gravity	.701	.6	.6	-
Moisture content	65	66	68	-
Cleavage (psi)	146	-	-	-
Shear parallel (psi)	1387	1240	1250	3
Compression perpendicular (psi)	2799	990	830	5.5
Compression parallel (psi)	6266	4570	3560	6
Hardness	-	-	-	-
End (lbs.)	2242	-	-	4
Radial (lbs.)	2263	-	1060	2.5
Tangential	2000	-	1120	2.5
Static Bending				
MOR (psi)	11100	10300	8300	-
MOE	1141419	1400000	1250000	-

\*Taken from Lee (1986:111).

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**APPENDIX III: TOOL INVENTORIES OF THE SAN ANTONIO  
MISSIONS, 1755-1794**



The following appendix presents detailed listings by year of the carpentry tools present in each of the San Antonio missions. The reader is referred to "Mission Tool

Inventories and Descriptions" in the main text for further information. The tool inventories are presented in both Spanish and English versions.

### MISSION SAN ANTONIO DE VALERO

1762 (Leutenegger 1985:333):

*para los ejercicios de carpinteria hay los instrumentos necesarios de azuelas, formónes, escoplos, gurbias, sepillos, junteras, garlopas, cucharas, picos, martillos, sierras y plomas.*

for the carpentry work there are the necessary tools, such as adzes, paring or forming chisels, [mortising] chisels, gouges, planes, jointer planes, jack planes, trowels, [pick axes or sharp hammers], hammers, saws, and a plumb bob. (Translation by Leutenegger 1985:333).

1772 (Leutenegger 1977; while this office is not specified as a carpentry shop, its contents would seem to make it one):

#### **Oficina**

*Yt siete escoplos entre grandes y pequeños*

*Tres gurbias*

*Quarto azuelas*

*Dos zepillos compuestos y erramtas, para otros de varias clases*

*Quatro zierras grandes y dos pequeños*

*Un formón A forming chisel*

*Diez barrenas grandes y ocho pequeños*

*Quatro ciquenas o hierros de torno*

*Cinco plomados y algunos niveles d albañilería*

*Trece achas*

#### **Office**

Seven mortising chisels large and 3 small

Three gouges

Four adzes

Two repaired planes and implements of various kinds

Four large saws and two small ones

A forming chisel

Ten large augers and 8 small ones

Four iron cranks for a lathe

Five plumbs and some levels used in masonry

Thirteen axes

Lopez (1793; translation by Leutenegger n.d.a):

*Dos sierras de mano armadas, una maior que otra*

*Tres ojas de sierra bracara sin amazon y un rostrillo de fierro con una de palo*

*Una almineta*

*Un escoplo sin otro qe por ordn de dho [?] Sen Gov or se dan a los mismos Indios*

*Quatro hachas fuera de los qe por dho ord n se entregaron a los referidos Indios con 14 rejas y otros tantos azagones qe de orn superior se les entregaron*

Two hand saws assembled, one larger than the other  
Three blades of a frame saw without the frame and with an iron rake with a wooden [handle?]

One cabinet (bin)

Mortising chisel, and absent the chisel given to the same indians by orders of the Governor

Four axes besides those given to the Indians by higher orders with 14 plowshares and several others given to those same Indians by orders from above

### MISSION SAN JOSÉ Y SAN MIGUEL DE AGUAYO

1755 (Dolores y Biana 1755; translation by Leutenegger and Habig 1978:116).

#### **Carpinteria**

*Tres azuelas*

*Dos hachas*

*Cinco barrenas*

*Seis escoplos*

*Dos gurbias*

*Dos pies de cabra*

*Una juntera*

#### **Carpenter's shop**

Three adzes

Two axes

Five augers

Six chisels

Two gouges

Two crowbars

One jointer plane

<i>Dos zepillos</i>	Two planes
<i>Dos compázes</i>	Two compasses
<i>Dos sierras</i>	Two saws
<i>Unas tenazas</i>	Some tongs
<i>Un torno</i>	A lathe
<i>Tres gurbias de maior a menor</i>	Three gouges ranging from large to small
<i>Un escoplo chico</i>	A small chisel
<i>Un pie de cabra</i>	A crowbar
<i>Un hierra de molduras</i>	An iron for moulding
<i>Otro chico de escantillón</i>	A small gauge (rule)
<i>Un taladro</i>	A drill
<i>Dos azuelas</i>	Two adzes
<i>Una garlopa</i>	A jack plane
<i>Un zepillo</i>	A plane
<i>Dos sierras</i>	Two saws
<i>Una picadera</i>	One pick
<i>Un escoplo</i>	A chisel
<i>Un raiador</i>	A marker
<i>Quatro barrenas</i>	Four augers
<i>Un mollejon</i>	A grindstone
<i>Dos formónes</i>	Two paring (or forming chisels)

1785 (Salas 1785; translation by Leutenegger and Habig 1978 with revisions by V. Kay Hindes)

<b><i>Carpinteria</i></b>	<b>Carpenter's Shop</b>
<i>Quatro barrenas de distintos</i>	Four augers of different sizes
<i>Tamaños us mayo de fierro</i>	A large iron mallet
<i>Dos azuelas</i>	Two adzes
<i>Quatro escoplos</i>	Four chisels
<i>Una gurvía</i>	One gouge
<i>Tres ojas de sierra grande</i>	Three blades for a large saw
<i>Dos sihuenas una de molejon otra de torno</i>	Two cranks one for the grindstone the other for a lathe
<i>Dos claveras</i>	Two nail moulds
<i>Un mayo (complete)</i>	A mallet [same one as in the blacksmith shop]
<i>Dos botijas casi llenas de clavazón</i>	Two jugs almost full of nails
<i>Dies y seis escuadras de fierro para puertas</i>	Sixteen angle-irons for doors
	Five lathes with their cranks and wheels (Simmons and Turley 1980:78)

1794 (Muñoz and Pedrajo 1794; translation by Leutenegger and Habig 1983)

<b><i>Carpinteria</i></b>	<b>Carpenter's Shop</b>
<i>Siete achas</i>	Seven axes
<i>Un escoplo</i>	A chisel
<i>Dos barras con peso a de veinte y quatro y media livras</i>	Two crowbars weighing twenty-four and half pounds
<i>Quatro sierras brazeras, la una armada</i>	Four frame pit saws, one of which is assembled
<i>Una dicha de mano</i>	One hand saw [a pit saw without a frame]
<i>Un aserrucho Yngles</i>	One English saw
<i>Dies y ocho hoses</i>	Eighteen adzes [or sickles?]
<i>Una juntera con su fierro</i>	One jointer plane with its iron [blade]
<i>Una garlopa con su fierro</i>	One jack plane with its iron [blade]
<i>Tres gurbias los dos grandes y una mediana</i>	Three gouges, two large ones and one medium sized
<i>Una barrena grande francesa</i>	One large French auger

## MISSION NUESTRA SEÑORA DE LA PURÍSIMA CONCEPCIÓN

1762 (Leutenegger 1985:336):

*Tiene una Mission para calzar las herramientas, una fragua con todos los instrumentos de yungue tenaya martillos como tambien martillos escoplos, plomadas, cucharas, sierras garlopas, sepillos y demas menesteres para albaniles y carpinteras.*

There is a room for storing tools, a blacksmith shop with all the anvil tools, pincers, hammers, etc.; also hammers also chisels, plumbobs, shovels (trowels), saws, jack planes, brushes and other needed items for the masons and carpenters.

1772 (Gumiel 1772a; translation by Leutenegger n.d.b with revisions by V. Kay Hindes)

**Carpintera**

*Tres azuelas  
Dos sierras brazeras  
Tres barrenas medianas  
Quatro dichas de barrote  
Dos sierras maneras  
Un zerrucho  
Una caja de garlopa con hierro  
Una caja de cepillo con su hierro  
Una juntera con su hierro  
Un formón  
Un escoplo  
Dos gurbias  
Dos compázes  
Un cartabón  
Una caja de bozel con su hierro  
Una caja de canalador con su hierro  
Una gurbia carretera  
Tres escoplos carreteros  
Un formón grande  
Dos gierros de juntera  
Seis azes  
Dos nibeles  
Dos garlopas y quatro escoplos  
Dos cepillos (zepillos)*

**Carpenter's Shop**

Three adzes  
Two frame pit saws  
Three medium augers  
Four iron bars  
Two hand saws  
One wood saw  
One jack plane with its iron blade  
One plane stock with its iron blade  
One jointer plane with its iron blade  
One chisel (paring) or forming chisel  
One chisel  
Two gouges  
Two compasses  
One square rule  
One molding plane with its iron blade  
One grooving plane with its iron blade  
One cart gouge  
Three smaller cart chisels  
One large forming chisel  
Two iron blades for a jointer  
Six sickles?  
Two levels  
Two jack planes and four mortising chisels  
Two planes

1794 (Muñoz 1794a; translation by Leutenegger n.d.c with revisions by V. Kay Hindes)

*Tres azadones  
Dos azuelas  
Nueve achas  
Un compas de tres gurbias de largo  
Dos sepillos (zepillos)  
Un guillemo  
Una garlopa  
Dos sierras brazeras  
Una de mano  
Una barreno mediana  
Dos escoplos carreteros  
Uno chico  
Un telas con cinco malacates, siete sigüeñas, onse peines, y tres para de lisos  
Un mollejon de a vara con su correspondiente sigüeña*

Three hoes  
Two adzes  
Nine axes  
A compass three gouges long  
Two planes  
One rabbet plane  
One jack plane  
Two frame pit saws  
One hand saw  
One medium size auger  
Two chisels for carts  
One small [chisel for carts]  
A lathe with five wheels, seven cranks, eleven combs (or cards)? three for smoothing?  
A grinding stone 33 1/3 inches in diameter, with its corresponding crank

## MISSION SAN JUAN CAPISTRANO

1762 (Leutenegger 1985:338):

*Para los carpinteros, alvaniles tiene los instrumentos al officio necesarios.*

For the carpenters and masons there are the tools needed for their duties.

1772 (Gumiel 1772b; translation by Leutenegger n.d.(d) with revisions by V. Kay Hindes)

**Carpinteria**

*Dos escoplos grandes carreteros, con una gurbia para lo mismo*

*Una alminetan*

*Tres azuelas*

*Dos sierras armadas de mano*

*Dos sierras brazeras armadas*

*Otra sin armor*

*Una ojita de sierra de mano*

*Una garlopa en corriente*

*Dos cepillos*

*Una juntera*

*Un barrena carretero*

*Otro barreno grande*

*Tres graniles*

*Un compas mediano y otro pequeño*

*Dos niveles*

*Un cartabón con codales*

*Otro cartabón con codales*

*Dos esquadras de madera*

*Diez escoplos mas de carpinteria de todos tamaños*

*Cinco gurbias nuevos, tres mas grandes y usadas*

*Seis formónes nuevos de todos tamaños*

*Doce barrenos de todos tamaños*

*Un barreno grande*

*Catorce hachas*

**Carpenter's Shop**

Two large mortising chisels for making carts with one gouge for the same purpose

One bin

Three adzes

Two assembled hand saws

Two assembled frame pit saws

Another saw without the frame

One blade for a hand saw

A jack plane that is in use

Two planes

One jointer plane

One cart auger

Another large auger

Three jointer's marking gouges

A medium compass and small one

Two levels

One rule with overplates (carpenter's square)

Another rule with overplates

Two flat L-shaped mending braces of wood

Ten more carpenter's chisels of all sizes

Five new gouges, three more large used ones

Six new paring or forming chisels of different sizes

Twelve augers of different sizes

One large auger

Fourteen axes

1794 (Muñoz 1794b; translation by Leutenegger n.d.e with revisions by V. Kay Hindes)

*Ytem seis azadones en cavadas*

*Ytem dos achas*

*Ytem tres barrenas los dos grandes y una pequena*

*Ytem una sierra brazera de armada*

*Ytem una dicha de mano armada*

*Ytem un aserrucho Yngles*

*Ytem una almineta*

*Ytem un talon con hi? escoplo*

*Ytem un escoplo carretero*

*Ytem un martillo pequeño*

*Ytem una cigüeña de torno de olna s?? Con las dos malacates*

Item six pick axes

Item two axes

Item three augers, two large and one small

Item one bare assembled? frame saw (frame pit saw)

Item one hand saw assembled

Item one English saw

Item one bin

Item one talon? with its chisel

Item a cart chisel

Item a small hammer

Item one lathe crank and two wheels

## MISSION SAN FRANCISCO DE LA ESPADA

1762 (Leutenegger 1985:338, 340):

*Para los carpinteros, alvaniles tiene los instrumentos as officio necesarios.*

For the carpenter shop and for masonry work all needed tools are had.

1772 (Gumiel 1772c; translated by Leutenegger n.d.f with revisions by V. Kay Hindes):

**Convento Oficina***Canoa**Un escoplo carretero**Quatro dhos pequeños**Dos gurbias carreteros**Quatro dhos medianas**Cinco formónes**Tres barrenas medianas**Tres dhos pequeños**Dos fierros de zepillo**Uno dho de juntera**Dos junteras armadas**Tres fierros armadas para molduras**Tres azuelas con martillo**Dos dichas sin martillo**Ocho dozenas de chapetuelas de cobre para clavazon**de puertas**Un cuchillo de cana grande**Quatro dos medianos**Dos espumaderos**Un martillo**Una acha mas**Una sierra manual**Treinta y ocho malacates**Tres cequitelas para tornos*

*En un caja con divisiones hoy como quatro arrobas de clavazon de todos tamaños*

*Quince nuditos a goznes para ventanas***Carpinteria***Primera te una sierra brazera**Tres sierras manuales**Quatro hachas viscainas, las tres grandes y la otra pequena**Dos azuelas**Tres gurbias**Un martillo**Unas tenazas**Un compáz**Un formón**Quatro escoplos**Una barrena grande**Un zepillo**Un fierro de moldura armado**Una alezna de tres filis**Una garlopa**Dos mollejones***Monastery Office**

Cabinet

A chisel for carts

Four more small ones

Two cart gouges

Four more medium sized

Five forming chisels

Five medium-sized augers

Three more small ones

Two irons for planing

One more jointer plane

Two assembled jointer planes

Three mounted iron sets for molding

Three adzes with a hammer [flathead opposite the blade]

Two more minus the hammer

Eight dozen copper nails for doors

A large bush? knife (a machete?)

Four medium ones

Two pitch skimmers?

A hammer

One more axe

One hand saw

Thirty-eight wheels

Three blades for lathes

In a box that has compartments there are about four arrobas [an arroba equals ca. 25 lbs.] of nails of all sizes

Fifteen small hinges for windows

**Carpenter's Shop**

First of all, a frame pit saw

Three hand saws

Four axes from Vizcaine, three large and one small

Two adzes

Three gouges

A hammer

One pair of tongs

One compass

A forming chisel

Four mortising chisels

One large auger

A plane

An assembled iron tool for molding

One three-edged (sided?) awl

One jack plane

Two grindstones