15

HAYDEN FLOUR MILL:
Landscape, Economy, and Community Diversity in Tempe, Arizona

VOLUME 1: Introduction, Historical Research, and Historic Architecture

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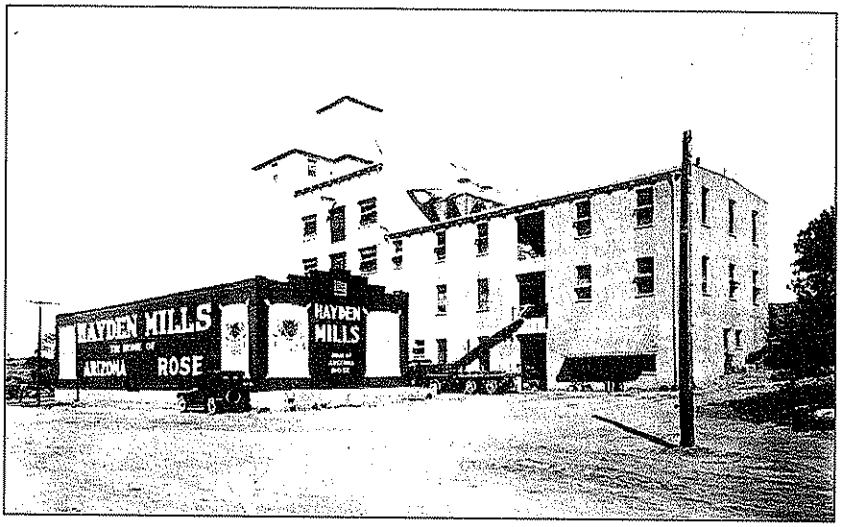

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CHAPTER 3: THE STORY OF CHARLES TRUMBULL HAYDEN AND HIS FAMILY

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This chapter presents an account of one of Arizona's premier pioneering families. Due primarily to the tireless work ethic, civic consciousness, and visionary qualities of its patriarch, Charles Trumbull Hayden, the Hayden family is inextricably linked with the early settlement and growth of Tempe, Arizona. Charles T. Hayden was among the first to recognize the agricultural potential of the lands surrounding Tempe Butte. He went on to prosper from and greatly contribute to the development of Tempe as a productive agricultural and commercial town; his wife, Sallie Hayden, and their children were equally committed as activists in the public arena. All of this good work took place in the context of the family's main business concern—the famous Hayden Flour Mill. Constructed in the early 1870s, it served as a major employer and landmark throughout the mid- and late-twentieth century, and was intrinsically connected to the life and other business interests of the Hayden Family.

A Connecticut Yankee: 1825–1848

Charles Trumbull Hayden was born April 4, 1825 at Windsor, Hartford County, Connecticut (Hayden 1972:1; Hayden 1898); his family had resided on the same piece of land since the seventeenth century. When Charles was six ›ars old his father, Joseph, died. It is unclear whether he drowned or succumbed to a fever (Fireman 1969:195). His mother, Mary, raised Charles alone from that point onward.

Hayden received a good education and at the age of 19 became a teacher in Caldwell, New Jersey. Afterwards, he studied law in New York City, but had to cut his education short due to illness. He went to Old Fort Comfort in Virginia to rest and receive treatment for "lung fever" (Hayden 1972:2). Once he recovered, Hayden made his way west, and resumed teaching, beginning in Kentucky then afterwards, in New Albany, Indiana, and finally, in St. Louis, Missouri (Hayden 1898) (Figure 3.1).

After finishing his teaching stint in St. Louis, Hayden left the teaching profession and moved to Wayne City, Missouri, where he went to work for William G. Moore as a clerk in his store (Fireman 1969:195). Missouri was in the height of its boom years due to its advantageous position between the East and the opening West. Steamers and wagon trains provided the transportation to move goods from the East to Missouri and then wagon trains moved the goods to the West to supply the ever-growing demand for goods on the frontier. It was during this time that Hayden went to ⁿdependence, Missouri, and went to work for his cousin /ho had a freighting business buying and transporting goods from the East that were needed out West (*Arizona Quarterly Illustrated* 1881; Hayden 1972:2).

Merchant and Freighter to the West: 1848–1873

Having gained independence from Spanish control in 1821, Mexico sought to attract enterprise and trade from its neighbors to the east; over the next two decades, the Santa Fe Trail developed from the steady flow of traffic from merchants, traders, and freighters between trading centers bordering the Missouri River and the previously isolated settlement of Santa Fe. After 1832, Independence was the eastern terminus of the extensive commercial route and Hayden saw first hand the wealth that could be earned by freighting supplies and small luxuries to New Mexico. Initially hired as an employee in his cousin's store, Hayden quickly progressed to partner status, and finally, in his mid-twenties, bought his cousin's freighting business and store (Hayden 1972:2). In 1848, before his first freighting trip to Santa Fe, Hayden wrote to his mother out East and included a list of goods that he asked her to purchase and ship to him in Independence for sale in Santa Fe (Fireman 1969:196; Hayden 1848). He was 23 years old at this time, and this event marked the beginning of his freighting and mercantile endeavors, which would continue up until his death in 1900.

Capitalizing on Both Ends of the Santa Fe Trail: Independence, Missouri and Santa Fe, New Mexico (1848–1858)

Hayden left Independence for Santa Fe on July 3, 1848 and would not return until the following fall (Hayden 1898). He kept a journal of his first journey to Santa Fe, but according to his son, Carl Hayden, the beginning entries of that log were lost (Hayden 1972:3). Hayden returned to Santa Fe in 1849 with a larger train of oxen-pulled wagons full of goods to open a mercantile store. He stayed in Santa Fe for 10 years, running the freighting business and periodically traveling East for additional goods. Hayden's partner, Matthew Jones Flournoy, managed the business in Independence and also traveled to the East Coast to obtain new supplies when needed.

Hayden also made annual trips to Chihuahua City, Mexico from Santa Fe, traveling down the Rio Grande to the Mesilla Valley and onward through El Paso to Chihuahua. He endeavored to learn the Spanish language, which enabled him to conduct business throughout Mexico and the Territory of New Mexico. He became a well-known figure in Chihuahua, even becoming acquainted with Governor Trais and later, Governor Cordero (Hayden 1972:5).

In 1856, two years after the ratification of the Gadsden Purchase, Hayden hauled a load of merchandise to Tubac, Arizona, following the 1848 Mormon Battalion Route via Guadalupe Pass to the San Pedro Valley and down Sonoita Creek (Hayden 1972:6). Increased mining activities and an American military presence were both within a few miles of Tubac, making it a strategic location for selling supplies both

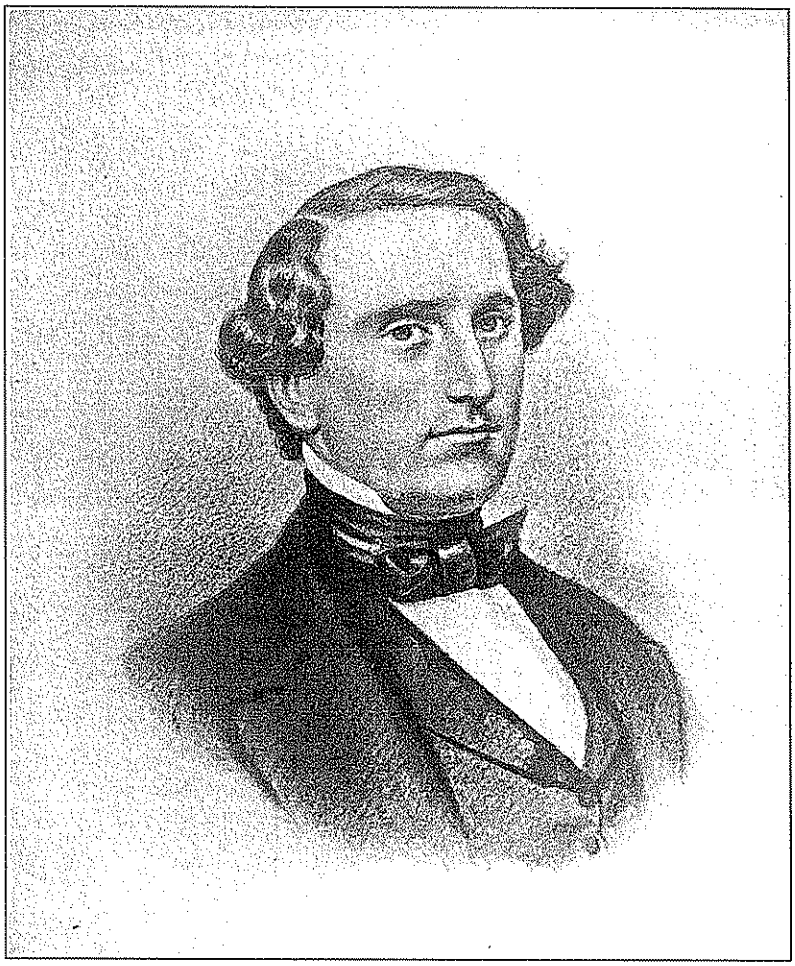


Figure 3.1. Portrait of Charles T. Hayden at age 21.
Courtesy of Sallie D. Hayden (Arizona and Southwestern Biographical File, University of Arizona Special Collections).

to the miners and to the Fort Buchanan military post. To take advantage of the new market opportunity, Hayden opened a store about 10 miles south of Tubac. The close proximity of the Mexican border also allowed Hayden access to a customer base in northern Sonora. In Tubac, he formed a partnership with Palatine Robinson, a reputed Secessionist (Fireman 1969:198; *Weekly Arizonian* 1859a).

Hayden Establishes a Store in Tucson, Arizona (1858–1873)

Hayden soon became aware of plans for a new stage route from Mesilla to California that would bypass Tubac, instead extending through Tucson. He moved his sights north, adding his merchandise to Robinson's store in Tucson, which had been open since 1857 (Hayden 1972:7; Santa Rita Silver Mining Company 2nd Annual Report 1860; Santa Rita Silver Mining Company 3rd Annual Report 861). It would appear however, that Hayden dissolved his association with Robinson by 1859 (*Weekly Arizonian* 1859c). Between 1858 and 1873 records indicate that Hayden made various trips between Tucson, Santa Fe, and to Independence to fill contracts with a variety of frontier clients—including the Santa Rita Silver Mining Company and the Sonora Exploring and Mining Company. Hayden's freighting company expanded, with wagon teams stocking goods in Independence; Port Lavaca, Texas; and Fort Smith, Arkansas. He also made purchases in San Francisco, which were brought by boat to Los Angeles, San Diego, Guaymas, and Port Isabel, thence by wagon to Tucson (*Arizona Citizen* 1872a) (Figure 3.2).

Hayden decided to close his Independence store in 1860 when rumors of Civil War became rampant. He returned to Santa Fe with 14 freight wagons filled with the Independence store goods, a portion of which were also taken to his store in Tucson (Hayden 1972:9; Hayden 1957: 1). During the Civil War, Hayden's freighting activities led some Union military personnel to question his allegiance; consequently, he restricted his wagon teams to hauling freight for the North (Fireman 1969:198). The Civil War's influence was also felt west of Texas in the New Mexico Territory, including the communities of Tubac and Tucson.

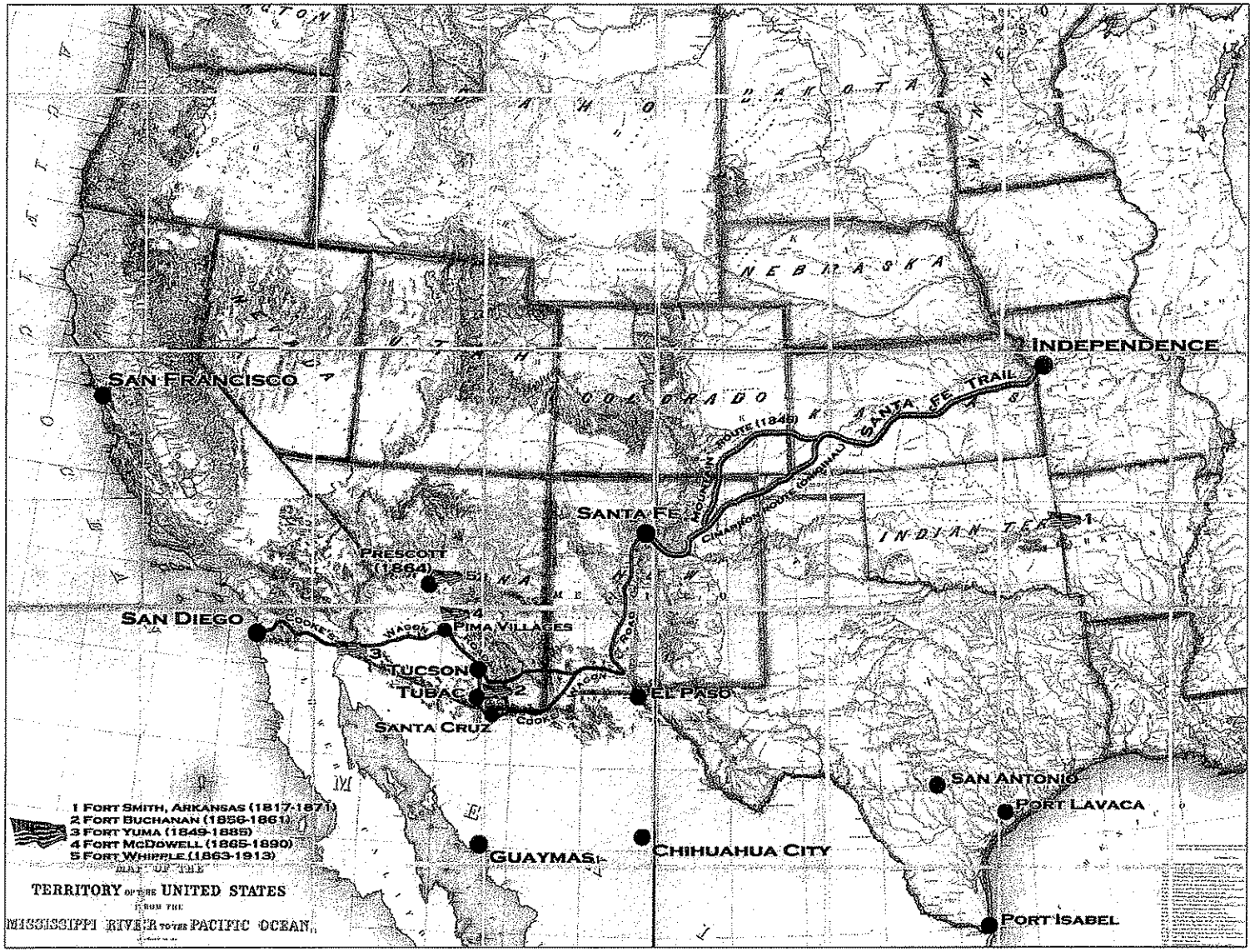


Figure 3.2. Portion of an 1858 United States Territory Map showing principal US travel routes, forts, and settlements frequented by Charles T. Hayden and his freighting enterprise (Freyhold 1858).

Hayden and other merchants left Tucson in 1862 after occupation by Confederate troops. In the summer of 1862, Colonel (Col.) James H. Carleton arrived with the column from California and drove the Confederate forces back into Texas (Fireman 1969:198). Hayden returned only after Federal control had been established in Tucson (Fireman 1969:198). (Arizona was designated a separate territory in February 1863.)

As matters settled on the frontier, Hayden resumed his business expansion. With the discovery of the Vulture Mine by Henry Wickenburg, yet another new market opened for Hayden. In 1863, he established a store in Vulture City, a small settlement adjacent to the Vulture Quartz Mill; he later sold the store to Judge John A. Rush in 1870 (*Weekly Weekly Arizona Miner* 1870e).

Within a year of his return to Tucson, Territorial Governor John Nobel Goodwin appointed Charles Hayden as the first Probate Judge of the First Judicial District, which spanned the southern portion of the new territory (Hayden 1972:9–10). Hayden assumed his responsibilities on May 13, 1864 with an annual salary of $250.00 (Hayden 1972:10; Pima County Book of Records 1865) and thereafter was affectionately known by locals as Judge Hayden (even well after he had relinquished his appointed duties). In the course of his one-year tenure as Probate Judge, Hayden helped set the tax rate for the Judicial District, served on the Board of Commissioners for Pima County, served on the planning board for the new court and jail buildings, and occupied the bench to rule on civil and criminal cases (Pima County Book of Records 1865). However, because of the cultural dynamics of Tucson's population in the 1860s, he presided over only one case. The overwhelming majority of residents in Tucson (approximately 500 individuals) were Mexican, for whom it was common practice to settle disagreements or disputes outside of the public sphere (Hayden 1972:11). Nevertheless, Hayden's service as Probate Judge marked the beginning of what would be a life-long involvement in the public service sphere.

On June 3, 1864, Hayden apparently filed suit against William S. Grant, a U.S. Army buying agent, in the First Judicial District court in Tucson, for failure to pay off a line of credit for goods purchased on behalf of the U.S. Army (Hayhurst ca. 1940–1950). Hayden was suing to attach and foreclose upon the Tucson Grist Mill that was supposedly owned by Grant to cover the unpaid debt. However, the mill no longer belonged to Grant, nor was Grant's mill still standing. The Army burned it to the ground when they withdrew during the Civil War in 1861. Grant abandoned the property and it was later taken up by Gerald M. Jones and J. Riordan, who rebuilt and reoutfitted the mill. The property again changed hands in 1864, when it was sold to John W. Swilling and James Lee, who owned the mill at the time Hayden filed his suit. They submitted an amended complaint arguing that the new mill that they possessed should not be used to settle an old debt of Grant's; the same mill did not even stand on the property. The article in which this information was derived states, "[h]ere our record ends without making clear whether Swilling and Lee retained title to the Tucson Grist Mill, or whether Charles T. Hayden was reimbursed for the debt contracted by Grant" (Hayhurst ca. 1940–1950). Given that no other records recovered during the research for this project mention anything about Hayden owning a mill in Tucson, it seems that Swilling and Lee must have won the case. Ironically, Swilling and Hayden would later be in partnership with others in the building of the Tempe Canal.

Hayden's freighting business continued to grow at a good clip in the late 1860s and early 1870s, and he was able to expand his customer base and government contracts. In 1866 the army moved its Arizona Department headquarters from Tucson to Whipple Barracks, near Prescott (Smith 1990). Hayden began to make regular trips from Tucson carrying grains and supplies north, and returning with lumber. On a notable freighting job, Hayden was contracted in 1867 by Governor Richard C. McCormick to haul the government furnishings and records from Prescott to Tucson when the territorial seat of government was moved south (*Weekly Arizona Miner* 1867; Hayden 1972:13–14). He also expanded his freighting territory, which now included Fort Yuma and the mining areas in northern Arizona, often using the Wickenburg route on his trips north (*New Mexican* 1867) and transporting lumber south to the Salt River and Gila area on his return trips (Hayden 1972:14). In the course of a decade between 1860 and 1870, Hayden's property value increased dramatically from approximately $10,000 to $25,000, with an additional $20,000 in real estate (Arizona Territorial Census 1864; U.S. Decennial Census 1870).

Expanding business interests abroad required additional help in operating Hayden's extensive business interests. In the early 1860s he made his nephew, Charles Hayden Allen, partner in the Tucson store; tragically, young Charles Allen died on December 14, 1865 (Hayden 1972:11). Matthew Jones Flournoy, former store manager in Independence, became Hayden's new Tucson store partner. However, he would die soon afterward as well; he was found dead on June 26, 1869 after a drinking binge some days before (*Weekly Arizonian* 1869). Flournoy's son, Newton G. Flournoy, replaced his father as Hayden's partner, but was forced to return to Missouri after falling ill; the young man passed away on August 12, 1873 at the age of 23 years (*Arizona Citizen* 1871; Fireman 1969:199). In August 1873, Hayden began selling off his merchandise and property in Tucson. His plans for business on the Salt River, and the tragic passing of Newton Flournoy precipitated the decision (*Arizona Citizen* 1873b);

by December 1873 Hayden had departed Tucson to set up his merchandise store and headquarters along the south side of the Salt River (*Arizona Citizen* 1873a; Hayden 1972:18).

Merchant and Farmer in the Salt River Valley: 1868–1881

Charles T. Hayden's first crossed through the Salt River Valley sometime between 1866 and November 1867 on a business venture to Fort Whipple via the Hassayampa River and Wickenburg River (*Weekly Arizona Miner* 1867). He had been informed by Florence residents that the most efficient river crossing en route to Prescott was on the Salt River "at a large and small butte near the south bank of the river, opposite some rocky hills on the north side" (Hayden 1972:32). This crossing was conveniently located approximately three miles east of the Wickenburg to Fort McDowell Road, as plotted on the 1868 General Land Office (GLO) cadastral survey plat for Township 1N, Range 4E. As popular legend states, it was on such a trip to Wickenburg, Prescott, and Fort Whipple, that a severe storm and subsequent flooding of the Salt River forced Hayden to wait several days on the south bank near what is now known as Tempe Butte. The delay gave him an opportunity to examine the surrounding land, where he envisioned a thriving agricultural community. He concluded that a grist mill built at the base of the butte would be an ideal location to provide for an agricultural community that could thrive on the surrounding fertile lands (Hayden 1972:33; Smith 1990:23–24). By the end of 1870, Hayden had made clear his intentions to purchase land in the vicinity of Tempe Butte.

It is currently unclear if this popular account regarding the founding of Tempe is truth or legend. Secondary references have documented various dates for Hayden's momentous trip through the Salt River Valley. Farish (1915) states Hayden first appeared in the Tempe area around 1870; Benton (1996a) and Lewis (1963) suggest a date around 1868. It has been documented that Hayden arrived in Prescott with cattle purchased from Sonora as early as 1867 (*Weekly Arizona Miner* 1867); given the complexities of driving cattle such a long distance, Hayden must have been familiar with a wagon route between Tucson and Prescott prior to 1867.

Hayden must also have been familiar with the success of the Swilling Irrigation and Canal Company and farmers on the north side of the Salt River in 1868—especially in view of the fact that the Swilling Ditch was located along the Wickenburg-Fort McDowell Road (Smith 1990: 21, 24; Zarbin 1997). Jack Swilling—an Arizona pioneer, entrepreneur, and prospector—was also no stranger to Charles Hayden before the court case in Tucson. In 1861, Swilling helped Hayden and his team during an Indian attack on one of his trains (Arizona Pioneers Historical Society 1894). Hayden's freighting contacts in Wickenburg, Prescott, and Fort Whipple must have ensured regular contact with Swilling, who eventually settled down as Phoenix's first citizen, postmaster, and justice of the peace. Swilling later returned to prospecting in the Bradshaw Mountains south of Prescott. He was falsely convicted of holding up a stage coach in 1878 and tragically passed away in a Yuma jail (Smith 1990:21).

It is likely that Hayden's intent to settle along the butte south of the Salt River was influenced by the growing settlement around the Swilling Ditch that would soon be incorporated as Phoenix. By the end of July 1868, corn and other vegetables were growing well on lands fed by the Swilling Ditch (*Weekly Arizona Miner* 1868b). Given the early success of crops in the Salt River Valley, just a few miles from the butte, it is understandable that Hayden's entrepreneurial mind began entertaining the possibility of a grist mill.

The Development of Hayden's Ferry

A letter, signed on November 17, 1870, by Hayden, A.W. Fields, Robt. Savery, E.R. Brown, and Wm. Garrett, announced that Judge Hayden and his associates, constituting the Hayden Milling and Farming Company, were "claiming 10,000 inches of the waters of Salt River, and giving notice that the Company has commenced the work of constructing the ditch, etc." Jack Swilling delivered the letter to the Prescott *Weekly Arizona Miner* who published it first on November 26, 1870 and again on December 31, 1870 (cited in Hayden 1972:34; *Weekly Weekly Arizona Miner* 1870b, 1870d:2). The announcement went on to state that Hayden had promised to have his new flour mill up and running before wheat ripened, as well as a steam thresher.

However, he abandoned his initial water claim and partnered with Swilling and others in the formation of the Tempe Canal Company, which had been formed by the amalgamation of the Kirkland-McKinney Ditch and the Hardy Irrigation Canal Company (Andersen 1989a:7). The first half mile of the Tempe Canal was completed in the spring of 1871 (Neeley and Kwiatkowski 1999:180). By 1873, the canal had been extended to incorporate the Kirkland-McKinney Ditch and became a lateral of the Tempe Canal; an extension of this lateral to the mill site on the west side of the butte was finished before completion of the mill in 1874 (Andersen 1989a:3–7). The Hayden Ditch was the source of motive power for the flour mill until 1923 when the Tempe Canal Company was acquired by the Salt River Valley Water Users' Association (SRVWUA) as part of the Salt River Project (SRP) and the mill converted to electrical power (Andersen 1989a:40–41).

Hayden's original homestead claim was also abandoned as he relocated along the west slope of Tempe Butte to build his flour mill and store. Construction of the mill's foundations began soon after, with timber regularly freighted by Hayden from Prescott (*Weekly Arizona Miner* 1871). With construction nearing completion, Hayden traveled to San Francisco, and brought back supplies, machinery, and, most importantly, John Sievers, a German miller, to oversee the installation of the milling equipment and mill operations (*Arizona Citizen* 1872b; Hayden 1972:40).

Ever the entrepreneur, Hayden installed a ferry while the mill was under construction by stretching a cable across the Salt River from near the western base of the butte. He had the ferry built of heavy lumber sufficiently sturdy to transport a wagon and team of horses across the river. The ferry was needed during times of high water when the river was not crossable by other means and provided yet another line of income for Hayden (*Arizona Citizen* 1874b; Hayden 1972:36–37).

Hayden's first adobe house was initially used as a store (*Weekly Arizona Miner* 1872; Hayden 1972:38) (Figure 3.3). Located west of the mill, Hayden's new home and store would experience a number of structural modifications and building additions over the next two decades to create a courtyard layout. After 1880, he added a block of four rooms of adobe construction to the north of the original structure to serve as his living quarters. Soon afterward, he attached another block of six adobe rooms on the end of the north addition that were aligned to the west. Finally, a high adobe wall connected the three wings into a courtyard (Fireman 1969:205). Water was conveyed to the compound with a ceramic pipe connected to the Hayden Ditch. A large adobe barn for storage of hay and grain was constructed west of the courtyard complex and a high adobe wall connecting the storage barn and courtyard formed an interior barnyard (Hayden 1972:38–39). A corral was also added to the west of the barn for cattle. The earliest *Sanborn-Perris Fire Insurance Map* on record for this area dates to 1890 and shows the layout of Hayden's store, warehouses, mill, and other features of his property (Figure 3.4).

After 1888, Hayden began to take on boarders and his home soon became a hotel (*Phoenix Herald* 1888d). On May 8, 1894, the *Phoenix Herald* (1894c) reported that "Hayden...is putting a brick second story on his city residence property...". Currently, Hayden's adobe house is situated on the west side of Mill Avenue and known as Monti's La Casa Vieja. The property is currently listed on the National Register, as well as the Arizona and Tempe Historic Property Registers.

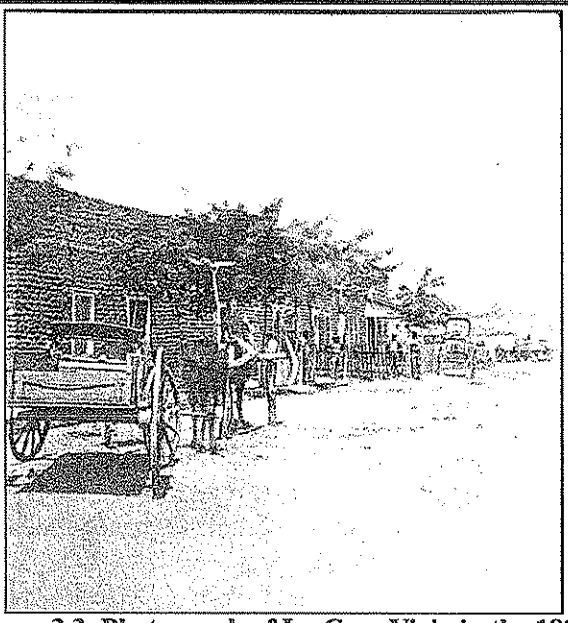


Figure 3.3. Photograph of La Casa Vieja in the 1880s. Photograph courtesy of Arizona Historical Foundation, Leonard Monti Senior Family Photograph Collection, MONTI-103.

Entrepreneur, Merchant, and Miller on the Salt River

Before commencement of mill operations in 1874, Hayden established trading posts at Sacaton and Casa Blanca on the Gila River Indian Reservation to exchange goods for reliable stores of wheat. He also acquired wheat from local farmers who had begun harvesting crops under the Tempe Canal, as well as Akimel O'odham settled on the north side of the Salt River opposite Tempe. He continued his freighting business, as evidenced by articles appearing in the *Weekly Arizona Miner* during these years (e.g., *Weekly Weekly Arizona Miner* 1873c). Chapter 9 details Hayden's business interests, especially that of the Hayden Flour Mill, through the years. Therefore, discussions about Hayden's business life in this chapter are provided at a more general level to provide a background to the other aspects of his life.

After opening the flour mill, Hayden was soon delivering flour to Camp Lowell, in addition to the Pima and Globe miners, and the towns of Florence, Prescott, Mohave County, Wickenburg, and Ehrenberg (*Weekly Arizona Miner* 1877d). New establishments were opened for business in Gillette and Tip Top (*Weekly Arizona Miner* 1878a; *Enterprise* 1878a). The flour produced at Hayden's Tempe mill was feted as a top-quality product throughout the west (*Territorial Expositor* 1879a). The success of the flour mill encouraged rapid expansion of equipment, as well as the structure itself (Weekly Arizona Miner 1877a; Phoenix Herald 1881b). Production was doubled in 1880 to keep up with demand (*Arizona Citizen* 1880).

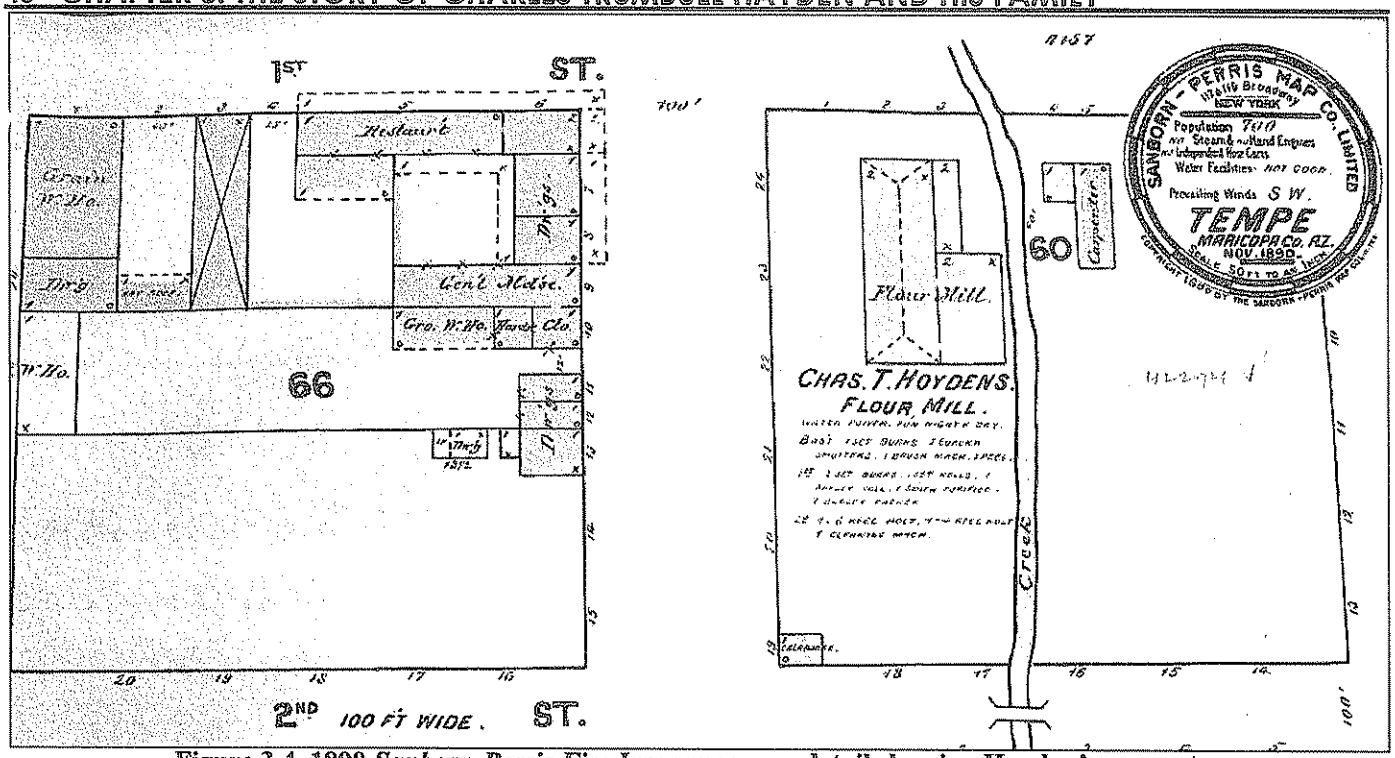


Figure 3.4. 1890 *Sanborn-Perris Fire Insurance* map detail showing Hayden's property.

Southern markets in the Arizona Territory after 1880 were serviced primarily by the railroad; however, wagons were still necessary in the northern portions of the territory. Hayden found Prescott to be a ready market for a variety of goods, including pork products and flour from his new mill; he made substantial profits importing wheat into the Prescott area, which he was not able to do profitably when based in Tucson (*Arizona Citizen* 1870). Newspaper reports from this time period indicate the frequent arrival of Hayden's wagons full of goods contracted by local businesses. With the completion of the Santa Fe, Prescott and Phoenix Railway in 1895, Hayden's freighting enterprise experienced a significant decline. Fortunately, his business acumen ensured that other aspects of his varied holdings flourished.

Husband, Family Man, and Public Figure: 1876–1900

Hayden's pioneering spirit and enterprising adventures took up most of his young adult life. At the age of 49 years, Hayden owned a successfully operating flour mill and mercantile business in the Salt River Valley at Hayden's Ferry; he must have finally decided to settle down. While on a trip to San Francisco in 1874, Hayden visited his friend, Doctor Alford, and met his future bride, Sally Calvert Davis who was then boarding with Dr. Alford and his family (Hayden 1972:52), (Figure 3.5). Two years after their initial meeting, on October 4, 1876, the couple were married in Nevada City and afterwards traveled to Hayden's Ferry (*Arizona Citizen* 1876; *Arizona Sentinel* 1876).

Together they had four children: Carl, Sallie, Mary, and Annie (Figure 3.6). Carl Trumbull, was named after his father, but with a German variant suggested by Hayden's German miller. Carl Hayden would later serve 56 years as a distinguished congressman, representing the young State of Arizona. Sallie was a long-time member of the teaching faculty at the Tempe Normal School. Mary (also known as Mapes), like her elder siblings, grew up in Tempe, graduated from the Tempe Normal School, and went on to receive her education at Stanford University. Of his parenting, Fireman speculated that perhaps "late parenthood gave him [a] great capacity for affection" (Fireman 1969:201). Sadly, the youngest daughter, Annie, died as a small child in 1885; Hayden gave the eulogy.

Enjoying their successes, the Hayden family hosted grand soirees, such as the 4th of July celebrations (*Weekly Arizona Miner* 1878b) and a widely attended Thanksgiving supper in 1878 (*Salt River Herald* 1878d). The Haydens also hosted lesser events such as employees' birthdays (*Arizona Gazette* 1882d), and even fiestas of the Akimel O'odham, held at the mill (*Arizona Gazette* 1882f). Hayden's inclusive attitudes meant that he was well loved not only by his family and friends, but also, by his employees (*Tempe News* 1883), who now comprised not only Mexicans and Americans, but also Germans, Englishmen, and even an Australian, Albert J. Peters (*Phoenix Herald* 1883), who later became his partner and manager of the mill (*Phoenix Herald* 1887c, 1888b). Hayden had become a great benefactor and appeared to be enjoying life as a family man (Figure 3.7). Trips away, earlier undertaken by Hayden on his own, were now also taken as a family (*Arizona Gazette* 1882e).

Figure 3.5. Portrait of Mrs. Sally Hayden age 32 years, shortly after the couple were married.
Photograph courtesy of University of Arizona Special Collections.

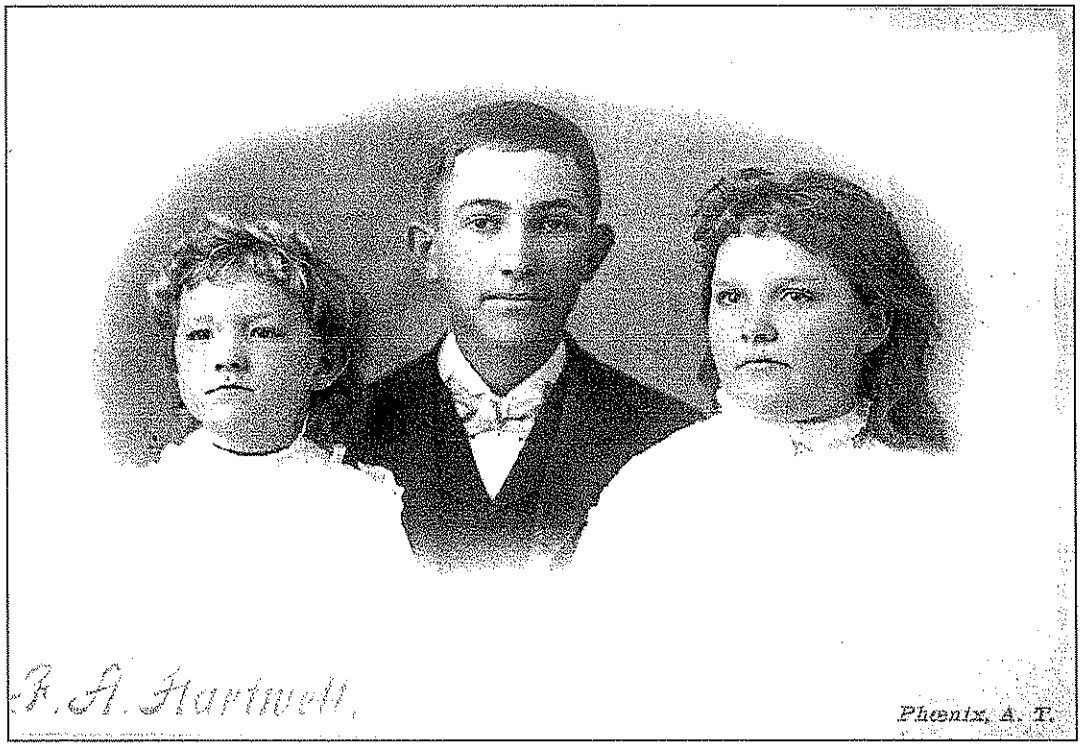


Figure 3.6. Portrait of the Hayden Children (ca. 1883–1884); Carl is in the center with Sallie on his left and Mary (Mapes) to his right.
Photograph courtesy of University of Arizona Special Collections.

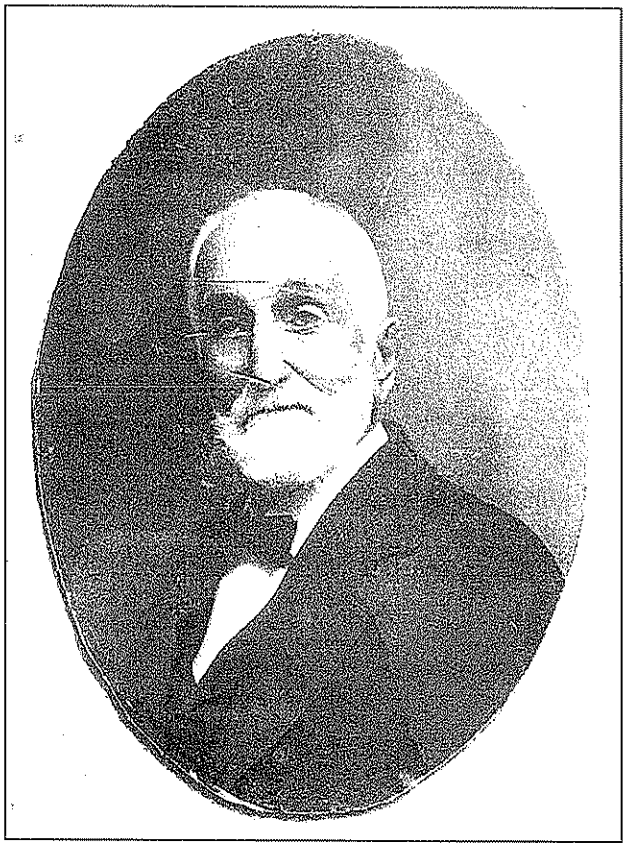


Figure 3.7. 1890s Portrait of Charles T. Hayden.
Photograph courtesy of Arizona Historical Foundation, Carl Hayden Photograph Collection, CH-8.

Confronting Personal and Economic Challenges: 1883–1900

The images of prosperity and happiness, however, masked another side of the Hayden business, which involved the problem of credit. As Chapter 9 illustrates, the decade of the 1880s was tumultuous for Charles Hayden and his business holdings. Hayden was an indefatigable traveler, particularly early in his career, and spent a considerable amount of time away from Tempe with his wagon trains. He was forced to hire people to ensure the successful operation of his business from day to day. While some of these people, like the Australian, Albert J. Peters, were honest and dependable, others, like Albright (*Arizona Star* 1898), turned out to be swindlers who embezzled considerable sums of money from the Hayden family. Only one of these embezzlers was ever prosecuted because Hayden generally refused to file charges. Hayden was benevolent to a fault, often advancing money to people that had little hope of ever repaying him. This attitude would lead to financial problems for the family and business (Fireman 1969:205–206).

On July 15, 1887, the bridge across the Salt River was completed, linking the M&P (now Southern Pacific) Railroad tracks already laid on both sides of the river (Fireman 1976:14). The ferry services provided by Hayden for the previous 16 years were now considered barely profitable (Hayden 1972:37). Haws and Fitch would operate the ferry sporadically at high water thereafter (Fireman 1976:17).

Through all his personal and financial troubles in the 1880s, Charles Hayden continued to be involved as a spokesman for public interest projects, including the construction of public roads and railroads (*Arizona Gazette* 1885b). Just days after the M&P Railroad Bridge collapsed under the onslaught of the legendary 1891 flood, Hayden petitioned county supervisors to construct a new iron bridge that would serve twofold as a wagon and railroad bridge (*Arizona Republican* 1891b). Unfortunately, while the railroad bridge was eventually reconstructed, the wagon road was not included (*Phoenix Herald* 1891).

By the middle of 1890, the Hayden family was back to entertaining guests in their new, spacious home two miles east of Tempe, on the corner of what would later be known as University Drive and McClintock Road (*Tempe News* 1890b) with a New Year's Eve party held at the residence (*Arizona Republican* 1890b).

In the 1890s, Hayden was able to improve his business holdings, including a stock investment in the Bank of

Tempe that would later merge with the National Bank of Tempe (*Arizona Daily Citizen* 1892). In 1892, he opened a butcher shop (*Arizona Gazette* 1892b); however, the butcher shop was short-lived, and closed in April 1894 (*Phoenix Herald* 1894b). Meanwhile shipments of flour, bran, and barley were taken as far as El Paso (*Phoenix Herald* 1894a), and his cattle business expanded to markets in Los Angeles (*Phoenix Herald* 1893c). By this time, however, an economic depression that would last between 1893 and 1897 was affecting the entire nation; Hayden's businesses were also affected. He was forced to apply for a loan for $10,500 at the end of 1894 to improve his businesses' cash position (Hayden 1894).

After years of intense business activity, Hayden's health worsened and his age caught up with him. Shortly after his 70th birthday in April 1895, he turned the management of his business holdings over to Joseph A. Ford (*Saturday Review* 1895). His failing health did not, however, stop him from serving the community in and around Tempe. In 1896 he formed the Hayden and Broadway Canal Company to provide water to lands beyond the flour mill's tail race (*Arizona Republican* 1896b). Two months later the Haydens hosted the graduating class of the Normal School, of which their son Carl was class president (*Arizona Republican* 1896a). Hayden traveled to various congressional sessions as a spokesman for Tempe and the Salt River Valley (see below), s well as spending time engaging with his community and family, until his death in early 1900 at the age of 74 (*Arizona Republican* 1900). All the major and minor papers, including *The Arizona Republican, The Arizona Daily Star, The Arizona Star, The Tempe News, The Phoenix Enterprise, The Phoenix Gazette, The Phoenix Republican,* and *The Mesa Free Press,* lamented the loss of Charles Hayden from Arizona's public sphere. "All the stores in [Tempe] were closed in respect to the deceased" (*Enterprise* 1900). Sally Hayden passed away seven years later in 1907 (*Arizona Republican* 1907).

Charles T. Hayden: Civic Servant and Statesman 1864–1900

Outside of his business activities, Hayden was also heavily involved in the public and civic realms. He was continually involved in furthering the interests of his community and ensuring their well being and ability to flourish. He served a one year term as the Pima County probate judge in 1864; he carried mail from Maricopa Wells to Phoenix in 1874. He also served as Grand Jury Foreman in two significant court cases. The first was in 1871 in Tucson following the Camp Grant Massacre when citizens responded in a vengeful vigilante action against the Apache ıd attacked a settlement at Aravaipa Creek. The second was in 1879 following a double lynching in Phoenix (Fireman 1969:199–201).

He was elected to the Maricopa County Board of Supervisors in 1880 (*Arizona Gazette* 1881). In his tenure as County Supervisor, he was frequently verbally attacked and criticized, despite the fact that he continued to work on roads and contributed to various county building projects, including the courthouse (*Phoenix Herald* 1882a). He resigned his post in May, 1882 (*Arizona Gazette* 1882h), citing personal business pressures. It seems to have been well known, however, that Hayden felt frustrated with other board members, who impeded his reforms (*Arizona Gazette* 1882h). Hayden was not always successful in politics, however. He failed to win a seat on the Territorial Council representing Gila and Maricopa counties when he ran in 1874 (*Arizona Citizen* 1874a). Likewise, he failed to gain public support for a nomination to the Assembly before the County Democratic Convention in 1882 (*Arizona Gazette* 1882a). That same year he declined a nomination for Councilman by a Republican County convention, which was looking for any avenue of success despite Hayden's Democratic allegiances (*Arizona Gazette* 1882c; Fireman 1969:200; *Phoenix Herald* 1882b).

Hayden also took part in ensuring a strong educational foundation for local residents. In 1884, he helped establish School District No. 3 and was appointed a trustee (*Phoenix Herald* 1884a); this district would later encompass the Tempe Normal School. He generously sold $2,000 worth of 20-acre, prime land, located in the Tempe agricultural heartland to the new teacher's college for only $800 in 1885 despite recent financial setbacks (*Clifton Clarion* 1885). Shortly afterwards he was elected Chairman of the Tempe Normal School (*Arizona Gazette* 1885a), but resigned in May, 1888 after helping form, and later, being installed as President of the Tempe Liberal Union (*Arizona Journal-Miner* 1888). He also established a public library in one room of his house which was free to anyone that could read (*Tempe News* 1888c).

Hayden headed the committee that successfully challenged the James Addison Reavis' fraudulent Peralta Land Grant claims (*Arizona Gazette* 1885c). Although in the end the attempts were unsuccessful, he was also a prominent voice in lobbying to form Butte County out of the eastern half of Maricopa County in 1887. On two separate occasions in 1893 and 1899, he was appointed delegate to the National Irrigation Congress in Montana (*Phoenix Herald* 1893d; *Tempe News* 1899). He participated as an Arizona delegate to the Trans-Mississippi Congress on three separate occasions as well in 1894, 1897, and 1899 (*Arizona Daily Star* 1894; *Arizona Gazette* 1897).

Mormon settlement in the Salt River Valley is strongly associated with the generous spirit of Charles Hayden. He sold a half section of his land on credit to new settlers from Utah and provided them temporary employment and store credit

(*Phoenix Herald* 1885a). According to Fireman (1969:205), the town of Mesa, an early Mormon settlement, was once called "Hayden" in honor of his help and encouragement in the development of their town. Although Hayden had excellent relations with the Mormons that lasted throughout his lifetime, he did not agree with their practice of polygamy (Fireman 1969:206).

At times, Hayden's generosity to others caused him economic hardship. For example, when natural disasters struck the small community along the Salt River, Hayden burned the ledgers of his indebted customers, which must have contributed to his failing finances. He judged others based on their behavior, not their race alone, which was a remarkable quality for the time period.

Hayden always had good relations with the Akimel O'odham who supplied his mill with wheat and he frequently defended them against the pervasive racism of some of the local Tempe residents (*Weekly Arizona Miner* 1879c; *Territorial Expositor* 1879b). He also continued doing business with the Akimel O'odham and the Yaqui well after others had stopped (*Arizona Republican* 1893).

Arguably, Hayden's passing in 1900 represented the end of not only a great businessman and the founder of Tempe, but an immeasurably committed social activist who often placed his community before his own interests. It was perhaps this attitude that inspired the course of his son, Carl Hayden, who would serve 56 years as a Representative and Senator for the State of Arizona.

Carl Hayden and Hayden C. Hayden: 1900–1981

Following the death of Charles T. Hayden, the family business passed to his eldest child, Carl Hayden. Shortly before his father's death, Carl had been studying at Stanford University with little interest in the family business. In a letter home to his family, Carl urged his father to retire from business and explained that he would "rather have a university education than a business education" (Benton 1996:11). Yet in 1899, Carl was forced to return home to be with his ailing father who passed away in February 1900. The inexperienced 23 year-old assumed responsibilities of the family business, which was faring poorly due to over-extension of credit and poor collection practices (Fireman 1976). R. Robinson, a business associate of his father, informed Carl by letter in 1897 that his father had placed the mill on the market for sale (Robinson 1897). Robinson appeared to be concerned that the mill would be sold for too low a price. Fortunately, this did not occur and Charles Hayden was apparently successful in negotiating a mortgage on the mill (Hayden 1898). Carl also corresponded regularly with his father's lawyer, Charles Woolf, whose assistance following Charles Hayden's death was much appreciated by Carl (Woolf 1901b). In a bid to rid the family of debts, and raise the necessary capital for putting his sisters through school and providing an income to his widowed mother, Hayden began to sell off some of the family's assets, including bonds and investments (Woolf 1901a, 1901c).

Carl appointed himself president of the C.T. Hayden Company, liquidated the assets of the general store, and leased the mill to A.J. Peters for $450 per month (*Tempe News* 1900). Hayden was empathetic to Peters—a longtime friend and business associate—and often contributed funds for maintenance and improvements to the flour mill (*Arizona Republican* 1901b). A.J. Peters ran the mill for 13 years, which was not an easy task (Celaya and Harter 1970:4). As more people settled in Tempe and drought conditions predominated, water supply to the mill became irregular (Woolf 1902).

Despite the family's financial uncertainty, Carl's mother urged him to continue his studies (Hayden 1901). Heeding her advice, he returned to Stanford in 1901 and remained there until at least the end of that year (Peters 1901; Woolf 1901c). He received regular updates from Woolf, and his newly appointed business manager, L.P. Moore, throughout his absence that year. While Peters was the Mill Supervisor, Moore managed the larger business holdings, including the mill and the Haydens' rental properties. Apparently, there were many difficulties in managing these businesses; in letters to Carl Hayden, Moore often cited obstacles in collecting funds (Moore 1901). Nonetheless, by appointing business managers, Carl was allowed to follow his interests in politics and community matters (Benton 1996:12). That same year he leased the family store to J. S. Armstrong and began an association with Albert Miller in the Arizona Commercial Co. (Fireman 1976:17–18), formerly known as the Arizona Mercantile Company. Soon after Hayden's return to Tempe, in 1902, he served on the Tempe town council where he first encountered water-rights politics.

By late in the summer of 1902, business affairs appeared to be improving; in a letter to his mother, Carl Hayden informed her that he "..enclose(s) a check for a hundred. If this is not enough to pay Mapes tuition and your sister her trip, I will send more. Things are brightening up since the rains and it will not be too hard to get hold of money as it has been. The mill is running full time and Pete is happy..." (Hayden 1902a). Family finances had apparently been settled by 1904, with Carl managing to achieve a modest stability for his mother and sisters despite ongoing troubles with the mill.

In late September of the same year, Carl began work at the Headquarters of the County Democratic Central Committee in Phoenix as its Chairman. In a letter to his mother, Hayden wrote: "the water storage business is coming

off in fine shape—hard work and harmony seems to be the motto of the Committee and I believe they will have an acceptable plan worked out in the very near future" (Hayden 1902c). In 1904 he chaired the territorial delegation to the 1904 Democratic National Convention; shortly afterwards, he was elected to County Treasurer, and then Sherriff in 1906 (Udall 1972).

In 1908, Carl married Nan Downing in San Bernardino, California. The couple initially resided on the Hayden ranch in Tempe, but later moved to Phoenix to be closer to Hayden's work as County Sherriff (Celaya and Harter 1970: 3–4). His political aspirations led him to run for and win the seat as Arizona's first state representative in 1912.

By this time, however, the Hayden Flour Mill was experiencing serious difficulties (Benton 1996:12), such that by 1914 it was closed. Within a year, the mill reopened under the management of the Tempe Milling Company, which had been incorporated by Carl Hayden, J.H. Dobson (President), F. A. Van Ritten (Manager), and C. G. Jones. A new miller by the name of W. L. Leslie was hired to oversee daily operations and a complete overhaul of machinery; Leslie had previously worked for the famous Pillsbury mills in Minneapolis, and the Globe Milling Company in Los Angeles (*Tempe News* 1915a, 1915b). The mill burned burned down just two years later in 1917, but was rebuilt within one year (*Tempe News* 1917). With Carl Hayden in Washington D. C. and the Hayden girls recently graduated, the family's finances depended on the dividends obtained from various holdings, including the flour mill, lands, and other investments (Hayden 1920).

Unfortunately, the newly constructed mill continued to struggle. At the conclusion of 1920, Mr. Henness, manager of the Tempe Milling Company, suffered a nervous breakdown (Hayden 1921); it is not clear whether the cause of this breakdown was work related, although the economic plight of the mill could not have helped matters. Bill Studer was selected as new manager at the mill in 1921. Despite his best efforts to keep production costs at a minimum, the mill struggled due to the rapid drop in flour, bran, and barley prices. A stock take in April of 1921 showed that the mill lost $45,000, a figure commensurate with the rates of loss in neighboring mills according to Studer (1921).

Conditions improved greatly over the next decade as grain prices increased. A 1936 report by Bill Studer was very positive; the mill was by then operating with a nice profit (Studer 1936). The improved financial health of the flour mill appears to have encouraged construction of a number of associated outbuildings between the 1930s and early 1950s. While the deed holders of the mill changed repeatedly through the 1920s, 30s and 40s (Benton 1996), Carl Hayden maintained a financial stake in the flour mill well into the 1960s. In his later years, Carl Hayden amassed a considerable collection of documents relating to the Hayden Family and operations at the Flour Mill. Currently stored in the Arizona Collection at Arizona State University, this collection is a valuable record of the contributions the Hayden family made to the growth and development of Tempe. Carl T. Hayden died in Mesa on January 25, 1972 at the age of 95. His wife, Nan, had died 11 years earlier in 1961. They had no children. In 2002, a special feature in the *Arizona Republic* celebrating the state's 90th anniversary listed Carl T. Hayden as the most influential person in Arizona History (AZplace.net 2002).

Carl's nephew, Hayden C. Hayden (Figure 3.8), started working at the mill in 1948, after serving in World War II. Initially employed as a sales representative, he would eventually be promoted to an office position. He slowly began buying out shareholders in the mill until he had acquired enough to take control in 1955, at which point, he had complete control of the mill (Biddy Hayden, personal communication August 9, 2007; Bryant 2005; Hayden 1964). Hayden C. Hayden thoroughly modernized operations at the mill and also diversified its products. Aside from providing a variety of flour products, he entered the food brokerage business, distributing a number of food and paper products from the Hayden Flour Mill. In 1981, Hayden Flour Mills was sold to Bay State Milling Company; the mill retained its name, and Hayden C. Hayden remained for another 10 years running the mill and serving on the Bay State Milling Co. board of directors. Hayden C. Hayden died July 12, 2005 at the age of 83. The Hayden Family is survived through his wife Cathrine (Biddy) Hayden; brother Larry Hayden; children Carl, Sallie and Catherine; and seven grandchildren (Bryant 2005).

Figure 3.8. Portrait of Hayden C. Hayden ca. 1992.
Photograph courtesy of Catherine (Biddy) C. Hayden.

CHAPTER 4: EXPLORATION AND SETTLEMENT OF ARIZONA AND THE SALT RIVER VALLEY

Scott Solliday

Arizona was first visited by Europeans as early as 1540 as part of the expanding empire of New Spain. Father Eusebio Kino, a Jesuit missionary to the Akimel O'odham, was the first European to traverse the Salt River Valley in 1699 (Manie 1954:121–122). However, despite early attempts to settle the land, subdue the Native Americans, and generate profitable industry, Arizona would remain largely unexplored and unsettled by Europeans through the mid-nineteenth century.

Until the mid-nineteenth century, the Salt River Valley was visited infrequently by other missionaries, American fur trappers, and even a few Forty-Niners who cut south and followed along the Salt River to join the Gila Trail to California. United States Boundary Commissioner John Russell Bartlett explored the Valley in 1852 during his expedition to survey and mark the international boundary that then ran along the Gila River (Murray 2003). Though centrally located in the Arizona Territory, the Salt River Valley was still isolated from the population centers (Figure 4.1). It was also dangerous, as Apaches who controlled the area were willing to fight any incursions into their territory.

This chapter provides a brief overview of the exploration f south-central Arizona from the mid-nineteenth century o the early settlement of the Salt River Valley after 1865, focusing on the social and economic conditions that affected and influenced the commerce of freighting and milling in Arizona after 1860.

Initial Development of Southern Arizona: 1848–1865

With the conclusion of the Mexican-American War (1846–1848), the United States acquired lands that now comprise Arizona, California, Colorado, New Mexico, and Utah. A delegation representing both nations was formed as part of the Treaty of Guadalupe Hidalgo to map and mark the boundary of Mexico and the United States. John Russell Bartlett was appointed Commissioner to lead the American delegation. While the surveying party (led by Lieutenant [Lt] A.W. Whipple) mapped the international boundary along the Gila River through Arizona, Bartlett diverted a team through the northern frontier of Sonora to acquire necessary supplies and gauge road conditions along Cooke's Wagon Road, which entered Arizona near present-day Douglas, thence traveling through Tucson to the Gila River at the Akimel O'odham Villages (presently near Sacaton). Bartlett's travels through Arizona and Sonora were written and published in o volumes in 1854: *Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, connected with the United States and the Mexican Boundary Commission during the years 1850, 51, 52, and 53.* In his extensive documentation of small towns and settlements in the Territory of New Mexico, Bartlett provided vivid insight into the structure and condition of small Mexican settlements throughout the newly acquired territories. However, government disputes over Bartlett's decision to plot the international boundary 40 miles north of El Paso led to additional tense discussions over the boundary. Finally in 1853, the Gadsden Purchase was approved by both countries, and new delegations were chosen to map the newly acquired land south of the Gila River (Bartlett 1854a).

In the years immediately following the Mexican-American War, Tucson represented the only viable settlement in Arizona. Between 1848 and the mid 1850s, Tubac was completely abandoned. Many former residents relocated to Tucson after the withdrawal of Mexican troops in 1848; the unrelenting Apache raids had by this time stretched north and west along the Santa Cruz River. However, a good number of others took the opportunity to escape and pursue fortunes in California as part of the Gold Rush (Bingham 2007).

At this time, Tucson was a small garrison of Mexican and Indian residents or sentinels walled within the presidio and at the mercy of relentless Apache raids and hostilities. Hilario Gallego provided an oral account of his 1850s childhood life in Tucson to the Arizona Pioneers' Historical Society in 1926. Following are a few brief observations of Tucson prior to sustained contact with the Americans:

> ...The first time we heard of coffee was when the Oury brothers came in and gave some of the green coffee to the women to cook, saying, 'Cook us some coffee.' They took it for granted that the women knew how to fix it. The women boiled it first but the kernels did not get soft; so they tried frying it and cooked it and cooked it. And they were still cooking it when Oury, the lawyer, came in and asked if the coffee was ready. One of the women looked at the frying grains and said: 'Well, it's been cooking a long time but it seems awful tough yet.'
>
> ...For clothing most of the men wore nothing but 'gee-strings' just like the Indians...many of the small children went naked, though a few wore 'gee-strings'...
>
> ...We had church service once in four or five years--just when the priest would come this way...The nearest church was at Magdalena. The San Xavier Mission was in charge of altar boys or caretakers, but there were no services held in it nor in the church across the valley [Cosulich 1953: 63–64].

It is not surprising that conditions improved significantly in Tucson and Tubac after the establishment of American military forts in southern Arizona to address the Apache threat.

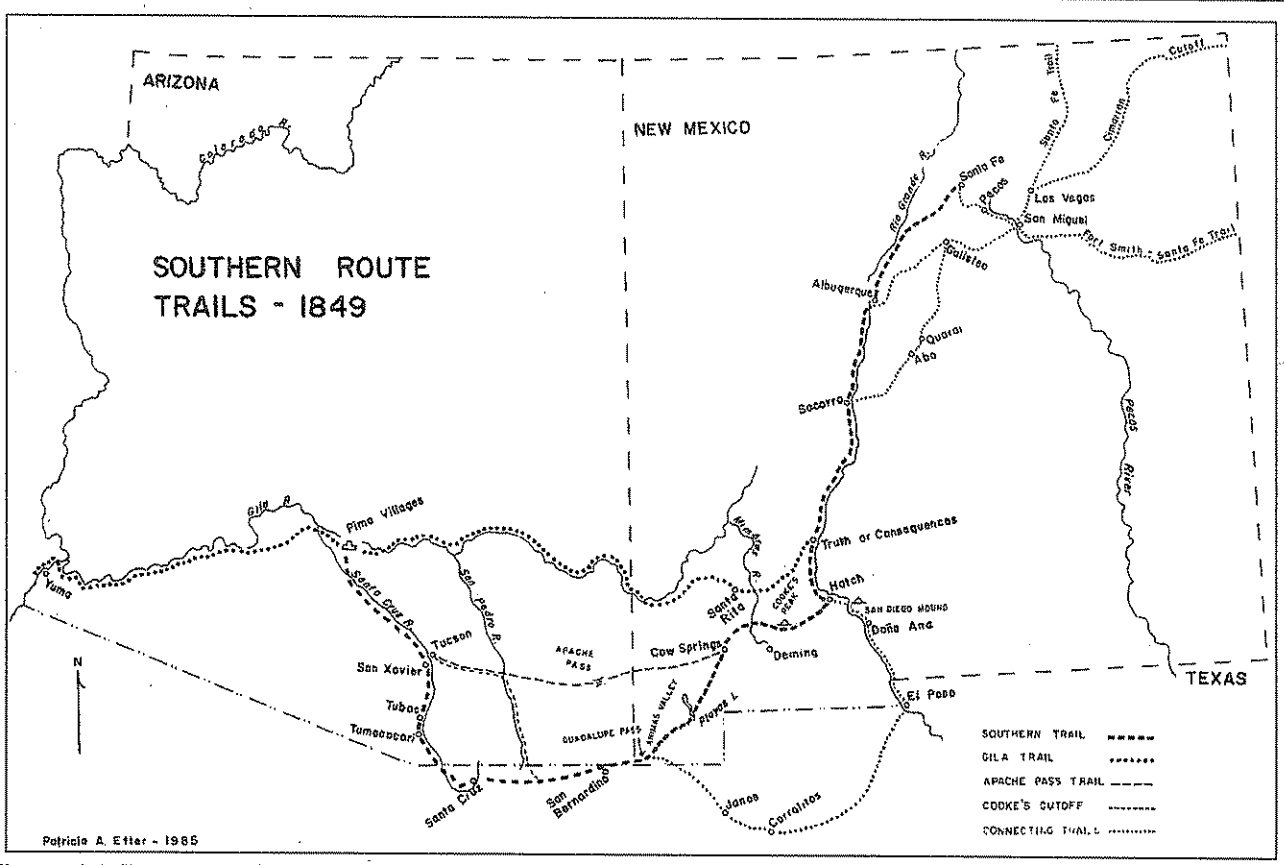


Figure 4.1. Patricia A. Etter's 1985 Map of the New Mexico Territory in 1849 showing various transportation routes.

Courtesy of Mary Bingham, Tubac Historical Society.

Perhaps even more significant for Tucson was its location along Cooke's Wagon Road (later dubbed the Southern Emigrant Route); prospectors and settlers traveled this road as they crossed the New Mexico Territory in search of gold in California. By 1858, the Butterfield Overland Mail Company was providing service between St. Louis and San Francisco via portions of the Southern Emigrant Route (Berge 1968; Stein 1994). As the fever of the California Gold Rush subsided, prospectors began searching for mineral deposits in Arizona. One such prospector was Charles Poston, who visited Tubac in 1854 and found the former presidio in complete ruins; he remained in the area for several months, locating potentially rich silver ore deposits. By 1856, Poston had returned to Tubac and established headquarters for the newly formed Sonora Mining and Exploring Company (Kollenborn 2002). Of the resettlement of Tubac, he would later write:

> In the course of a few months, several hundred people had gathered around Tubac and engaged in planting; the mines developed wonderful riches; and traders from Sonora, New Mexico and California came to supply all our wants with the productions of foreign lands in exchange for the silver bars which we made 'current with the merchant' [Browne 1871: 229].

The outbreak of the Civil War in 1861 delayed further settlement of southern Arizona. Military outposts like Fort Buchanan, located three miles west of present-day Sonoita, that had been established to administer land acquired in the Gadsden Purchase, were abandoned. Government merchants lost everything as property was confiscated or destroyed, and agricultural fields were burned along the Santa Cruz as troops evacuated the territory. In less than a year, Tucson was again isolated, Tubac in ruins, and Mexican and American citizens were at the mercy of raiding Apaches. To make matters worse, exploitation of Mexican mine workers had significantly altered relations by 1861. Poston's memories provide a vivid assessment of the anarchy:

> After the abandonment of the Territory by the United States troops, armed Mexicans in considerable numbers crossed the boundary line, declaring that the American Government was broken up, and they had come to take their country back again. Even the few Americans left in the country were not at peace among themselves—the chances were that if you met in the road it was to draw arms, and declare whether you were for the North or the South...

> ...The Government of the United States abandoned the first settlers of Arizona to the merciless Apache. It was impossible to remain in the country and continue the business without animals for transportation, so there was nothing to be done but to pack our portable property on the few animals we kept in the stables and strike out across the desert for California...
>
> ...Of all the lonesome sounds that I remember (and it seems ludicrous now), most distinct is the crowing of cocks on the deserted ranches. The very chickens seem to know they were abandoned. [Farish, 1915:291–292].

Post Civil War Security and Development of the Territory of Arizona

Following the end of the Civil War, the United States again turned its attention to the Southwest with the reoccupation of existing forts and construction of additional forts throughout Arizona to encourage and protect settlement and development of the newly established U.S. Territory (Figure 4.2). Until 1870, the military in Arizona was under the jurisdiction of the District of California, Pacific Division of the U.S. Army. At this time, there were basically two subdistricts (north and south of the Gila River) in the Arizona Territory. Camp Whipple was the headquarters and main depot in the north and Camp Lowell of Tucson in the south. Camp Yuma was the principal supplier for all forts in Arizona. Apparently, the headquarters of the Arizona Division of the California District was relocated in March 1866 when it was transferred to Tucson (Farish 1916b).

By late 1867, the Arizona Territory had been divided into subdistricts (Farish 1918a:249–260). Each district included one or more camps with at least one central depot for providing supplies to the others:

- **District of Tucson**: Six camps; Camp Lowell was the principal depot
- **District of the Verde**: Camp McDowell was the only constituent in the district, though Camp Reno would be added sometime later.
- **District of Prescott**: Three camps; Fort Whipple was the principal depot
- **District of the Upper Colorado**: Camps Mojave and El Dorado were the only constituents in this district; Camp Mohave was the principal depot.
- **District of the Lower Colorado**: Fort Yuma was the only constituent in this district and also served as the principal depot for all forts in the territory.

By 1870, the military in Arizona was reorganized under the Department of Arizona and the headquarters moved back to Fort Whipple. Establishment of the forts after the Civil War in strategic areas were an economic windfall for freighters and merchants. In return for protecting civilians in newly established settlements, the forts were able to greatly reduce the government expenses associated with food and general goods (Farish 1918a:204).

With the eventual end of Indian hostilities in the closing decades of the nineteenth century, many of the camps or forts were closed and abandoned, including Fort Lowell (1891), Fort McDowell (1890), Fort Mojave (1890), and Fort Yuma (1885). Fort Whipple was abandoned temporarily between 1898 and 1902, when it reopened before closing permanently in 1913 (Brandes 1960).

Exploration and Settlement of the Salt River Valley

At the time that the Arizona Territory was created in 1863, nearly all of the non-Indian population was concentrated in Tucson and surrounding valleys in the southern portion of the territory. The only settlements north of the Gila River were the new territorial capital of Prescott, a few mining camps in the Bradshaw Mountains, and the far northern outpost of Fort Defiance. The Salt River Valley, a 10-mile-wide swath of fertile bottomlands, was uninhabited. With an ample supply of water, the area had obvious value as farmland. Over the centuries, the Hohokam had pushed agricultural development to the edges of the Valley, but all of their fields had been abandoned since the fifteenth century. In the early Historic period, the Valley was only sporadically occupied by competing tribes as small bands of Akimel O'odham, Piipaash, Apaches, and Yavapais visited to hunt or gather food.

Two events in the mid-1860s made permanent settlement in the Valley possible. The first was the establishment of Fort McDowell in 1865 as a strategic outpost in the campaigns against the Apaches. In 1864, discovery of the Vulture Mine led speculators to the streams and hilly regions of the Lower Verde River (Carlson 1996; Spicer 1986). Fort Whipple was established in Prescott to protect the miners and settlers in the area. Despite the government policy of peaceful negotiations, soldiers and settlers embarked on hostile campaigns against the Apache. The retaliation by Apache-Yavapai coalitions throughout central Arizona led to the establishment of Fort McDowell in 1865. With the construction of Fort McDowell, a defensive line of forts stretched through Apache territory from Prescott, Arizona to present-day Silver City, New Mexico. Fort McDowell, situated on the west bank of the Lower Verde River, was constructed adjacent to an Apache trail that ran from the Verde River through Cave Creek and the Bradshaw Mountains. The strategy was to disrupt raiding

sorties of the Tonto Apache. The military fort was a significant factor in the subsequent settlement and development of the Salt River Valley; additionally, Euroamerican settlers now could count on a defensive line of forts stretching throughout the Apache territory (Spicer 1986). As the soldiers of Fort McDowell needed support, a group of civilians, mostly Hispanic farmers and laborers, settled near Fort McDowell to raise food and hay for the military.

Secondly, in January of 1867, William H. Pierce began the government survey of the Gila and Salt River Baseline and Meridian, establishing the initial point at the old international boundary marker near where the Salt flows into the Gila. Completion of this survey was an essential requirement before settlers could file a claim to lands under the Homestead Act (Simkins 1989:11–12; Zarbin 1997:4–5).

By 1867, conditions were ideal for starting farming settlements in the Salt River Valley. The military garrison offered both protection for settlers and a readily available market for their produce. Jack Swilling, one of the most illustrious characters in Arizona history, was the first to take advantage of this auspicious convergence of events. After the Civil War, Swilling took on various jobs, including a mail carrier; he passed through the Salt River Valley and realized the agricultural potential of the area when he noticed abandoned canal alignments of the prehistoric Hohokam (Luckingham 1989; Zarbin 1997). Other factors undoubtedly led to Swilling's determination, including the economic climate, demand for agricultural goods in the mining districts of the territory, and relative security provided by Fort McDowell.

After reorganizing the Planters Irrigating Company as the Swilling Irrigation and Canal Company in 1867, Swilling and a party of 16 other shareholders traveled to the Salt River Valley from Wickenburg to begin construction of the Swilling Ditch at a location on the north side of the river in Section 15, Township 1N, Range 4E (Zarbin 1997). Using a plow and shovels, approximately 600 ft of the alignment was excavated before they abandoned their efforts and moved westward to another location. Apparently, the shallow bedrock in the original proposed location precluded successful completion (a letter to the *Weekly Arizona Miner* [1868a] suggested the head was relocated in order to expedite the increasing demand for food supplies in Wickenburg and Vulture City). The new heading was approximately one-eighth mile east of modern 40th Street, which is now within the Sky Harbor International Airport right-of-way (SE¼, SW¼ Section 7, Township 1N, Range 4E) (Hill 2000; Zarbin 1997). By the end of July 1868, corn and other vegetables were growing well on lands fed by the Swilling Ditch. News of the agricultural potential of the Valley spread with the success of the Swilling Ditch and other canals. Within two years, the small settlement had grown from a fledgling camp of farmers to a population of 225 individuals (61 women and 164 men) (Alsap 1868; Trimble 1990:214).

Settlement of Tempe: 1870–1879

The farmers that first came to this area were mostly Mexicans from southern Arizona and northern Sonora who worked on the canals to earn a right to the water that flowed through them. Only by working together would they be able to bring water onto the desert lands for farming. They were soon joined by others, Euroamerican and European immigrants from the East, most of whom came with an interest in starting a homestead. The area on the south side of the Salt River in Township 1N, Range 4E, was first referred to as Rio Salado by visiting priests who came from Florence to say the Mass for the few hardy souls there. There was really no town in those early years, but rather, a checkerboard of farms ranging from 40–160 acres, extending as far south as the baseline (Bureau of Land Management 2007).

On November 26, 1870, Hayden formed the Hayden Milling and Farm Ditch Company, along with partners J. W. Fields, A. F. Garrett, E. R. Brown, and later, Robert Savery, and filed a water claim of 10,000 miner's inches of water "to be taken from said river at or near a butte, to the left of the main road to the Gila River, from Phoenix, and on the south side of said river" (Weekly Weekly Arizona Miner 1870d:2). A miner's inch, according to the SRP website (2007), is a flow rate equal to 11.22 gallons per minute. The initial alignment proposed for the Hayden Ditch originated at the Salt River in Section 15 east of Mill Avenue, extending southwesterly towards Sections 28 and 29 around Tempe Butte. However, work on the initial alignment was indefinitely suspended, as was Hayden's land claim in Sections 28 and 29. These decisions might have been influenced by the completion of the Kirkland-McKinney Ditch and recent organization of the Hardy Irrigation Canal Company. The Hardy Irrigation Canal Company—organized in 1870 by Jack W. Swilling, B.W. Hardy, J. O. Sherman, J. L. Mercer, J. Olvany, and J. E. Ingersoll—claimed 20,000 miners inches, with a heading "... to be taken at a point five miles above the mouth of the Hayden Ditch" (Andersen 1989a:4; Benton 1996:4; Neeley and Kwiatkowski 1999:180).

Hayden and others must have seen the potential benefits of building upon the ditches already completed and organized to create a unified irrigation system. By the end of the year, Hayden had joined with members of the Kirkland-McKinney Ditch and the Hardy Irrigating Canal Company to form the Tempe Irrigating Canal Company, which was organized in January 1871 to build a large canal with several branches to cover a much larger area.

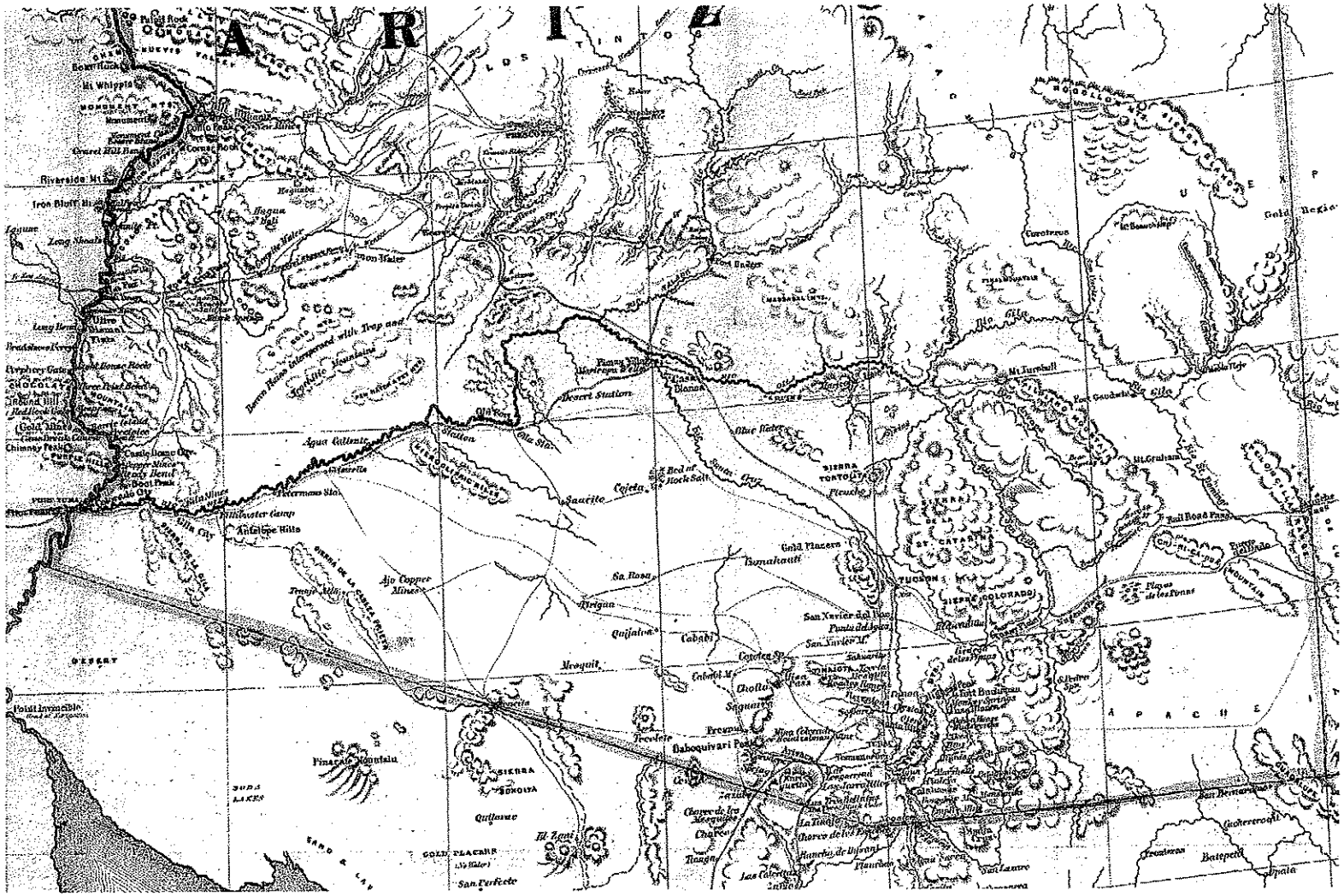


Figure 4.2. Portion of Hartley's 1865 Map of Arizona showing the sparsely settled regions of Arizona shortly in 1865 (Smith 1865).

Membership in the company was by payment of two hundred dollars or its equivalent in labor. One share entitled the holder to about five acre-feet of water per acre, which was adequate for raising all types of crops. Hayden's interest, however, was to obtain a supply of water to power a flour mill. In April 1871, Swilling offered 17 shares, which would entitle the holder to 2,000 miner's inches of water, to anyone who built a grist mill in the area. This provision was clearly tailored to Hayden's plans, but would also benefit the farmers. Hayden needed a steady flow of 1,100 miner's inches to turn his mill stones, and the remaining water could be used for his own farming operations or rented to others.

Hayden was so confident of the successful expansion of the agricultural development that was underway that he made plans to move his freighting business from Tucson to the Salt River. He returned to Tucson, while a long-time employee, John J. Hill, remained at the Salt River to supervise construction and manage the small store that had been erected. The growing settlement became known as Hayden's Ferry, named for the cable-operated ferry that was put into operation in 1871. A U.S. Post Office was opened there on April 25, 1872, also with the name Hayden's Ferry, with Hill serving as the first postmaster. By this time, workers were building a three-story adobe flour mill at the base of the butte, and had also begun construction of a permanent adobe store, a home, and other outbuildings. When the new store and home were completed in 1873, Hayden closed all of his Tucson operations and moved everything to Hayden's Ferry.

The mill was completed and started operating in 1874. By this time, the settlement consisted of the flour mill, a large general store, Hayden's residence, and a freight yard with warehouses, blacksmith's and carpenter's shops, corrals, and a bunkhouse for his employees, as well as a small acreage of irrigated farmland. (Figure 4.3) These were the only commercial businesses on the south side of the river, and Hayden had already established a very strong symbiotic relationship with the local farmers (Farish 1915a:288–289, 1918b:108; Haigler 1914; Hayden 1972:13–18, 30–39, 45–49; Lewis 1963:21; Robinson and Brough Bonham n.d.:1; Salt River Herald 1878a; Simkins 1989:31–37; Zarbin 1997:33–36, 45).

It was a difficult life for the Salt River farmers; they lived in houses made of adobe, canvas, and brush, and worked with tools of wood. Good metal implements were apparently so scarce that the men had to occasionally call a halt to canal work so that they could use the company's tools on clearing their own fields. Despite their hardships, the Tempe Canal was expanded quite quickly, and by 1872, it extended three miles south of the river to irrigate 6,000 acres. For the farmers, the potential reward for their hard work was great: the opportunity to acquire 160 acres of free land under the Homestead Act of 1862. An individual could move onto unclaimed land, build a house and make certain improvements, namely, clearing land for agriculture, and thereby establish a preemption right, and the opportunity to later acquire patent to the land by homestead or cash purchase. Wilfred F. Ingalls had continued the survey work started by William Pierce, and in December 1870 he filed plats of 39 townships on the Gila and Salt River Baseline and Meridian. Settlers were now allowed to file declaratory statements with the General Land Office and begin the five-year process of proving a homestead claim (Tempe Irrigating Canal Company 1870–1879; Zarbin 1997:6, 13, 50).

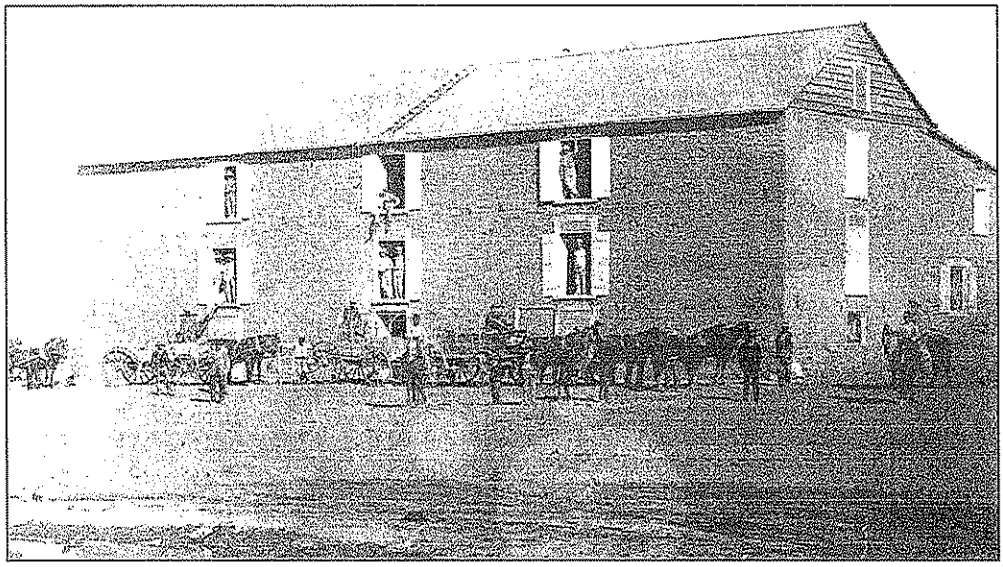


Figure 4.3. Ca. 1880s photograph of Hayden Flour Mill with freight trains.
Photograph courtesy of the Arizona Historical Foundation Collection (MC-H261, FP Foundation Photographs, MC-H Folder).

The first truly urban development in the area was the townsite of San Pablo, which was established against the south base of the butte in 1873. At this time, about 90 percent of all settlers in Township 1N, Range 4E, were Mexican farmers and laborers who came from Tucson and northern Sonora (Solliday 1993: 57–59; U.S. Census Bureau 1870, 1880). Many were too poor, or too ignorant of the land laws, with their complex procedures for establishing and proving a claim, to successfully obtain a patent. As more people came from the south, there was a growing population of landless Mexican laborers employed by Hayden and the mostly white farmers. In 1873, William Kirkland, one of the original organizers of the Kirkland-McKinney Ditch, left the Tempe Irrigating Canal Company and moved on to new mining and farming ventures. He abandoned his claim to land south of the butte, but offered the 80-acre parcel to the Mexican community that had helped him do the real work of breaking the wilderness. The *Arizona Citizen* reported on the creation of the townsite: "The Tempe people, not satisfied with Hayden's Ferry, have laid out a new town just along side named San Pablo and the proceeds of the sale of the town lots is to be devoted to the building of a Catholic church" *(Arizona Citizen 1873b:1)*. Two Catholic priests from Florence were invited to a meeting of the San Pablo Town Association, and Father Andrés Eschallier, pastor of the Assumption of the Blessed Virgin Mary Church, celebrated the first Mass in Tempe on Sunday, April 12, 1872 (Farish 1918b:110; Goodson 1971; Lamb 1981; Simkins 1989:42; *Weekly Arizona Miner* 1873b; Wright 1901).

The first four patents in Township 1N, Range 4E, were issued on October 20, 1875. All were cash entry purchases of 160 acres at $1.25 per acre. Cash entry was the fastest route to own land for those that could afford the two hundred dollars. Charles T. Hayden, rather than claiming a standard quarter section, filed for the S½ NW¼ and the N½ SW¼ of Section 15, a precise selection that included both banks of the Salt River, the west half of the butte, and good flat land suitable for irrigation. Hayden's manager, John J. Hill, obtained a quarter section south of Hayden's land; Conrad Meyer's purchase was farther to the south, and Nathaniel Sharp's was three miles to the east, just below the head of the Tempe Canal. Two months later, Charles Bolzan and Winchester Miller obtained title to quarter sections. James Vader received a patent in October 1876. The first individuals to successfully prove up their homestead claims and receive patents were William H. Willey in 1878 and Albert Decker in 1879. All lands under the Tempe Canal were claimed by preemption by this time, but proving a claim and acquiring title took a long time. Some of the early settlers moved on, abandoning their claims; many others waited 10–20 years, at the risk of losing their preemption status, before they completed the process and took ownership of their lands (Bureau of Land Management 2007). Hayden immediately began acquiring more land. When John J. Hill left Tempe in 1876, Hayden bought his land, 160 acres just to the south, and started buying out other small landholders, including some who may not have actually received a patent. His landholdings eventually included about 300 acres stretching nearly a mile south of river. (General Land Office [Tucson] 1886; Smith 1990:29).

All of these lands on the south side of the Salt River were known collectively as Tempe. The name was originally given to the irrigation system, and San Pablo also became known as the "Town of Tempe" (Probate Case No. 446, Maricopa County Superior Court). In 1879, the Tempe Canal stretched six miles south of the river, expanded to its maximum capacity to irrigate 12,000 acres (Tempe Irrigating Canal Company 1870–1879). In that year, the Hayden's Ferry Post Office was renamed Tempe. Charles T. Hayden apparently supported the change. This act was not really a renaming of the town, but recognition of the larger community that surrounded and included Hayden's Ferry.

Effect of the Hayden Flour Mill on Exploration and Settlement

The initial settlement of Tempe was a risky venture. Farmers who chose to move to a very remote valley with an inhospitable desert environment knew that their success was not assured, and a merchant in the midst of those penniless farmers would find it difficult to conduct a profitable business. Yet, the Tempe people did quite well and were able to quickly establish a prosperous community. The Hayden Flour Mill, in particular, was perhaps the most important feature of the community that supported the development of a strong local economy. It created a symbiotic relationship between Charles T. Hayden and the farmers. Hayden took the grain they produced, milled some of it, and transported both grain and flour to buyers across the Arizona Territory. The farmers had no means of marketing their produce on their own, and without the farmers, Hayden had no commodity to sell. The Hayden Flour Mill continued to maintain a close relationship with local farmers, even after Hayden's death in 1900. The mill firmly established agriculture-based industry as the foundation of the town's economy.

CHAPTER 5: TRANSPORTATION CORRIDORS THROUGH THE SALT RIVER VALLEY AND TEMPE

Scott Solliday, Victoria D. Vargas, and Thomas E. Jones

The Hayden Flour Mill has long served as a landmark on the key regional transportation routes linking Tempe to the rest of Arizona and beyond. Originally, the location that Charles T. Hayden chose for the Hayden Flour Mill and his freighting business headquarters on the south banks of the Salt River and at the foot of Tempe Butte was strategically situated to take advantage of the Tempe Crossing site. Subsequent development of roads and railroads enhanced the importance of the location as it evolved into an essential link in local, regional, and national transportation corridors. The Hayden Flour Mill and its founder, Charles T. Hayden, were key supporters of improved transportation routes to connect the growing town of Tempe with the north side of the Salt River and beyond, to the larger region. The relationship between the Hayden Flour Mill, Charles T. Hayden, and regional transportation corridors is explored in this chapter.

Throughout the world, rivers have historically been corridors of travel, the conduits through which people and goods have been transported to distant destinations. But with the exception of the Colorado River, the desert streams of Arizona could never serve this purpose. These rivers were itally important to early travelers for other reasons: they ere the primary source of life-giving water in the harsh desert environment, and they also served as directional markers, with their vibrant green band of vegetation set against the dull gray-brown landscape, pointing the way to the next settlement. Most often, however, the desert rivers were more of an impediment than an aid to travelers. Their erratic fluctuating flows frequently created new channels across a broad floodplain, and shifting pockets of quicksand made crossing by foot, horseback, or wagon difficult or even dangerous. The hazards of rivers were most evident in the spring when melting snow in the mountains converged into raging torrents tearing through the valleys. All who journeyed through Arizona were familiar with these unpredictable hydrological obstacles; consequently, early transportation routes tended to follow not the rivers, but the river crossings.

The Tempe Crossing was an ideal location for fording the Salt River. Through most of the Valley, the Salt River separated into two or more channels spanning a soggy floodplain that was often more than a mile wide, but where water flowed between Tempe Butte and the Papago Buttes, the river was confined to a flat narrow channel cut through a solid bedrock foundation. The ford was reliable and could be fely crossed under most conditions. Additionally, Tempe Butte was a distinctive landmark which made it easy to identify the precise location of the crossing from great distances. As the development of the Valley progressed, the Tempe Crossing quickly proved to be a vital link between the north and south sides. This chapter examines the importance of the Tempe Crossing in the context of local, state, and national transportation patterns. Since the early settlement of the Salt River Valley, virtually all modes of ground transportation—horse, wagon, train, and automobile—have converged at this place. Charles T. Hayden's selection of this site, strategically located at the juncture of so many east-west and north-south routes, was a great benefit to his transportation-oriented business, and to the ongoing operations of the Hayden Flour Mill even after his death. The crossing also played an important role in shaping the development of Tempe and its relationship with its neighboring communities.

Trails, Wagon Roads, and Ferries in the Salt River Valley and Vicinity: 1846–1900

In the latter days of Spanish colonial rule in the Southwest, trails from the south extended as far as the Gila River, but very few people ever traversed them. One such trail was known as the Gila Trail, which extended northerly along the Santa Cruz and San Pedro rivers from Mexico to their respective confluences with the Gila River; the trail continued westward along the Gila River into California. With the opening of the Santa Fe Trail in the mid 1820s, trappers began exploring the river valleys of Arizona in search of beaver. As early as 1826, James Ohio Pattie and a group of French hunters passed westward through Arizona along the Salt and Gila rivers to the Colorado River, thence north beyond the mouth of the present Bill Williams River to the Mohave Valley. James Pattie's written accounts of his travels constitute some of the earliest American narratives of the geography and cultures of Arizona (Davis 1986:20). However, because of its remoteness and desolation, much of Arizona was largely avoided by Euroamerican settlers until the mid-1800s.

Military Expeditions and Trails

At the outbreak of the Mexican-American War in 1846, Colonel (Col.) Stephen Kearny was given the charge of leading a military force west to seize the Mexican territories of New Mexico and California. Upon obtaining control of Santa Fe and the New Mexico Territory (which included Arizona), Kearny followed the Gila River to the Colorado River, thence to San Diego (Trimble 1990). Before he left, however, Kearny left a detachment of men behind under the command of Lieutenant Colonel (LTC) Philip St. George Cooke; their task was to construct a passable wagon road through New Mexico to San Diego. This detachment under the command of LTC Cooke consisted of approximately 500 Mormon volunteers, who were dubbed the Mormon Battalion. Constructed within only a few months, the road extended southerly from Santa Fe along the Rio Grande River, continuing westerly through Guadalupe Pass and into the San Pedro River valley in present-day Mexico. Entry

into Arizona was along the San Pedro River, thence westerly to Tucson. From Tucson, Cooke's Wagon Road followed ıe Santa Cruz River to the Gila confluence, proceeding westward into California. This route was later dubbed the Mormon Battalion Route and then the Southern Emigrant Route (Stein 1994; Trimble 1977).

Following the Mexican-American War in 1848, the United States government funded a number of other expeditions through Arizona to explore and record the geography of the newly acquired territory, and locate potential rail and wagon transportation routes. In southern Arizona, along the 32nd parallel, Lt John G. Parke conducted two surveys in 1854 and 1855 between the Pima Villages on the Gila River and the Rio Grande River in New Mexico. The two surveys entered Arizona through mountain passes west of Tucson and north of Cooke's Wagon Road. Parke's survey through Apache Pass in the Chiricahua Mountains would later be used by the Southern Pacific Railroad as part of their Sunset Route between San Francisco, Los Angeles, and El Paso (the Sunset Route would later be extended to New Orleans). The Apache Pass route was also preferred by Hayden in his freighting travels between Santa Fe and Tucson after 1858.

Along the 35th parallel in the northern half of the territory, military-funded expeditions included the Sitgreaves (1851), Whipple-Ives (1853), Beale (1857–1859), and Ives (1858) expeditions (Farish 1915; Trimble 1977). The Atchison, Topeka and Santa Fe (Santa Fe) Railway and U.S. Highway Route 66 through Arizona would closely follow the wagon road constructed by Lt Beale between 1857 and 1859.

Development of Roads in the Salt River Valley and Maricopa County

Little Euroamerican activity occurred in the territory until the 1848–1849 discoveries of gold in California, when speculators began traveling across the New Mexico Territory in larger numbers to reach California. By 1850, thousands of Forty-Niners had traveled along the Gila, or Southern Emigrant Route on their way to California. Later, mail and stage lines were established along the same general route, running east to west, which primarily served those interested in passing through Arizona (McClintock 1916:270–273; Walker and Bufkin 1986:13–14). In 1857, the federal government awarded a contract to John Butterfield and the Butterfield Overland Mail Company to provide service between St. Louis and San Francisco (Berge 1968; Stein 1994). The new service entered Arizona through Parke's Apache Pass to Tucson, then followed the Southern Emigrant Route along the Gila River into California. Twelve age stations were constructed in the Arizona Territory between Fort Yuma and Tucson, including Maricopa Wells and Sacaton (Berge 1968).

The first major north-south trail into the interior of the territory was established in 1863 by James R. Walker, who led a group of prospectors from the Pima Villages on the Gila River northwest to the Hassayampa River, and into the Bradshaw Mountains. The Walker Trail became the main route between Tucson and Prescott, and was well traveled by mail carriers, freighters, and stagecoaches.

When the First Territorial Assembly convened in 1864, legislators recognized the urgent need for improved wagon roads in Arizona, but as there were no funds to allocate for that purpose, they granted several lucrative franchises for the construction of toll roads leading into the territorial capital at Prescott. Pioneer rancher and miner King S. Woolsey formed the Prescott, Walnut Grove and Pima Road Company in partnership with several prominent businessmen and territorial officials, including Richard C. McCormick, Jack Swilling, Bob Groom, and Dr. John T. Alsap. They built the Woolsey Trail, which extended from Prescott to Woolsey's Ranch on the Agua Fria, then southeast through the Salt River Valley to the Pima Villages. Before long, the Woolsey Trail—later variously known as the Black Canyon Road, Phoenix to Prescott Road, and Black Canyon Highway—developed into a public trade corridor between Prescott and Phoenix as a response to the growth of mining in the Bradshaw Mountains; it would become one of the most heavily traveled wagon roads between Prescott and Phoenix (Rosebrook 1994; Simkins 1989:49; Wagoner 1970:53–54; Walker and Bufkin 1986:40–41; Zarbin 1997:9).

The First Tempe Roads

The 1868 cadastral survey plat indicates at least three roads in the vicinity of the future townsite of Tempe (Figure 5.1). One road entered the Township 1N, Range 4E subdivision on the north side of the Salt River from the northeast; the road was labeled "Road from Wickenburg to Fort McDowell." A second road entered the subdivision on the south side of the Salt River from the west, and is listed as "Road to Maricopa Wells." The northern road originated from Fort McDowell and likely represented the Smith Hay Road. The southerly road appears to have been an alternate route to Maricopa Wells and the Pima Villages. The third road apparent on the survey plat was a small wagon road that extended eastward from the Smith Hay Road towards the future site of Tempe Crossing; the original heading of the Swilling Ditch was located at the east terminus of this road on the Salt River. Over the next decade, this small extension would be utilized by wagons crossing the Salt River at Tempe Crossing. The Smith Hay Road and Tempe Crossing represented the earliest roads used by the founders and settlers of Hayden's Ferry.

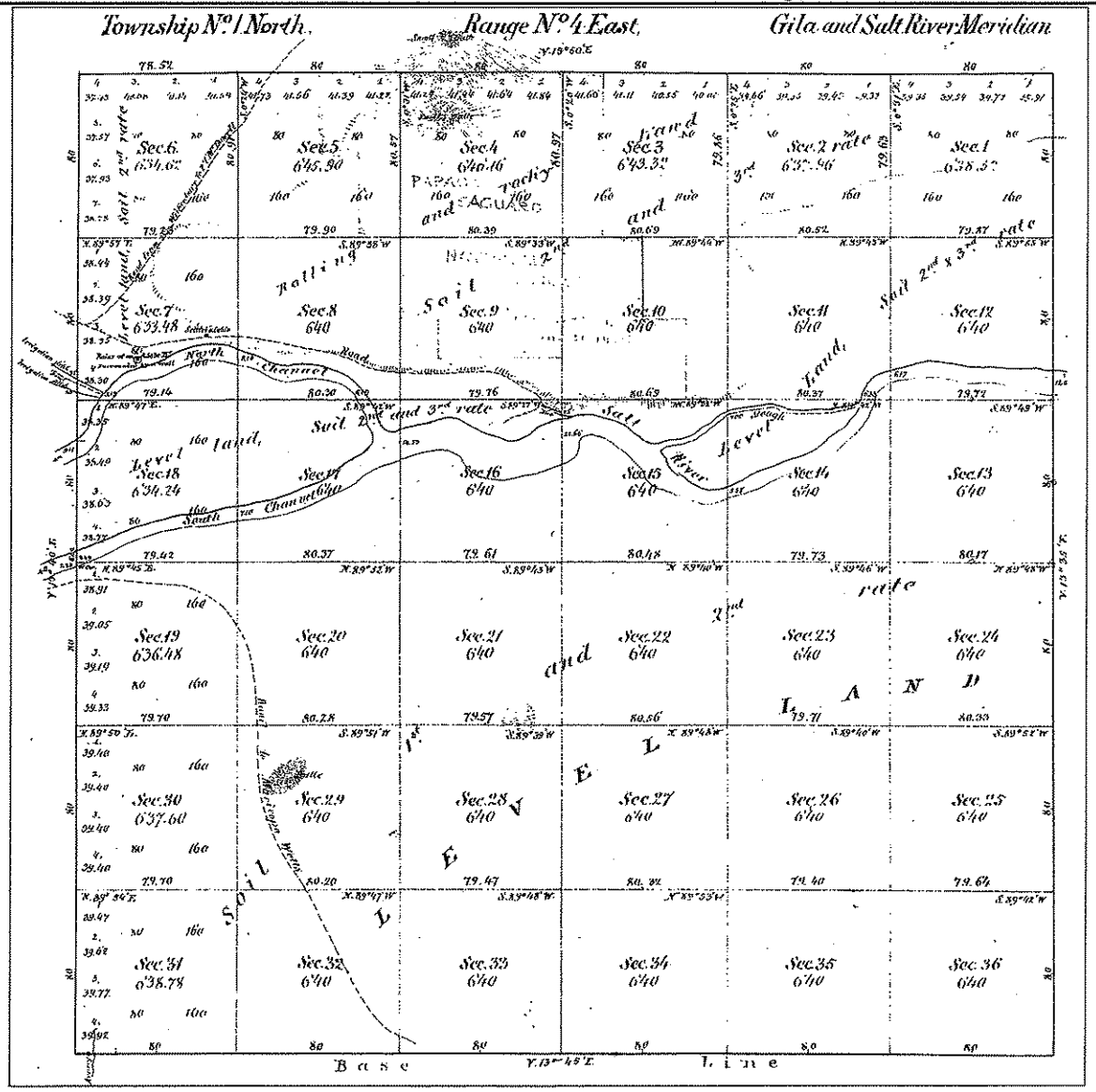


Figure 5.1. Portion of the 1868 Cadastral Survey Plat of Township 1N, Range 4E showing wagon roads in use in the vicinity of the future townsite of Tempe.

Smith Hay Road

The establishment of Fort McDowell after the Civil War significantly influenced Euroamerican settlement in the Salt River Valley. Soon after 1865, a civilian settlement developed alongside the military post, consisting of laborers who cleared land and dug a canal, grew food, and chopped wood to provide many of the supplies needed to sustain the military personnel (Hackbarth 1992:41, 396). The constant need for forage for the soldiers' horses led the first non-Indian residents into the Salt River Valley. In 1866, John Smith led the first of many excursions along the Salt River to harvest wild galleta grass.

Smith (later known as John Y. T. Smith) had enlisted in the 4th California Infantry during the Civil War and had attained the rank of lieutenant by the time he was mustered out of the California Volunteers at Yuma in 1865. At Fort McDowell, he became civilian Master of Transportation, as well as the farm manager and post trader.

When a flood damaged the McDowell Ditch in 1867, the post faced a critical shortage of hay. Smith took a large contingent of workers down to the Salt River and set up a more intensive hay harvesting operation with a semipermanent camp on the north side of the river. This settlement of brush and mud shelters was called Smith's hay camp and was located in Section 13, Township 1N, Range 3E (near the 36th Street alignment) (Simkins 1989:11; Zarbin 1997:9–11). The Smith Hay Road became the primary mode of transportation from Fort McDowell, running directly southwest to the Salt River Valley. A network of hay trails and wood trails extended down both banks of the Verde and Salt rivers.

Tempe Crossing and Hayden's Ferry

There were two important fords on the Salt River. The upper or McDowell Crossing was located near what is now McDowell Road and Country Club Drive. At the lower crossing, later to be known as Tempe Crossing, a boat was kept until it was washed away in the flood of 1867. By 1870, the trail that extended south from the lower crossing was a well-broken wagon road connecting the Salt River Valley with the Pima Villages, Maricopa Wells, and Tucson (Goff 1998:62–63; Hayden 1972:32; Reed 1977:5, 8, 32, 122; *Weekly Arizona Miner* 1870a). The earliest-known account of the Tempe Crossing involves Hayden's legendary encounter on his first trip to Prescott in 1866: "At Florence he made inquiry about how he should go and was told that the best crossing on the Salt River, with the least danger of quicksand, was a large and a small butte near the south bank of the river, opposite some rocky hills on the north side" (Hayden 1972:32).

According to legend, Hayden arrived at the Salt River at a time when a freshet had swollen the normally calm waters into a raging flood. As the story was recounted by his son, Carl Hayden, his father could only wait for the waters to recede, providing him the opportunity to climb up the nearby butte to survey the landscape. Hayden, seeing the Valley as a virgin undeveloped wilderness, immediately recognized the importance of the ford. As an experienced professional traveler, he easily saw both the advantages of the location as well as the limitations that would need to be overcome to develop it (Hayden 1972:30–32).

Several years later, when he heard of the completion of a federal land survey and the arrival of farmers in the Valley, Hayden made plans to claim lands near the Tempe Crossing. He initially selected a site about two miles southwest of the ford, in "sections 28 and 29, Government survey, on the south side Salt River, taking in two Buttes on either side of the main road from Phoenix to Gila River" (*Weekly Arizona Miner* 1870c: 3). This location was in an area now known as the Broadway Curve on Interstate 10. However, his plans apparently changed quite quickly. By the end of the year, Hayden had joined with members of the Kirkland-McKinney Ditch and the Hardy Irrigating Canal Company to form the Tempe Irrigating Canal Company, allowing him to claim lands encompassing the Tempe Crossing and prepare a mill site at the base of Tempe Butte. The new site was well suited to supporting all of his business activities; Hayden hired local workers to construct a store, flour mill, and eventually, a residence and additional outbuildings to augment freighting operations (Hayden 1972:34–36; Zarbin 1997:27–29).

Through most of the year, the river was seldom more than a foot deep, and could easily be crossed at the fords (Figure 5.2). However, spring freshets could last several days, and the current generally ran faster and higher throughout the spring. A few boats were kept near the river in the late 1860s, and John Smith briefly operated a ferry at McDowell Crossing. Hayden established a more permanent ferry at the Tempe Crossing in 1871 (Figure 5.3). These ferries were seasonal and could only run during times of high water. He had a flat-bottomed boat made of heavy timbers large enough to carry a wagon and a team of horses to the other side. A cable was stretched across the river, from the northwest base of the butte to poles on the north side, and the boat was secured to the cable by pulleys. The boat was navigated by lowering a keel into the water; the force of the current would then propel it across the river. On several occasions, raging flood waters tore the ferry from its mooring and sent it drifting far downstream. For many years, Hayden's settlement was known as Hayden's Ferry (Hayden 1972:36–37; Simkins 1989:39).

Hayden had a monopoly on providing high-water passage for many years, but by the 1890s other ferry operators were also operating at the Tempe Crossing. For a fee of fifty cents, passengers would be carried to the other

side of the river in less than five minutes. As the twentieth century approached, the people of Tempe had very limited options for crossing the river.

Maricopa County Road System

Maricopa County was created in 1871, and at their first meeting on March 18, 1871, the Board of Supervisors declared all section lines in the county to be potential public highways, claiming a right-of-way of 33 ft on each side of the section lines. The decisions as to where to actually build roads were to be made as needed (Maricopa County Board of Supervisors 1871–1920:1). An 1866 law authorized boards of supervisors to divide their counties into road districts and collect a road tax not to exceed five cents per one hundred dollars valuation. There was also a poll tax of not more than six dollars per man, but in a truly democratic spirit, if one could not pay it, he could provide two days of labor working on the roads in lieu of the cash payment (Cross et al. 1960:219).

The first county roads were built in and around Phoenix. The lack of funds, however, precluded any substantial progress for several years (Maricopa County Board of Supervisors 1871–1920:1–6). In 1877, the territorial legislature authorized Maricopa County to issue $15,000 in bonds for building four wagon roads extending from Phoenix to Globe, Yuma, and Prescott (two roads were proposed to Prescott via Wickenburg and Black Canyon) (Wagoner 1970:113).

Although Hayden declined to serve as Road Commissioner in 1877 (*Weekly Arizona Miner 1877e*), he was an unwavering advocate for road construction to open new markets to struggling communities. As early as 1875, Hayden proposed a wagon road that would extend from the communities south of the Salt River through the Superstition Mountains and onward to San Carlos: "This is a route of great importance to the government as well as to every person in the Territory.

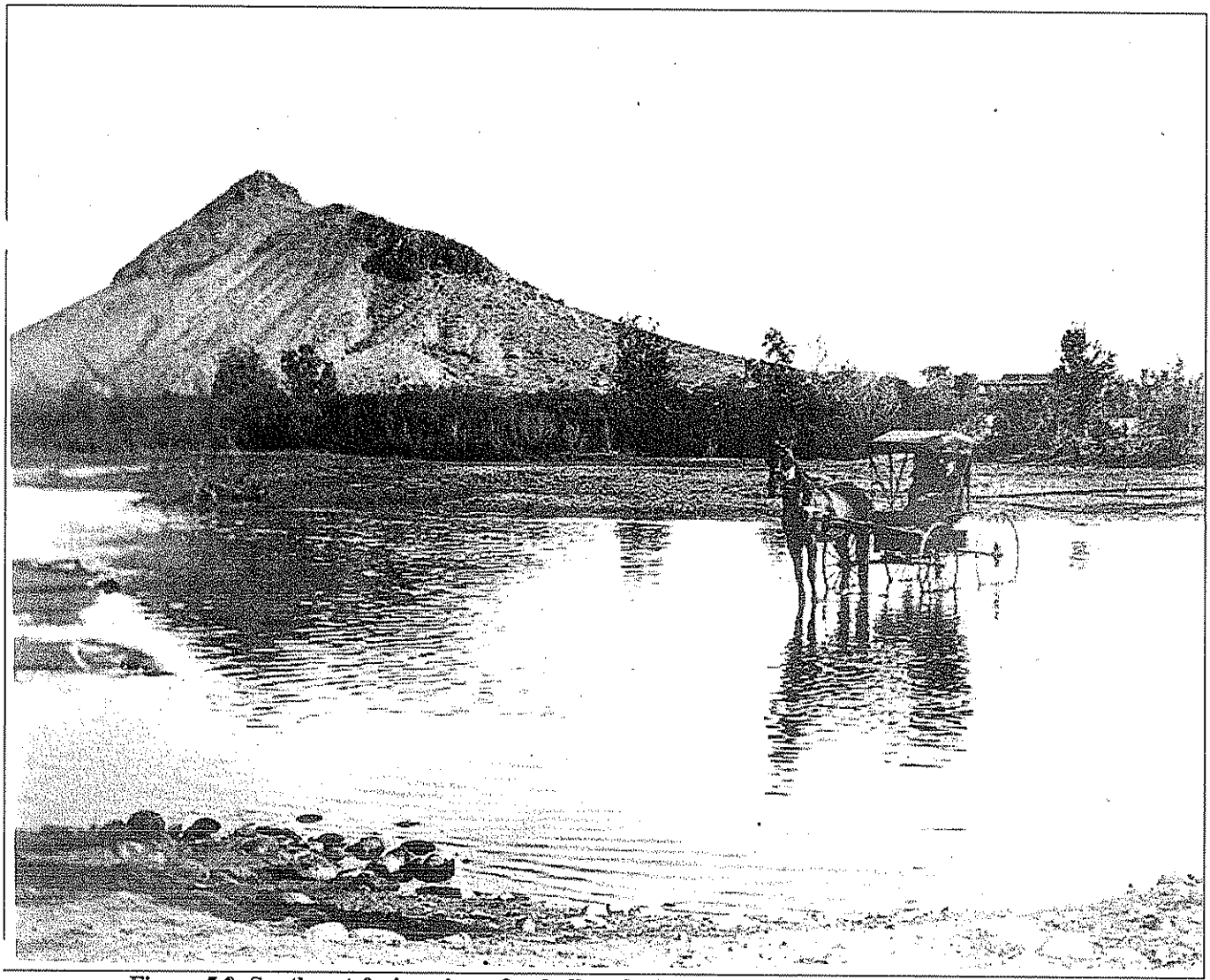


Figure 5.2. Southeast-facing view of a shallow ford across the Salt River, ca. 1870s–1880s.
(Photograph courtesy of the Tempe Historical Museum, OS-255, 1987.1.2584)

Figure 5.3. Southwest-facing view of Hayden's Ferry on the Salt River, with the M&P Railroad Bridge in the background, ca. 1900.

(Photograph courtesy of the Tempe Historical Museum, OS-249, 1987.1.2851).

It would save the expense of long lines of transportation to San Carlos Agency and Camp Apache, and would help to open up a mineral district and much otherwise attractive country" (*Arizona Citizen* 1875:4).

Interestingly, the proposed route to Globe approved by the Maricopa County commissioners was north of the Salt River extending to Fort McDowell, Camp Reno, and thence south to Globe. Despite Hayden's assurances of a feasible route through the Superstitions, the commissioners felt it was not practical. In 1880, after visiting the growing community of Globe, Hayden was apparently determined to revisit the issue of a road through the Superstitions; in March 1880, Hayden accompanied 11 Mormon settlers and a road engineer to construct a road eastward from Mesa City to the Miami Quartz Mill and Globe City. The route was used extensively for many years, portions of which were supplanted by an automotive road that would later be designated U.S. 60 (Fireman 1969; *Phoenix Herald* 1891).

Another road proposed by Hayden would extend from Tempe south to Quijotoas, a mine and settlement established in 1883 and located southwest of Tucson. Apparently, however, the mine was not as profitable as had been hoped; within a matter of years, the mine and town had largely been abandoned (GhostTowns.com 1998-2006). While initial construction of the road was reported (*Arizona Gazette* 1884b), it is unclear if it was ever completed.

The first county expenditures for roads on the south side of the Salt River near Tempe were directed for the improvement of Kyrene Road from Tempe south to the baseline. Finally, in 1879, the Board of Supervisors approved two major road projects for Tempe. One ran east along the 8th Street alignment (University Drive) from the northwest corner of Section 21 (Priest Drive) to the Kirkland-McKinney Ditch (near present-day Rural Road), then went north along the river to Lehi and Mesa. The second graded road was Mill Avenue, from Hayden's Ferry to 5th Street,

then east to Willow Street (College Avenue), and south two miles to the baseline. The old Phoenix-Tempe Road from he Tempe Crossing to the section line road into Phoenix (Van Buren Street) was graded in 1881, completing a fairly decent network of roads connecting all of the communities of the Valley (Maricopa County Board of Supervisors 1871–1920:1–6, 11–12; *Phoenix Herald* 1880c; *Salt River Herald* 1879).

As irrigation systems were extended and new farmlands were opened, the population of the Salt River Valley continued to grow. Farmers located their homes and harvesting operations near section lines, and frequently joined with their neighbors to petition the Board of Supervisors for new roads, even offering to donate their labor for the project, as a new road would provide them easier access from their farms to the towns, flour mills, and regional roads. The county system slowly evolved into a one-mile grid of roads through the most populated areas. A new Tempe-Mesa Road was completed in 1892, crossing the Tempe Canal in Section 17, near present-day Alma School Road, then turning south to meet the Mesa Main Street alignment. The old road to Lehi was extended northeast to join the Fort McDowell Road. The Florence Highway was built along the section line that is now McClintock Drive (Maricopa County Board of Supervisors 1871–1920:25, 30; 1894–1925:26, 36-37, 1, 131). By the 1890s, there were four major crossings on the Salt River: Maricopa Crossing (19th Avenue), Gray Crossing (7th Street), Wilson Crossing (36th Street), and Tempe Crossing. The Valley was also connected to other parts of the territory by the older regional trails, which were well traveled. Improved highways went to Fort McDowell, Wickenburg, and Prescott. Two main roads went to the south, to Maricopa Wells and Tucson—the east road running along the present alignment of Interstate 10, and the west road, which went around the west side of the South Mountains (Bufkin 1977:296; Phoenix Chamber of Commerce 1894).

Railroads In and Around Tempe

The early development of the Arizona Territory was entirely dependent upon the horse. With no navigable rivers through the interior, horse-drawn wagons carried all of the ore, grain, and timber that was produced, and hauled food and machinery in from the Colorado and Rio Grande rivers and northern Mexico. For personal conveyance, horseback or stagecoach were the only means to traverse the great distances between towns and mines. Connection to the world beyond the wagon trails and to the ever-expanding national economy would ultimately come through rail. The st transcontinental railroad was completed in 1869 at the time that Phoenix was first settled, and the people of central Arizona eagerly awaited the arrival of a southern line.

The first attempt to build rails across Arizona was the Texas and Pacific Railway, chartered by Congress on March 3, 1871, which was to run from eastern Texas to San Diego. Many years later, the company's only accomplishment was the consolidation of several Texas lines, but it never laid tracks west of El Paso. The route was taken over by the Southern Pacific Railroad, a growing conglomerate which had taken control of most of the rail traffic in California. The Southern Pacific Railroad completed a bridge across the Colorado River at Yuma on September 29, 1877. More than a year would pass before construction continued eastward across Arizona. While Hayden had vocally supported having the rail extend directly into the Salt River Valley, the Southern Pacific Railroad owners were apparently not interested. On April 29, 1879, the tracks reached Maricopaville, or Maricopa, a speculative townsite near the old stage station of Maricopa Wells, bringing the first major rail line in Arizona to within 30 miles of the Salt River Valley. Construction continued for only two more weeks when intense heat brought all work to a halt. Crews resumed laying track in the fall, and the first train arrived in Tucson on March 17, 1880. Six months later, the railroad reached the eastern boundary of the Arizona Territory, and continued through New Mexico to meet the Texas and Pacific Railway at El Paso. When it was completed in January 1883, the Sunset Route, running from Los Angeles to New Orleans, became the nation's third transcontinental railroad (Anspach 1947:4–6, 10; McClintock 1916a:290–291; Myrick 1968:7, 10; White 1991:253–254).

In northern Arizona, a railroad was constructed by the Atlantic and Pacific Railroad (later the Santa Fe Railway) between 1882 and 1883. The railroad facilitated development of the mining and lumber industries, and generated new settlements like Kingman and Williams (Myrick 1998; Stein 1996).

The arrival of the Southern Pacific Railroad had an immediate impact on Hayden and all of the established freighting businesses in the territory. All long-distance hauls ended, as the railroad's freight rates were far lower than the costs of running teamsters and wagons. However, new opportunities opened up in transporting goods to and from the rail heads. There were still considerable distances between most Arizona towns and the railroad, and Hayden's freighters regularly went to Maricopa, a distance of about 18 miles on a road that followed the alignment of present-day State Route (SR) 347 (Maricopa Road) and Interstate 10. Now a much greater variety of fresh foods and manufactured goods were brought up to Tempe and points beyond.

Railroads in the Salt River Valley

On February 13, 1879, the territorial legislature passed an act to aid in construction and maintenance of a railroad

that would connect the Salt River Valley to the Southern Pacific Railroad line. However, the legislature did not commit any territorial funds to the project, but rather, demanded that Maricopa and Yavapai counties provide bond money in the amount of $30,000 for every 10 miles of track completed, not to exceed a total of $400,000. The Arizona Central Railroad was incorporated to take advantage of the generous terms, but opposition from the Maricopa County Supervisors made it difficult to attract investors, and no tracks were ever laid. A second venture, the Maricopa, Phoenix and Prescott Railroad, also failed to start construction, and the act was repealed in 1881 (Anspach 1947:11–12; McClintock 1916a:294).

Hayden became actively involved with the development of a railroad through Tempe and the Salt River Valley. In January, 1884 he chaired the newly incorporated Quijotoa, Tempe and Phoenix Wagon and Railroad Company. Organized by Hayden and other Tempe pioneers—notably Niels Petersen, Winchester Miller, Alfred J. Peters, and John S. Armstrong—the company began construction of a wagon road from Tempe to Quijotoa, southwest of Tucson (see above). The company would then proceed to construct a narrow-gauge railroad from the fledgling mine, across the Gila River to Tempe and Phoenix, thence north through the timber lands of northern Arizona into Salt Lake City (*Phoenix Herald* 1884d). Apparently, no action was ever taken on the proposed railroad. Although construction of the wagon road was started, it is unclear if it was ever completed; the mine and town were largely abandoned shortly after initial development in 1883.

In December of 1884, Hayden wrote to Territorial Governor Tritle with concerns over the Arizona Mineral Belt Railroad, projected to run from Flagstaff to Globe, and another railroad connection that would extend from the Santa Fe Railway at Ash Fork, to Prescott and Jerome (*Phoenix Herald* 1885b). In the letter he suggested that the territory would better be served to invest in railroad connections on these new railroads with the Salt River Valley and Tucson communities. Editors of the *Phoenix Herald* were obviously supportive of Hayden's proposals:

> The line suggested by the honorable gentleman unites the great mining, lumber and agricultural regions of the territory and gives them reciprocal markets and supplies, thus doing away in a great measure with the immense expense of freight to which our businessmen are forced each year as matters now stand. The system would also unite the Atlantic and Pacific road with the Southern Pacific and also the entire territory becomes largely self-supporting and commercially independent [*Phoenix Herald* 1885c:1].

Although suggestions made by Hayden regarding the railroads in his letter were not undertaken (a northern connection with the Santa Fe Railway would not occur until 1895), the Governor must surely have been aware of the pressing needs for a branch connection to the Salt River Valley.

The Maricopa and Phoenix Railroad Company

The Maricopa and Phoenix Railroad Company (M&P Railroad) was incorporated on January 16, 1885 by John J. Valentine, Homer S. King, Monroe Salisbury, Joseph L. Roberson, and Edward B. Young, all of California, and Austin Carrington and Hugh White of Benson, Arizona. This time the legislature's act to assist in the construction of a railroad between Phoenix and the Southern Pacific Railroad offered a less generous subsidy of $200,000. John S. Armstrong, a legislator from Tempe, was successful in getting the bill amended, changing the wording of the requirement to "cross the Salt River at or near Tempe" to "cross the Salt River at Tempe" (Myrick 1980:492). Governor Frederick Tritle signed the bill into law, and Maricopa County was now eager to issue $200,000 in bonds to aid construction. The route was surveyed, but once again, construction was not started. The primary issue that delayed construction was congressional approval to build through the Gila River Indian Reservation (Anspach 1947:11–17, 22; Myrick 1980:494; Simkins 1989:62–63).

The delay in construction by the M&P Railroad was not received well in Valley communities, despite assurances that work would start as soon as possible. Meanwhile, a new group of investors took up the project. The primary backer, Illinois contractor Morris R. Locke, was joined by Nathan K. Masten, a Southern Pacific employee, his brothers, Cornelius S. and William C. Masten, and Francis Cutting, owner of the Cutting Packing Company of San Francisco. Using the same name, they incorporated a new Maricopa and Phoenix Railroad Company on June 4, 1886, and began negotiating to buy the rights of the previous M&P Railroad. N. K. Masten was president of the corporation, Locke received the contract to build the railroad, and C. S. Masten served as superintendent of construction. Construction began on October 30, 1886, and tracks were laid north from the Southern Pacific line at Maricopa to the Gila River. Once the bridge over the Gila was completed, the company was qualified to receive the $200,000 in Maricopa County bonds. In early 1887, the rails reached the farming village of Kyrene, and by April, they were approaching Tempe. The apparent success of the venture attracted new investors, notably, Lewis W. Blinn, a Tombstone lumber dealer and member of the territorial legislature. On June 19, 50 passengers rode the first train from Maricopa to Tempe. A wooden trestle bridge was built across the Salt River, and tracks were laid all the way to Phoenix by July 3, 1887. That Fourth of July was a

festive occasion in Phoenix as the townspeople celebrated their connection with the outside world (Anspach 1947:17–4; Hayden 1972:37; Myrick 1980:496–504, 527, 531; Simkins 1989:63; Zarbin 1997:111).

The arrival of the railroad in the Salt River Valley brought profound changes to the local economy. A variety of foods, supplies, equipment, and consumer goods could be brought in at a much lower cost than by wagon, and locally produced farm products could be shipped to distant markets. The rapid economic expansion brought the opening of many new restaurants, hotels, dry goods stores, drugstores, and lumber yards. Because of this development, along with the Valley's central location in the territory, the legislature voted to move the territorial capital to Phoenix in 1889 (Johnson 1993:20; Simkins 1989:23–24).

The Phoenix, Tempe and Mesa Railway Company and the Maricopa and Phoenix and Salt River Valley Railroad

James C. Goodwin and Robert G. Goodwin, two brothers of a Tempe ranching family, planned to extend a new rail line from the M&P Railroad to serve the expansive agricultural district around Mesa. They incorporated the Phoenix, Tempe and Mesa Railway Company on April 7, 1894. Despite financial difficulties, they completed eight miles of track to Mesa in May of 1895. The railway went ong the south base of Tempe Butte, crossing the Kirkland-McKinney Ditch and continuing easterly beyond the Tempe-Mesa Produce Company (later renamed the Pacific Creamery). However, the Goodwins had no money left for operating funds, and the line sat unused for six months. They were forced to enter into arrangements with N. K. Masten, president of the M&P Railroad. The railroad was finally put into service on December 9, when it was merged with the M&P. The consolidated company was called the Maricopa and Phoenix and Salt River Valley (MP&SRV) Railroad (Anspach 1947:24–27; Myrick 1980:517–522). Financial struggles in the first decade of the twentieth century led to the sale of all company interests to Southern Pacific; however, the MP&SRV continued to operate the line independently until 1908 when Southern Pacific took direct control of the railroad and all its property (Myrick 1980:537).

The Santa Fe, Prescott and Phoenix Railway Company

The territorial legislature had made several attempts to get additional rail service extended into the Salt River Valley. The establishment of a line from the south, connecting to the Southern Pacific, made the most sense since the distance was less than 30 miles, but the legislators also wanted to ncourage construction of another line from the north, nnecting Phoenix to the Atlantic and Pacific Railroad, which went through the northern part of the territory. Two acts were passed to provide inducements for construction of a new 200-mile railroad: one offered subsidies in the form of bonds from Maricopa and Yavapai counties; the other granted a tax exemption for 20 years for any railroad entering Phoenix from the north. The generous incentives attracted the attention of Frank M. Murphy, the brother of Territorial Governor Nathan O. Murphy, who had helped build the Atlantic and Pacific Railroad through northern Arizona. Frank Murphy incorporated the Santa Fe, Prescott and Phoenix Railway Company on May 27, 1891, and gained financial backing from the Santa Fe Railway, which had acquired the Atlantic and Pacific tracks. Construction of the Santa Fe, Prescott and Phoenix line began at Ash Fork in 1892. The line reached Prescott and Wickenburg in 1894, and was completed through to Phoenix on February 28, 1895. The completion of this railway connected two major transcontinental railroads, the Santa Fe and the Southern Pacific, by way of Phoenix (Anspach 1947:27–32; Myrick 1980:545–546).

The Phoenix and Eastern Railroad

After the turn of the century, there was increasing competition between railroads for a share of Arizona's freighting business. In 1901, Frank Murphy decided to build a new railroad to serve the copper mining region along the Gila River east of Phoenix. On August 31, 1901, he incorporated the Phoenix and Eastern (P&E) Railroad. Once again, he was able to secure financial support from the Santa Fe Railway. He planned to extend his Santa Fe, Prescott and Phoenix Railway, cross the Salt River at Tempe, and continue on through the Gila Canyon to Winkelman, thence down the San Pedro River to Benson. This route put him in direct competition with the Arizona Eastern Railroad (funded by Southern Pacific), which had similar plans.

Murphy began construction of the new line in 1902, which ran east from Phoenix parallel to the MP&SRV line. Workers began driving piles for a bridge at Tempe in late November of 1902; by January 1903, tracks were being laid between the Hayden Flour Mill and Tempe Butte. In return for relinquishing the right-of-way for construction of the P&E mainline, a mill spur was constructed immediately adjacent to the flour mill for access to the rail line. At least two other spurs were present on the Hayden Mill property through the first half of the twentieth century; these additional spurs have been designated the gravel spur and dead-end spur and are discussed briefly in Chapter 22. The tracks then went around the south base of the butte, headed southeast to Normal Junction, and then east into Mesa along 3rd Avenue. A depot was built at the north end of Willow Street (College Avenue). The railroad was completed to Mesa in April 1903 and to Florence by February the following year.

By the end of 1904, the rails had been extended as far as Winkelman near the confluence of the Gila and San Pedro

rivers. Although the railroad had been originally projected to run to Benson, Santa Fe Railway initially funded construction only to Winkelman. In 1903, a major revision of the proposed right-of-way was approved to Lordsburg and Deming, New Mexico after crossing the Gila River near Dudleyville; the original Benson terminus was terminated. Unfortunately, financial and political difficulties after initial construction to Winkelman delayed further construction (see discussion below); the line would eventually be extended to Christmas, Arizona, but only after Murphy sold the company to Southern Pacific and the Arizona Eastern Railroad Company (Anspach 1947:53–55; Myrick 1980: 532–534, 545–553).

Railroad Bridges at Tempe Crossing

All of the railroads through central Arizona crossed the Salt River at Tempe (Figure 5.4). The bridges there were built to specifications that would have been adequate in most locations, but none of these early bridges were able to withstand the force of the frequent floods on the Salt River. In February 1890, a flood washed away part of the new M&P Railroad Bridge. It was promptly repaired, but one year later, the people of the Valley witnessed a flood of unimaginable force. A record flow estimated at 300,000 cubic feet per second rolled through the Valley, sweeping away everything within the floodplain, including the M&P Railroad Bridge and much of the City of Phoenix (Myrick 1980:572; Zarbin 997:124, 143). A new wooden trestle bridge was built when the waters subsided. Then, unexpectedly, on October 29, 1902, the middle section of the bridge collapsed into the dry riverbed; support for the foundation had apparently been scoured away by previous minor flooding (Myrick 1980: 524–525).

When Frank Murphy was building the P&E Railroad across the Salt River in Tempe, he was well aware of the potentially devastating currents that could be expected in that location. The first bridge he erected was intended to be temporary. Construction of the permanent bridge did not begin until the end of the year, after 40 cars of heavy steel girders were brought to Tempe. The steel trestle was assembled on massive concrete piers, and the new bridge was put into operation in January 1904 (Figure 5.5). One year later, the M&P Railroad replaced its old wooden trestle at Tempe with a new steel trestle (Myrick 1980:565, 571).

These sturdy new bridges were designed to withstand the force of the freshets that typically swelled the river every spring, and it was expected that nothing short of a massive flood of the type that struck in 1891 would be able to move them from their footings. However, record rainfall in the spring of 1905 tested the limits of their design. On March 20, 1905, the northern two spans of the P&E Railroad Bridge collapsed. The *Tempe News* (1905b: No page number available) gave this account of the incident:

> The big cement pier first south of the north end of the bridge which has for days been receiving the full force of the current, but which almost everybody thought was only less solid than the butte itself, was completely wiped out of existence. Some idea of the awful force of the water may be had when it is understood that this pier stood on piles that were driven seventy feet into the ground, and upon these piles was a concrete foundation twenty feet deep upon which the cement pier was built.
>
> The bridge was quickly restored, only to be completely washed away a week later, on April 11. The combination of consecutive storms in the Valley and warm weather in the snow-covered mountains swelled the river even more, and two days later, the north approach to the M&P Railroad Bridge was washed out (Myrick 1980:572, 575–576). By late 1905, four railroad bridges were in use, spanning the river at Tempe—the 1891 M&P Railroad wooden bridge that was dismantled in 1907, the new M&P Railroad steel bridge, the damaged P&E Railroad Bridge, and a temporary P&E Railroad Bridge to supply service until completion of its permanent counterpart. However, another series of storms in November 1905 (*Tempe News* 1905b) and again in December 1906 (Tempe News 1906), brought more destructive flood waters that took out both of the P&E Railroad bridges and the old wooden trestle of the M&P, leaving only the 1905 M&P Railroad Bridge standing.

An agreement was made between the two railroads allowing P&E traffic to travel on the M&P tracks from Phoenix and across the existing M&P Bridge into Tempe; trains were then directed back onto the P&E mainline via a small connecting spur south of the mill property (Figure 5.6). Consequently, the P&E mainline that originally ran behind the mill property and Tempe Butte became another spur to serve the flour mill. After construction of the Grain Elevator and Silos in 1951, this "mainline spur" brought in rail cars delivering grain, while the original mill spur transferred flour and other products to markets across the state.

In 1912, the Arizona Eastern Railroad, successor of the two previous railways, removed the steel spans from the remaining bridge and erected nine through-truss spans on the existing piers. This is the railroad bridge that still stands today at Tempe (Myrick 1980:575–576).

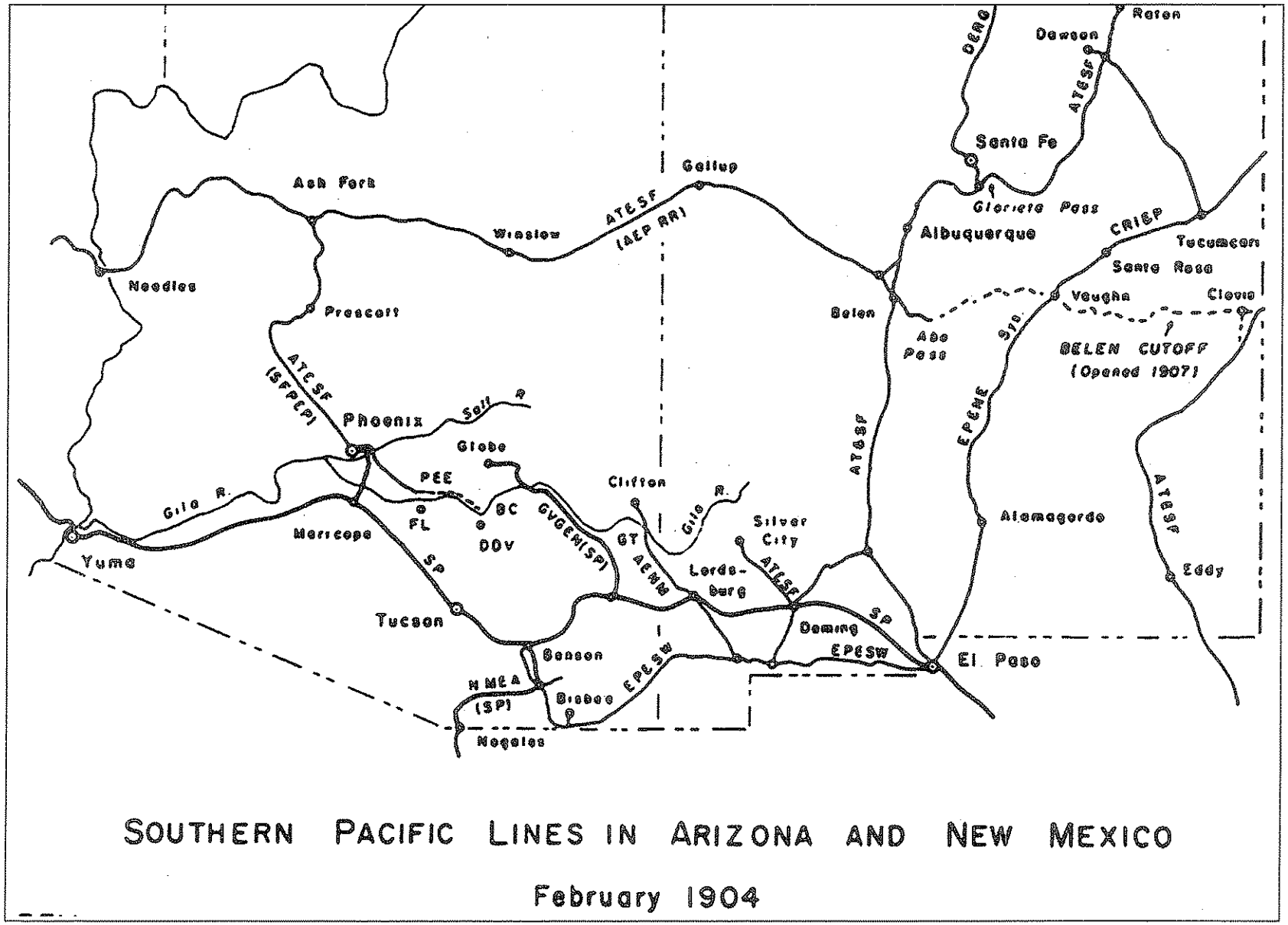


Figure 5.4. Map of Southern Pacific Lines in Southern Arizona in 1904 (including the former M&P). Central Arizona Lines ran through Phoenix and the Salt River Valley, crossing the Salt River near Tempe Butte. As shown, the P&E Railroad in 1904 was nearing completion at Winkelman, and was projected to cross the Gila River near Dudleyville (DDV), and continues to Lordsburg (Myrick, 1980:540).

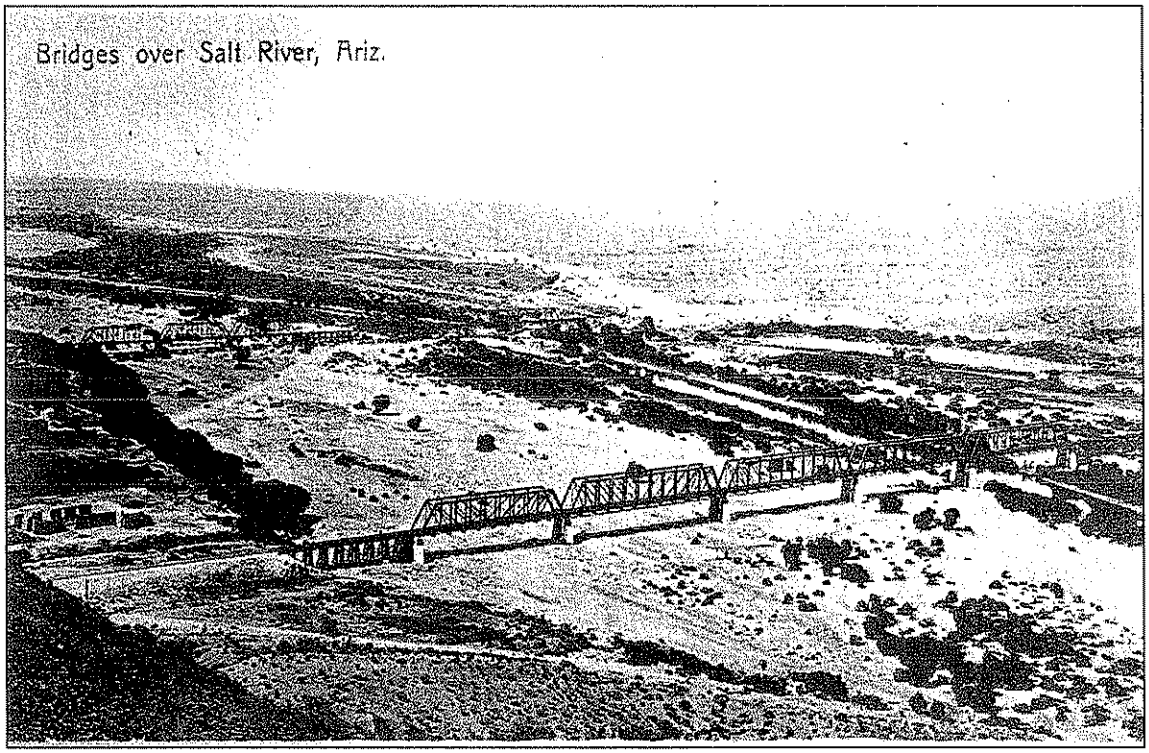


Figure 5.5. Northwest-facing view of the two railroad bridges crossing the Salt River near Tempe, ca. 1904–1905. The M&P Railroad Bridge is in the background, with the P&E Railroad Bridge in the foreground. (Gerald A. Doyle & Associates 1991: Photograph AZ-29-3).

Consolidation of Local Rail Lines

In the first decade of the twentieth century, the two railroad giants—the Santa Fe Railway and the Southern Pacific Railroad—were in fierce competition over rights-of-way along the Gila River southeast of the Salt River Valley. The P&E Railroad, a subsidiary of the Santa Fe Railway, was completing a rail line to Winkelman and was in the process of surveying a revised extension towards Deming and Lordsburg, New Mexico along the north side of the Gila River. The Arizona Eastern Railroad Company, a subsidiary of the Southern Pacific Railroad, was incorporated on February 16, 1904 to construct a line along the Gila River through southern Arizona, which would apparently include a mainline in Phoenix and Globe before terminating in Lordsburg. The point of contention for both proposed lines was along the Gila River near Dudleyville (Box Canyon (BC) in 5.4). After several years of litigation and intense negotiations, a settlement was reached, whereby the Southern Pacific Railroad gained control of the P&E Railroad (including all its debts and expenditures) and Santa Fe Railway was able to extend into northern California through the formation of the jointly owned Northwestern Pacific Railroad Company. The Southern Pacific Railroad officially took control of the P&E Railroad in 1906 by purchasing its outstanding stock; however, the line operated under its own company name for several years before it was leased to the reincorporated Arizona Eastern Railroad in 1910 (Myrick 1980:595–608).

On February 1, 1910, the Arizona Eastern Railroad was reincorporated and constituted all Southern Pacific subsidiaries in Arizona and New Mexico, including the original Arizona Eastern Railroad and the MP&SRV; the P&E Railroad was leased to the new railroad. In June of the same year, the Arizona Eastern Railroad also purchased the Phoenix and Buckeye Railway, which had just been completed. The consolidation of these lines seems to have completed the original charter of the Arizona Eastern Railroad in 1904; however, between 1910 and 1924 when the corporation was subsumed by Southern Pacific Railroad, additional lines were not constructed to create a unified mainline along the Gila River and through the Salt River Valley. In 1924, the Southern Pacific Railroad acquired the El Paso and Southwestern rail lines in Arizona and New Mexico under an agreement that a mainline be constructed from the Southern Pacific Railroad line at Wellton and extending through Buckeye, Phoenix, Mesa, and Florence before rejoining the Southern Pacific line at Picacho. The Arizona Eastern Railroad and P&E Railroad both came under operative control of the Southern Pacific Railroad. Apparently, however, the corporate identity of the Arizona Eastern Railroad continued to exist through at least 1955. The two spur segments that currently extend through the current project area were relinquished in 1950 and 1951 by the Arizona Eastern Railroad, transferring the rights-of-way to Hayden Flour Mills (Maricopa County Recorder 1950).

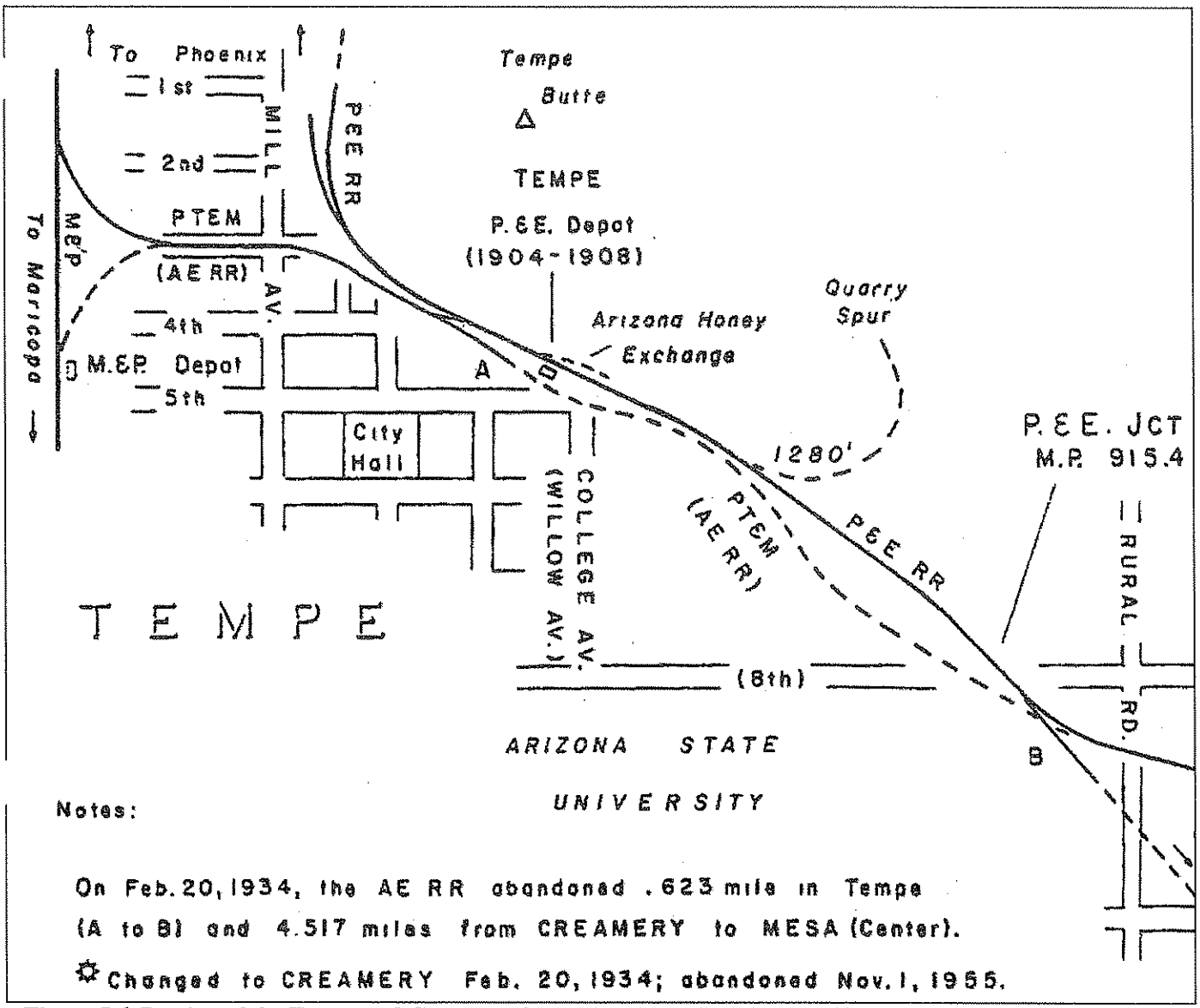


Figure 5.6. Portion of the Tempe and Creamery figure showing railroads extending through Tempe from Myrick 1980:518.

According to a Wikipedia article, the Arizona Eastern Railroad was officially dissolved by the Southern Pacific Railroad in 1955 (Wikipedia 2007c).

The mainline was completed through Phoenix in 1926, giving the company an even firmer hold on rail traffic through the region. By 1934, all rail lines in central and southern Arizona were consolidated under the Southern Pacific Railroad (Myrick 1980:578–581; Walker and Bufkin 1986:46). Over time, portions of these pioneer rail lines through the Salt River Valley were abandoned and tracks removed (see Figure 5.6). The original M&P Railroad line at had first brought the rail to Phoenix and the Salt River Valley was abandoned between 1935 and 1941; completion of the mainline had significantly diminished its usefulness.

As for the original P&E Railroad, segments of the historic line were abandoned and sold to various mine companies. At some point after 1955, the line segment between Magma and Winkelman (including the Winkelman to Christmas extension) was sold to Kennecot Copper, which operated the railway until 1986. At that time, it was sold to Rail Management Corporation and designated the Copper Basin Railway. The Copper Basin Railway has been owned by ASARCO Copper Corporation since 2006 (Wikipedia 2007). The historic P&E Railroad extending through Tempe was owned by the Southern Pacific Railroad and its subsidiary, the Arizona Eastern Railroad, for most of its existence (1907–1996). Since 1996, however, the Tempe segment has been an element of what is known as the northern spur of the Union Pacific Railroad Sunset Route, which extends north of the Gila River from Wellton to Poston, then south to terminate at

Picacho on the original Southern Pacific Railroad mainline. The two spurs existing within the current project area were in use through 1998 when the mill was abandoned.

Automobile Highways and Bridges in the Twentieth Century: 1910–1945

At the beginning of the twentieth century, the cities of Phoenix, Tempe, and Mesa were growing at a rapid rate, and yet, the Valley was still split into a north side and a south side by the river that supported its agriculture-based economy. The only bridges across the Salt River were for the railroads, which had effectively connected these cities to the rest of the country, but did little to foster transportation across the Valley. Scheduled passenger service was limited, and the high cost of crossing by train or ferry was a barrier to creating a fully integrated economy for a "Greater Phoenix." Hayden had lobbied heavily for a wagon road to also be built, running parallel along the new bridge trestle, but the Maricopa County Board of Supervisors would not agree to the added cost (*Tempe News* 1895a). By 1900, everybody recognized the urgent need for permanent bridges to allow free crossing for local traffic at all times regardless of the level of the river (Simkins 1989:26).

This was essentially a local issue, but the impetus for building improved roads and bridges in central Arizona at this time came largely as a result of national trends and the introduction of the automobile, America's newest mode of transportation. Initially, only the wealthy bought the new engine-driven horseless carriages, but when Henry Ford introduced his inexpensive Model T touring car in 1908, anyone with one hundred dollars for a down payment could afford to buy one. By 1910, there were 10 automobile dealers in Phoenix, and purchase prices soon dropped lower as competing manufacturers started offering other low-priced models. Automobiles were immediately popular everywhere, a trend fueled in part by Progressive Era politics and people's intense dislike of railroad companies, whose schedules and rates seemed to serve no one but themselves. In contrast to the railroads, the automobile seemed more representative of democratic principles, promoting mobility and independence for all at a low cost, with no restrictions except the lack of good roads (Goddard 1994:ix, 50, 54, 61; Kaszynski 2000:35; Luckingham 1989:51).

The advent of automobile travel drew attention to the country's inadequate system of roads and bridges, and brought about a nationwide Good Roads Movement. While some cities had streets paved with cobblestone, brick, or wooden blocks, these roadways seldom extended beyond city limits. The only roads that connected cities and regions were the old pioneer trails and wagon roads that were usually nothing more than a pair of wheel ruts. Privately organized Good Roads associations began demanding that local, state, and national governments begin building improved hard-surfaced roads. President Theodore Roosevelt was one of the first national leaders to anticipate the revolution in transportation that was underway. In 1905, he created the Office of Public Roads to test new road-paving materials and construction techniques. By 1910, many states were building hard-surfaced roads with newly developed materials such as concrete and asphalt, also known as bituminous, which was a mixture of petroleum oil, sand, and gravel (Goddard 1994:54; Kaszynski 2000:1, 16, 19, 27–32).

In Arizona, the biggest obstacle to vehicular travel was the lack of secure bridges over any of the territory's major rivers. In 1905 the legislature authorized bonds to pay for construction of a bridge across the Gila River at Florence (Cross et al. 1960:223–224). Once construction was underway, planning was begun for a bridge on the Salt River. Dwight B. Heard, a prominent Phoenix rancher and land developer, actively promoted construction of the bridge on Center Street (Central Avenue), which would provide easy access to his own lands south of the river. The Tempe Crossing, with its bedrock formations, was a much better site for constructing a bridge, and the location would serve many more people, but Heard was very persuasive. The site of the bridge was to be decided in a special Maricopa County election in 1909, and voters chose the Center Street location over Tempe by 873 to 712. The Center Street Bridge was completed in March of 1911, and the first traffic to pass over it was the great automobile caravan that accompanied former president Roosevelt to the dedication of the new dam that now bore his name. With the completion of both the bridge and Roosevelt Dam, it seemed that the people of the Salt River Valley had finally overcome the last natural obstacles to the further development of prosperous cities and farms (Lamb 1981; Luckingham 1989:52–53, 1909a, 1909b, *Tempe News* 1909c, 1910a; Wagoner 1970:484).

At the time construction began on the Center Street Bridge, the legislature realized that a bridge at Tempe would need to be built as well, not just for local traffic, but as a component of a larger regional travel route. The position of Territorial Engineer was created to develop and implement a system of roads through the Arizona Territory; James B. Girand was the first to hold this position. Additional funds were appropriated for building the Tempe Bridge—a structure constructed with the relatively new technology of reinforced concrete. Construction began in 1911, with prisoners from the Territorial Prison at Florence providing most of the labor. The Tempe State Bridge was completed in 1913 (Figure 5.7). It was the first concrete multiple-arch bridge in Arizona. As the first dependable river crossing for vehicles, it finally allowed unrestricted travel between Tempe and the other south-side communities and Phoenix, creating the conditions necessary for a unified economy

stretching across the entire Salt River Valley. Perhaps more importantly, as improved highways were developed, nearly all major east-west and north-south routes through the state would pass over the Tempe State Bridge. This structure was later known as the Ash Avenue Bridge; it was permanently closed to traffic in 1931 due to serious structural damage and was demolished in 1991 (Gerald A. Doyle & Associates 1991:4–5, 20; Janus Associates 1983: Inventory Form HPS-227).

When Arizona became a state in February 1912, the Territorial Engineer, James Girand, became the first State Engineer; however, his actual role in improving transportation across the state was not immediately clear. The counties were still responsible for nearly all road construction and maintenance. A tentative highway system was drawn in 1912 by the State Engineer that included two statewide highways—an east-west alignment between Yuma and Clifton and a north-south alignment from Douglas to the Grand Canyon (Arizona State Engineer 1914). A new law was passed to promote broader planning and more consistent funding across the state. Transportation routes were proposed to connect all county seats in Arizona. The various county road taxes were eliminated and replaced with a new state property tax, which was expected to raise $250,000 each year. Three-quarters of these revenues were to be distributed to the counties for road projects, and one-quarter was reserved for the development of state roads (Cross et al. 1960:219–220).

By mid-1912, Girand reported that 86.5 miles of graded state roads had been constructed during the fiscal year just ended, the largest single expenditure being for 40 miles of the new Tucson-Florence Highway, which was an important segment of a planned north-south route. Funding for the state roads was lower than anticipated, partly due to problems collecting the state property tax, but the State Engineer continued surveying different routes that would eventually be tied together into the north-south state highway connecting Douglas, Bisbee, Tucson, Florence, Mesa, Tempe, Phoenix, Prescott, and Flagstaff (Arizona Board of Control 1912:7-8, 1913:7; Arizona State University 1968:2). There was slow but steady progress being made toward the establishment of a state highway system, but the designation of state roads did not necessarily mean that the state had ownership over them. As an early state highway employee recalled, "If he [the state engineer] spent any money in improving a road, it was considered a state highway. If he ceased maintaining it, then it ceased to be a state highway" (Cross et al. 1960:219–220).

State and county road-building activity was largely focused on connecting cities and towns in Arizona, but in Chicago and other distant cities, national touring clubs and automobile associations were considering how Arizona fit into their plans to promote transcontinental highways. The American Automobile Association, formed in 1902, was one of the first organizations to propose cross-country routes. In 1910, the Touring Club of America started exploring and promoting many well-known routes, including the Ocean-to-Ocean Highway.

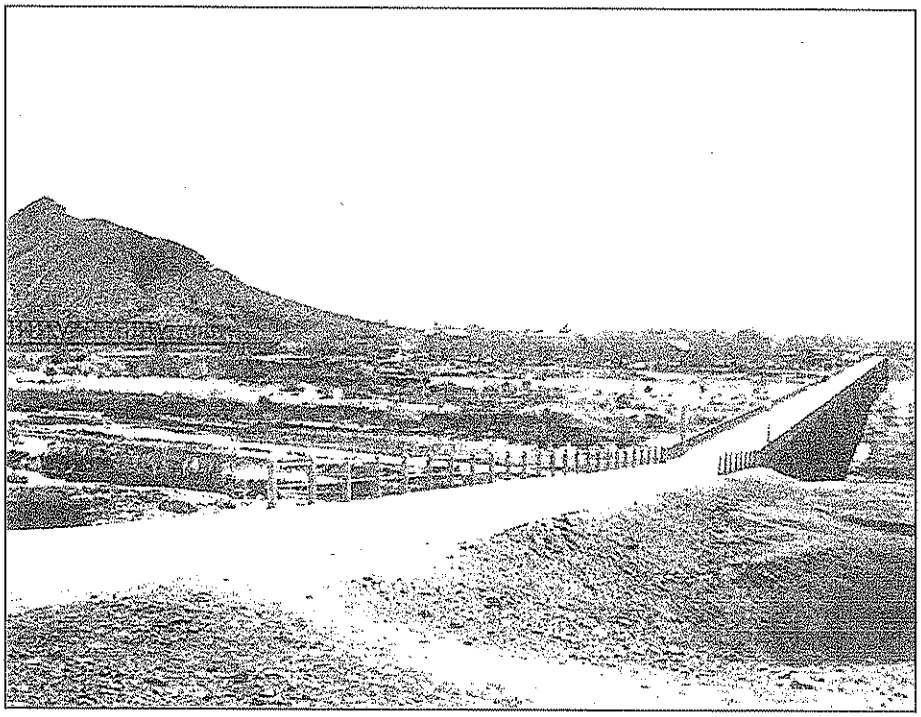


Figure 5.7. Southeast-facing view of the Ash Avenue Bridge approaching Tempe, ca. 1913. The remnant spans of the P&E Railroad Bridge are visible in the background (Gerald A. Doyle & Associates 1991) Photograph AZ-29-5) .

A few years later, the National Old Trails Road Ocean-to-Ocean Highway Association focused on identifying the famous historic trails that had fostered westward expansion and settlement into every part of the country. All of these organizations followed the same basic approach: they explored the country, designated routes which incorporated the best available state, county, and local roads, and published maps and guidebooks to encourage Americans to take to the roads and see their country (Kaszynski 2000:35–42). One of the most famous of these early routes, the Ocean-to-Ocean Highway, went from Savannah to San Diego. As it went through Arizona, it followed much of the State Engineer's meandering chain of roads, passing through Bisbee, Tucson, Florence, Mesa, Tempe, and Phoenix before continuing on to California (Arizona Good Roads Association 1987:42, 45; Hi-way Travel Services ca.1935).

In 1915, the segment of the Ocean-to-Ocean Highway that passed through the Salt River Valley was paved with tar macadam, also known as Tarvia. The two-lane roadway was a uniform 18 feet in width with gravel shoulders (Janus Associates 1983: Inventory Form HPS-229). Although such hard-surfaced roads were very expensive to build, they required far less maintenance than graded roads, and local motorists saw the clear benefits of smooth roads. However, it was another six years before local residents were willing to make such an investment for improving all of the other roads. In 1921, Maricopa County voters approved $4 million in bonds for building a grid of concrete-paved roads at one-mile intervals throughout the Salt River Valley. At the time, it was the most ambitious paving project undertaken by any county in the nation (Cross et al. 1960:226; Myrick 1980:766; Touring Guide Publishing Company 1926).

By 1919, most of the Ocean-to-Ocean Highway had been designated as the Bankhead National Highway by a new national organization. The highway was named for Senator John H. Bankhead of Alabama, who had been the sponsor of the Federal-Aid Road Act of 1916. Passage of this law was an important first step toward creating a national highway system. Under its provisions, the federal government agreed to pay for half of the costs of approved projects, up to $10,000 per mile, with funding sent directly to the states. It included an annual appropriation of $25 million, which was distributed to the states by a formula that considered population, road mileage, and land area. There were certain conditions attached to the funding: participating states were required to have a state highway department headed by a civil engineer, and a highway system that comprised at least 7 percent of the total road mileage in the state. Also, prisoners could no longer be used to do road labor, as Arizona and many states had become accustomed to doing. This practice was found to be contrary to constitutional prohibitions against involuntary servitude and cruel and unusual punishment, and an executive order banned the use of convict labor on federally funded projects (Arizona Board of Control 1912:3; Cross et al. 1960:220; Kaszynski 2000: 35–42, 52–54, 96).

The Federal-Aid Highway Act of 1921 expanded funding for a range of urban, rural, and transcontinental roads, and established a permanent federal gasoline tax to pay for road construction (Cross et al. 1960:220, 224; Kaszynski 2000:59-60). The law also authorized federal designation of a national highway network. As with the early state highway system, highways included in the national system did not confer any federal ownership or control; such designation generally meant only that the highway was funded in part with Federal aid and met certain minimum design standards. By 1925, eligible highways were assigned route numbers, which were posted along the roadways on standard signs with the federal highway shield (Arizona State University 1968:2; Cross et al. 1960:220; Kaszynski 2000:59–60). Principal U.S. Federal-Aid Highways through Arizona included:

- **U.S. 60**, which ran from Richmond, Virginia, to Los Angeles; it entered Arizona near Springerville, and went through Show Low, Globe, and the Salt River Valley.
- **U.S. 66**, previously known as the Will Rogers Memorial Highway, which ran from Chicago to Los Angeles; it went through the northern part of Arizona.
- **U.S. 70**, previously known as the Jefferson Davis Highway and the Sunkist Trail, which ran from Raleigh, North Carolina, to Globe, Arizona; it entered the state near Safford, and was later extended to the Salt River Valley and Los Angeles.
- **U.S. 80**, the Ocean-to-Ocean Highway and the Bankhead National Highway, ran from Savannah, to San Diego; it entered Arizona near Douglas, and went through Bisbee, Tucson, and the Salt River Valley.
- **U.S. 89**, which was the only major north-south highway in the state, began at Nogales and went through Tucson, Florence, the Salt River Valley, Wickenburg, Prescott, Flagstaff, and Fredonia before continuing on to Salt Lake City.

With the exception of U.S. 66, the other four US highways all converged at Florence Junction, followed the Apache Trail, Main Street in Mesa, and the Tempe-Mesa Road, crossed the Tempe State Bridge, and then went on to Van Buren Street. The highways eventually separated again at Five Points, where Grand Avenue begins, where U.S. 60, 70, and 89 went northwest to Wickenburg, and U.S. 80 continued west to Buckeye, Yuma, and Los Angeles (American Automobile Association 1930; Arizona State Highway Commission 1933, 1942, 1970; Cross et al.

1960:225; Hi-way Travel Services ca.1935; Kaszynski 2000:35–42, 57; Luckingham 1989:82; Rush 1922; Touring Guide Publishing Company 1926).

The Arizona State Highway Commission was created in 1927. At the time, Arizona had 1,988 miles of roads, but only 219 miles were paved (Cross et al. 1960:219–223; Sheridan 1995:239). One of the first issues that the commission had to face was the deteriorating condition of the Tempe State Bridge. In 1920, flood waters scoured away at the foundation, and one of the supporting piers sank several inches. Repairs were made to level the road bed, but the serious structural damage could never be corrected. The bridge had also not been built to withstand the weight and volume of automobile traffic that had proliferated in the Valley by this time. The road bed was only 18-feet wide, which was not wide enough to accommodate two-way traffic, so vehicles were often lined up waiting to cross. With the merging of so many state and national routes at the Tempe Crossing, all transcontinental traffic south of the Colorado Plateau was funneled through the Tempe Bridge. In 1925, it was reported that 3,500 to 4,000 cars crossed the bridge every day; by 1928, up to 8,000 vehicles a day were passing over the unsafe bridge. A delegation of Tempe businessmen approached the commission with an urgent plea to immediately replace the bridge. Because of the importance of this key link in the state's highway system, the commission made construction of the proposed Mill Avenue Bridge its first priority (Gerald A. Doyle & Associates 1991:5, 11).

Because floods had destroyed so many bridges at Tempe, project engineers chose a diagonal alignment so that concrete pylons could be sunk directly into a solid bedrock ridge that lay just below the surface of the riverbed. The State Highway Commission contracted with Lynch-Cannon Engineering Company of Los Angeles to build the structure, which was of concrete construction with 10 arched spans, each 140-feet long, with a total length of 1,577 feet. The roadway was 36-feet wide, twice the size of the one on the old bridge at Ash Avenue, and sidewalks were set on both sides of the road. The new bridge, built at a cost of $518,788, was designed to carry up to 25,000 vehicles per day. The Mill Avenue Bridge was completed in July 1931, though a formal dedication ceremony was not held until 1933. Four of the major Federal-Aid Highways, including U.S. 60, U.S. 70, U.S. 80, and U.S. 89, crossed the Salt River on the Mill Avenue Bridge (Gerald A. Doyle & Associates 1991:5; Lamb 1981).

The Post World War II Era: Street Grids and Interstate Highways

In the 1930s, all major roads through the Salt River Valley, from Florence Junction to Buckeye, were paved with concrete or asphalt, but only certain segments of the Federal-Aid Highways in the state were paved. There was very little funding for highway construction during the Great Depression, and when the Second World War began, even less road work was completed due to labor shortages and wartime restrictions on construction materials (American Automobile Association 1930; Arizona State Highway Commission 1933; McCauley 1993:197). After World War II, new industries were established in central Arizona, and the population of all of the Valley's cities started growing at a rapid rate. In 1949, the Phoenix City Council approved the Phoenix Master Street Plan, which envisioned a one-mile grid of broad paved streets throughout the city. This plan, essentially a modernization of the 1921 county system, was generally followed by the other cities in the Valley. The extension of the grid between cities required that streets cross the Salt River at one-mile intervals, but as the riverbed was now almost always dry due to the completion of the Salt River Project's system of reservoirs, bridges were considered unnecessary, and roads were laid across the river channel. Phoenix updated its transportation planning in 1960 with the Major Street and Highway Plan, which was similar to the earlier plan, with the addition of proposed freeways (McCauley 1993:197–199; Ruff 1971:11).

After World War II, the federal government assumed a greater role in developing an improved national highway system. President Dwight D. Eisenhower's call for a new interstate and defense highway system resulted in the passage of the Federal-Aid Highway Act of 1956. The proposed 41,000-mile interstate system was to be completed over a 13-year period at a cost of almost $25 billion. As with earlier federal-aid highway laws, the states would be responsible for actual construction, but Congress would provide funding for up to 90 percent of the costs. This enormous undertaking was to be financed by increased gasoline and tire taxes and truck user fees. This new approach was considerably different from earlier federal highway planning, which had focused on developing a limited number of cross-country routes by connecting various state highways. The new national system of superhighways would link all states, cities, and defense plants into a single road network with uniform design standards. By 1960, the proposed interstate system through Arizona included 1,162 miles of new highways. The construction of the Black Canyon Freeway (Interstate 17) and Maricopa Freeway (Interstate 10) through Maricopa County was substantially completed by 1970 (Cross et al. 1960:222; Kaszynski 2000:162–167).

Hayden Flour Mill and the Transportation Corridor

The location that Charles T. Hayden chose for the Hayden Flour Mill and his freighting business headquarters was strategically situated to take advantage of the Tempe Crossing site. Subsequent development of roads and railroads enhanced the importance of the location as it evolved into an essential link in local, regional, and national transportation corridors. This was of great benefit to Hayden and his successors, considering the need to effectively distribute flour and other finished products to communities throughout Arizona. Easy access to all modes of transportation, whether by wagon, rail, and/or truck, has always been important to the success of the Hayden Flour Mill.

The Hayden Flour Mill has also served as a landmark on the key transportation routes. The large distinctive structure at the base of Tempe Butte was the first thing one would see when approaching Tempe from the north. Because of its strong visual association with the town, the iconic mill was often recognized by travelers as a sign welcoming them to Tempe. Indeed, the intrinsic relationship between the Hayden Flour Mill and the roads is illustrated by the fact that the main street through downtown Tempe was and still is named Mill Avenue.

The Tempe Crossing was the juncture of all major transportation corridors through central Arizona for nearly one hundred years (Figure 5.8). It was not until after World War II, with the development of the street grid and interstate highways, that there were alternative routes that bypassed the mill and downtown Tempe. However, more recently, the Tempe Crossing has reemerged as an important corridor in the modern regional transportation system. Since the 1990s, the construction of the Red Mountain Freeway, the Second Mill Avenue (northbound) Bridge, and the Light Rail Bridge have once again made this unique location one of the most important links connecting Phoenix to the East Valley and beyond.

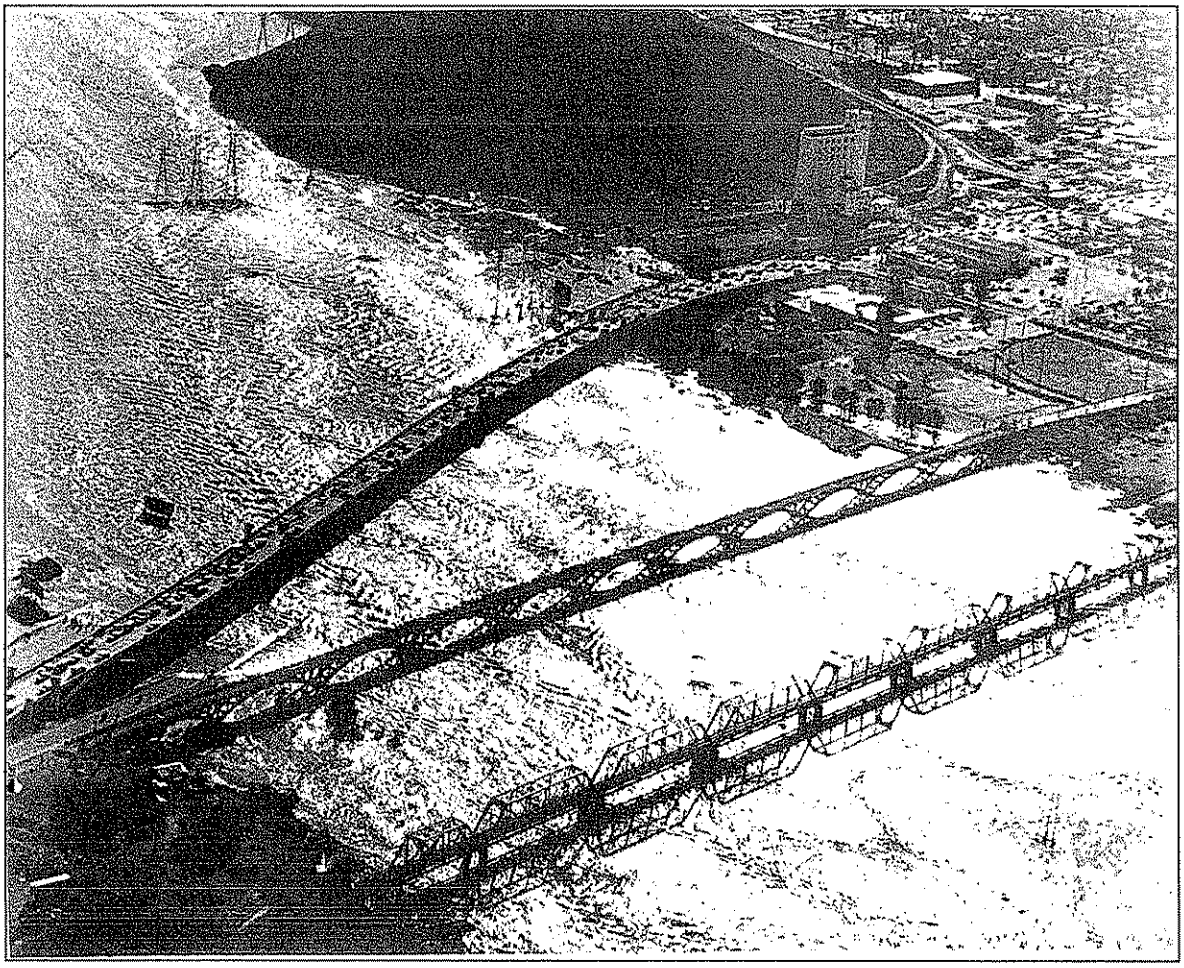


Figure 5.8. Southeast-facing oblique aerial showing the Mill Avenue, Ash Avenue, and Southern Pacific (former M&P) Railroad bridges at Tempe Crossing, taken 1965 (Gerald A. Doyle & Associates 1991: Photograph AZ-29-6).

CHAPTER 6: COMMUNITY PLANNING AND DEVELOPMENT

Scott Solliday and Victoria D. Vargas

Tempe began not as a town, but as a series of separate settlements on the south side of the Salt River. Through the late 1860s and 1870s, Mexican American and Euroamerican homesteaders established farms on the south side of the Salt River and constructed the Tempe Canal to deliver water to agricultural fields. Charles T. Hayden, a Tucson merchant and freighter, chose to move his business operation to the more centrally located site in the Salt River Valley. His homestead and thriving commercial establishment along the west slope of Tempe Butte was soon known as Hayden's Ferry. By 1878, the growing settlement of Hayden's Ferry comprised one quarter of the Valley's population; aside from Hayden's thriving business enterprise along Tempe Butte, Hayden's Ferry also included a school house, a post office, a Justice of the Peace, two stores, and one rum shop (*Arizona Enterprise 1878b*). Hispanic settlers, who had migrated from southern Arizona and northern Mexico to work as laborers and toil the fields established two separate residential communities known as San Pablo and Sotelo Ranch around the butte. Each settlement had its own distinct character and purpose; but despite the differences between these scattered clusters of people, they were all unified under a single canal system. By 1879 there was an emerging consensus that they all comprised a single community known as Tempe; on May 5, 1879, the post office was renamed Tempe (Hayden 1972:36; Solliday 1993:56).

Laying the Foundation for a Community: Tempe in the 1880s

In 1880, Tempe was a widely dispersed agricultural community; essentially an irrigation district that covered the south half of Township 1N, Range 4E, from the river to the baseline. The population comprised 135 people, of which 85 percent were Hispanic. About half of the people were farmers living on 160-acre homesteads spread across 12,000 acres of irrigated farmland under the Tempe Canal system. They grew wheat, barley, alfalfa, and some experimental plantings of deciduous fruit and grapes, most of which would fail from the seasonal heat. There were three distinct population centers in this area—Hayden's Ferry, San Pablo, and the Sotelo Ranch—that were quickly growing with the arrival of a few families, but mostly single men coming to work. The residents of Hayden's Ferry were primarily the employees of Hayden: his freighters, carpenters, blacksmiths, millers, and a sizeable team of general laborers.

The Sotelo Ranch, located east of Tempe Butte, was the homestead of Manuela Sotelo, matriarch of the first family in Tempe. Her husband, Tiburcio Sotelo, and their two eldest sons, came to the Salt River in 1870 and helped construct the Kirkland-McKinney Ditch. However, all three men died within two years. Doña Manuela then moved onto the land with her daughters and young son. The quarter section they claimed, at what is now the southeast corner of Rural Road and University Drive, was quickly settled and turned into farmland by the men who married her daughters and many friends and relatives who were invited from Tucson.

By 1880, most of the new arrivals in Tempe settled in San Pablo, the townsite at the south foot of the butte. The land for this townsite had been donated by William Kirkland, who had not actually obtained a patent, for the benefit of the Hispanic workers that had helped build the canals. This was the residential foundation for the new town, with small Sonoran-style adobe homes set along a grid of dirt streets. In 1881, a Catholic church was built in the northwest corner of San Pablo, near the Hayden Canal, and was dedicated to Our Lady of Mount Carmel. Initially, Hayden's store was the only mercantile business on the south side of the river. In 1874, Adolph Goldman built a store south of San Pablo, and soon Harry Bernard's store and Jesús Pérez' saloon also opened for business. By 1883, Tempe had four stores and several saloons and restaurants, and was truly a bustling town along one of the main roads in the territory (Bureau of Land Management 2007; Goodson 1971; Janus Associates 1983; *Salt River Herald* 1878b; Simkins 1989:43–45; Solliday 1993:37–38, 51–59; Tempe Irrigating Canal Company 1870–1879; *Tempe News* 1889b; U.S. Census Bureau 1880).

At the same time, civil and organizational aspects of the community were being established. By the early 1870s, an informal school for children was started, with classes held, by various accounts, in an adobe shack near the lumber yard or in a saloon. The creation of Tempe School District No. 3 was approved by the Maricopa County Board of Supervisors in 1874 to serve the 43 children living in the area. On April 25, 1874, William R. Osborn, William Arnett, and William Willey were elected school trustees for the new district. Tempe's first permanent school, a one-room adobe school house, was built in 1878 on land Hayden donated in Section 22, at what is now the southeast corner of Mill Avenue and University Drive (DeForest 1991:9–13; Wright 1901).

With no municipal organization for the town, many essential community services were provided by the county. Maricopa County—created in 1871, just as the Salt River Valley was being settled—oversaw all law enforcement and road construction in the Valley. Hayden, or at least one Tempe resident, always sat on the Board of Supervisors, but local administration of county services was by Winchester Miller, the long-time president and zanjero of the Tempe Irrigating Canal Company who also served as deputy sheriff for Tempe in the 1870s and 1880s. In addition to law enforcement, his duties as sheriff also included collecting taxes and hiring road maintenance crews. Miller was one of the earliest settlers in Tempe, and had married one of Manuela Sotelo's

daughters. He was trusted by all to fairly adjudicate all civil matters. Indeed, his daughter-in-law later described his role ı the canal company as the man "who divides the waters ırom the canal that justice be done" (Hardwicke ca.1960). While Charles T. Hayden has often been called the founder of Tempe, his role was primarily the economic development of the town. Winchester Miller was arguably the first civil leader widely recognized by the whole community (Anon. ca.1923; Farish 1918b:104–105; Haigler 1914; Miller 1970; Simkins 1989:40–41; Solliday 1993:52, 64, 70–71; Tempe Irrigating Canal Company 1870–1879).

In the late 1870s, several parties of Mormon farmers from Utah visited and eventually settled in the Salt River Valley. The townsite of Lehi was established on the south bank of the river upstream from Tempe in 1877, and in 1878, a larger group of Mormon families settled on higher ground that became the town of Mesa (McClintock 1985:197–206). Hayden maintained a close relationship with this new neighboring community: he extended credit, provided supplies, and bought their surplus grain. In 1882, Benjamin Franklin Johnson and Joseph E. Johnson purchased 80 acres from Hayden and started a Mormon colony in Tempe. The land was located south of Hayden's Ferry and west of San Pablo, between what is now 5th Street and University Drive. B. F. Johnson, who arrived with as many as seven wives and 42 children, was joined by the Openshaw, Wilson, LeBaron, ɲd Babbitt families. The arrival of about 300 newcomers nearly doubled the local population. They built homes and a cooperative store, planted 100,000 trees, vines, and shrubs, and imported bees from California. Within a year, they had a well-established community that became known as West Tempe (Clayton 1974–365-366; ca.1972:284–286; Idso and Idso 1980:3–5; McClintock 1985:219; Simkins 1989:45–47, 64).

Hayden was a widely known and respected pioneer businessman of the Arizona Territory and had always sought to promote the growth and improvement of Tempe, but in the 1880s, it was his most trusted employee, John S. Armstrong, who became the key to bringing important changes to the town. Armstrong originally came to Arizona in 1879 to teach at the Indian School at Sacaton. Hayden hired him to manage his store, and Armstrong soon took an active role in operating the mill and his other business ventures as well. Armstrong was well educated and became highly respected in the community.

In 1884, Arizona was suffering a lack of trained teachers to staff schools. Many settlements still did not have access to education for their children, despite the founding of the Arizona Territorial public school system in the early 1870s ɣy Governor Safford, and other established schools could not find a teacher to educate the children. Additionally, there were no high schools or pre-preparatory schools that would provide the education needed for students to move on to a university education (Hopkins and Turner 1960:43). A teacher's school, called a normal school, was desperately needed in the territory.

Hayden led the effort for the establishment of a normal school in Tempe. To this end, Hayden knew that they needed a voice on the Territorial House of Representatives. Therefore, he began considering who might best fill that position and represent the best interests of Tempe, lobbying convincingly for locating a normal school in Tempe. In 1883, John Samuel Armstrong moved to Tempe and Hayden hired him to manage his store, and Armstrong soon took an active role in operating the mill and his other business ventures as well. Hayden encouraged him to pursue the Territorial seat in the House of Representatives and helped fund his campaign. In 1884, Armstrong was elected and proved to be very influential, effectively representing the interests of the people of Tempe, which tended to also reflect those of his employer. Just prior to the Thirteenth Territorial Legislature in January 1885, Hayden called a town meeting to discuss the normal school proposal and encourage them to donate land and money in its support. Several local farmers and businessmen joined Hayden in donating funds to purchase a five-acre site, and Armstrong went to his first legislature armed with this secret agenda; no mention of it had been made during his campaign or since he had taken office (Hopkins and Turner 1960:46–53). Armstrong was successful; on March 12, 1885, Territorial Governor Frederick A. Tritle signed a bill for $5,000 in appropriations to fund the Territorial Normal School in Tempe. The same day, he also signed another bill that provided funds for the founding of the University of Arizona in Tucson. Eleven months later, on February 8, 1886, the Normal School opened in a four-room school building with a class of 33 students and one instructor and principal, Hiram B. Farmer.

The Territorial Normal School developed into a Teachers College in 1925, evolved into the Arizona State Teacher's College in 1929, and with Dr. Grady Gammage at the helm, fought until it won the honor of being recast as Arizona State College at Tempe in 1945. In 1958, due to its unprecedented growth and expansion, Arizona residents voted 2-to-1 for it to be raised to the level of a state university, and it was named the Arizona State University (ASU). A history of ASU published in 1960, The Arizona State University Story, states that "[i]t is a singular fact that three men, and three only, have guided the destinies of the institution over virtually its entire 75 years of life—Charles Trumbull Hayden as its mentor in its 15 pioneering years, Dr. Arthur J. Matthews as its President for 30 years, and Dr. Grady Gammage, President for 27 ½ years during its amazing period of explosive growth" (Hopkins and Thomas 1960:x). Given the distinction that Tempe still receives today due to

ASU, it is clear that Tempe owes much to Hayden's original vision and persistence to locate the school in the pioneer town. As Hayden had predicted, the educational institution would play an integral role in the development of Tempe, growing along with the town (Goff 1996:45; Hopkins and Thomas 1960:45–52, 80-82; Lamb 1981; Wright 1901).

After several failed efforts to build a railroad from the Southern Pacific mainline to Phoenix, a new M&P Railroad, incorporated in 1886, finally succeeded in crossing the Gila River and laying tracks to the north. The railroad reached Tempe by June 19, 1887. The first bridge across the Salt River was built at Tempe, and the first train arrived in Phoenix on July 4, 1887 (see Chapter 5). With the completion of the M&P Railroad and the inauguration of freight and passenger service, Tempe was connected to the growing commercial center of Phoenix, and to the modern world far beyond the boundaries of the Arizona Territory.

The Tempe Land and Improvement Company

The Investors in the M&P Railroad, in the classic railroad tradition, sought to control development of townsites at strategic points along the route of their line. On July 16, 1887, just two weeks after the last tracks were laid, Francis Cutting and Lewis W. Blinn, principal stockholders in the M&P Railroad, joined with E. B. Gage, C. W. Leach, and Charles A. Hooper and incorporated the Tempe Land and Improvement Company (TLIC) to capitalize on the expected growth of the town (Myrick 1980:501; Phoenix Herald 1887a; Simkins 1989:64). Land companies such as the TLIC were typically formed in association with a railroad, buying land, laying out a townsite, subdividing the land into lots, marketing the boom town's glorious attributes in major cities back East and in western cities (e.g., San Francisco, Los Angeles), building commercial and financial institutions, and selling the newly subdivided lots to new settlers for a handsome profit. Land prices during such boom years could rise exponentially over short periods of time and speculators counted on this price increase for their generous profits. There was a lot of money to be made in this arena as the railroads further connected towns and cities across the West.

The Investors

Francis Cutting, the son of a Massachusetts mechanic, had followed his father to San Francisco about 1858. Their family business, the Cutting Packing Company, became one of the largest fruit packing firms in California. In the 1870s, Francis Cutting started expanding his portfolio by acquiring a stake in the wine bottling and salmon canning industries, as well as investments in railroads and mining. He was a millionaire by 1886 when he put up a considerable share of the funds needed to build the M&P Railroad. Cutting also brought in Sidney M. Smith, a partner in many of his West Coast business ventures, as an investor (*Daily Evening Bulletin* 1863, 1864, 1874, 1879, 1880, 1883a, 1883b, 1885, 1886, 1888, 1889). Shortline railroads were risky ventures, but in early 1887, when the M&P Railroad erected a bridge over the Gila River, it was clear that the company would successfully complete the first railroad into the Salt River Valley. Lewis W. Blinn, a Tombstone lumber dealer, then joined the railroad company, bringing in the capital need to finish the final segment of tracks. Like Cutting, Blinn was also a Yankee entrepreneur who in 1864 had gone West to seek his fortune in California. After many years in the lumber business, he moved to the Arizona Territory and established the Blinn Lumber Company in Tombstone, with lumber supplied by his California associates. He soon opened branches in the neighboring mining towns of Bisbee and Fairbanks. In 1886, Blinn was elected to the territorial legislature representing Cochise County (Ensing 2002; Goff 1996:60; Myrick 1980:501–503).

As Cutting and Blinn made their plans to form the TLIC, Blinn brought in several other associates, including his lumber supplier, San Francisco timber magnate Charles A. Hooper, and Tombstone mine owners E. B. Gage and C. W. Leach. The three men from Tombstone represented a new breed of capitalists in the Arizona Territory. They had profited greatly from the huge silver strikes at Tombstone, and as mine profits were declining, they were looking for new investment opportunities that would provide more stability for their wealth than the boom and bust cycles of silver mining (Simkins 1989:64). The anticipated boom of Tempe with the arrival of the railroad was just the opportunity they were seeking and they all expected to receive a good return on the investment.

Notable among the incorporators was E. B. Gage, who was one of the wealthiest and best known entrepreneurs in the territory at the time. Gage, another New England native, went from New Hampshire to Charleston, Illinois, about 1860 to work as a railroad surveyor. In 1878, he took up an offer to buy into the Grand Central mining claim in Tombstone, and when a silver lode was discovered, he became superintendent of the Grand Central Mine. As he quickly amassed a sizeable fortune, he began investing in local businesses, banks, and timber operations. Gage was a notorious frontier personality and a close associate of the Earp brothers during the time of the legendary shootout with the Clanton gang in 1881 (Chapman Publishing Co. 1901:862, 865; Chaput 1995; Cool 2000; Faulk 1972; Spude 2007). E.B. Gage was called "one of the industrial kings of Tombstone" (Brown 1994b:76). Paul Cool (2000:6) describes Gage as:

> ... a prominent Republican and a member of the Citizens Safety Committee which backed the Earps in their efforts to contain what mine operators such as Gage viewed as the cowboy threat to law, order and capitalist enterprise. On November 23, 1881,

> when Judge Spicer set bail for Wyatt Earp and Doc Holliday at $50,000 apiece, Gage was one of two mining magnates who posted the required amount.

E.B. Gage continued to play a leading role in Arizona mining and banking into the twentieth century. In perspective, his investment in the TLIC was a seemingly minor part of his varied business interests (Slawson 1999:31). Aside from providing money for the venture, his only apparent involvement with the TLIC was to get his brother, George N. Gage, a place in the new company (Chapman Publishing Co. 1901:672, 675). The two brothers were very close, having gone to Illinois together in the 1860s. George joined his older brother in Tombstone in 1886, but he did not share his brother's interest in the cutthroat mining business, and preferred to live in a small farming town to raise his family (Bob Spude, personal communication 2007). Thus, George N. Gage became secretary of the TLIC and the local agent in Tempe who handled land sales and supervised the development and promotion of the townsite.

The development of the town of Tempe up to that point—with an established canal system, Hayden's flour mill, the railroad, the Territorial Normal School, and a steadily growing population—provided an excellent opportunity for the TLIC to profit greatly from the inevitable continued growth of the town. In addition, the individual investors were involved with various railroad and lumber interests that also stood to benefit from the arrangement. Not only would they sell townsite lots to people, they would also harvest and mill the timber, transport it to Tempe, and sell the finished lumber needed to build new homes and businesses in Tempe.

Acquisition and Development of the Townsite

On April 2, 1887, just as the M&P Railroad was approaching Tempe, an announcement in the *Arizona Citizen* (1887:2) stated that "[a] large land sale at Tempe by Mr. C. T. Hayden, is about to be consummated. The purchasers will subdivide the property, build hotels, etc., and make it a lively and flourishing resort." Shortly thereafter, the TLIC acquired a total of 705 acres of land, of which 305 acres were purchased from Hayden that included the southern portion of his landholdings and the butte, but not the mill, store, or house property.

Twelve days later, the *Phoenix Herald* (1887a:1) published more details on the agreement that Lewis W. Blinn had reached with Hayden and others:

> [Blinn] has purchased from C. T. Hayden 305 acres and from the Mormon colony an adjoining 80 acres, exclusive of a few reservations amounting to 20 acres or thereabouts. Mr. Hayden reserved his mill and his homestead upon the banks of the river. Mr. Blinn has also bought the Benton place of 160 acres and from Mr. Larsen 160 acres more, both two miles south of town. This gives Mr. Blinn and his associates a holding of about 700 acres in the very heart of this valley and at a spot where nature has said there should be a large and prosperous city.
>
> The work of surveying and mapping the townsite and suburban divisions of this magnificent property will be begun at an early day and by the time the railroad reaches there they will be ready to make sales to those desiring business or residence property. Just what they proposed to do the reporter for the Herald was unable to find out as Mr. Blinn is not a talker, but on the contrary, a worker. It has been rumored that the not remote contingency is an elegant hotel on Tempe Butte, with a fine graded road winding its way to the top. It is also rumored that a large reservoir will be built upon its summit and steam pumps erected to pump the water from the river into this receptacle from which will run a main to the townsite and thence run distributing pipes throughout the town. Of one thing we are assured, there will be no more impediments thrown in the way of the advancement of Tempe along the royal road of progress to prosperity and greatness.

The actual sale of the Hayden land was executed, signed, and notarized by Hayden and his wife, Sally D. Hayden, on April 26, 1887, and filed with the Maricopa County Recorder on May 2, 1887 (Maricopa County Recorder 1887a), thereby transferring ownership to Charles A. Hooper, who would become one of the principals of the TLIC when it was incorporated two months later. The purchase price of the Hayden property was listed as $24,302. The TLIC was incorporated on July 16, and on September 13, Hooper conveyed title to the Hayden lands and the other parcels, totaling 705 acres, to the TLIC (Maricopa County Recorder 1887b). The total compensation to Hooper for the transaction was declared to be five dollars, presumably to protect the confidentiality of the company's internal operations.

During the time that the TLIC was negotiating these purchases, other lands also began changing hands fairly rapidly. Over a dozen deeds for land conveyances in Tempe were executed on April 7, 1887. This was coupled with a building boom, with "residences going up in all directions, business property on Mill Street...is in great demand. in East Tempe new business enterprises are being opened every week" (Arizona Gazette 1887). Within just one

month, property values soared, with lots originally costing $10 to $15 now going for upwards of $75 to $100. Other local property owners were also subdividing their land for development, including Benjamin Goldman's Addition to East Tempe, located east of the Normal School, and Farmer's Addition, southwest of town, on land owned by Hiram B. Farmer, principal of the Normal School (Lamb 1981; Ryden Architects 1997).

Development of the townsite proceeded quite quickly once the TLIC took ownership of the properties. The land was surveyed and subdivided into a grid of city blocks with residential and business lots (Dyer 1888). The Johnson clan and other Mormon families of West Tempe had sold their 80 acres to the TLIC and moved six miles to the east, toward Mesa, to found the Nephi Ward. The company's remaining acreage consisted mostly of level farmland. Blinn established lumberyards in both Phoenix and Tempe (Myrick 1980:501–503). Though he continued to reside in Tombstone, he was actively involved in the affairs of Tempe, and in 1888, was appointed to the Territorial Normal School Board of Education (Hopkins and Thomas 1960:96). Blinn sent Peter J. Corpstein, freight manager at his Bisbee lumberyard, to open the Tempe branch of the L. W. Blinn Lumber Company, which was located on 4th Street just south of Hayden's flour mill (Arizona Historical Foundation 1994; McClintock 1916:337–338).

By 1888, George N. Gage moved to Tempe from Tombstone. As secretary of the TLIC, he was the company's local agent and the one individual most directly involved in the development of the Tempe townsite. The TLIC not only sold lots to individuals for house and business sites, they also helped to develop the town's commercial center by assisting in the construction of commercial buildings. They gave away a certain number of lots for free if individuals would build businesses on them. They built a new hotel and a large warehouse for storing the large amount of goods they expected to pass through Tempe now that the railroad connected them directly to other markets. They invested in capital improvements around Tempe, such as grading streets and constructing bridges across irrigation canals (Tempe News 1894b). A glowing account in the newspaper stated, "Sec. G. N. Gage of Tempe Land & Improvement Co. is continually doing something to improve our city. His next move in this direction will be the construction of a gravel sidewalk from Mill Avenue along 8th Street to the Normal School" (*Tempe News* 1895b). Gage also helped to organize the Bank of Tempe in 1888. Directors of the bank included L. W. Blinn, John S. Armstrong, Niels Petersen, and C. S. Masten. Also in that year, the TLIC started constructing commercial buildings, including the Tempe Bakery and the Bank of Tempe (Chapman Publishing Co. 1901:672, 675; Janus Associates 1983; Lamb 1981).

The initial real estate promoter for the TLIC was the firm of A. R. Jenkins and Company, but soon Schultz & Franklin were hired to begin a national sales campaign (*Tempe News* 1888a). They produced pamphlets, advertisements, and an impressive full-color bird's-eye-view map of Tempe by Czar J. Dyer. The Dyer Map (Figure 6.1) paints an almost Elysian picture of the town with flowery language describing all its advertised attributes:

> 1st We have a supply of water equal in volume to the entire supply of the three Southern counties of California.
>
> 2nd We have a larger and more productive body of land susceptible of irrigation than can be found elsewhere.
>
> 3rd We are from two to three weeks earlier with our fruits than California's most favored spots.
>
> 4th We are from one to two days nearer the Eastern markets.
>
> 5th Our lands are yet low enough to give the husbandman an opportunity to purchase at reasonable figures, viz. unimproved land from $4 and improved land from $25 per acre upwards according to location.
>
> To the poor and the rich, the high and the low, the well and the sick, to all, except the "born tired," we say come! Come to "Sun-Kissed" Valley of bright days and beautiful nights, of flowers and fruits. Its climate is superb, its surrounding picturesque, its lands cheap and fertile, and homes with comforts and luxuries of life can be made quickly (Dyer 1888).

Schultz & Franklin had 10,000 copies of Dyer's color lithograph map printed (Tempe News 1888b), and the sales campaign was very successful in bringing new residents to Tempe. Within five years, Mill Avenue was a bustling business district, and new residential construction was extending to the south (Lamb 1981; *Phoenix Herald* 1887a, 1888e, 1888b; *Tempe News* 1888c, 1889b, 1892c, 1892d, 1892e, 1893c, 1893d, 1893e, 1893g).

There was one serious problem that threatened the company's well-laid plans. The General Land Office had never issued a patent for the south half of the southwest quarter of Section 15, the 80-acre parcel between 5th and 8th streets known as West Tempe. Occupancy of this land had originally been by preemption, but with neither homestead nor cash entry completed, apparently only the claim of right had been passed along to different "owners" without actual title. Various accounts suggest a vague and contradictory

chain of ownership. According to his son, Carl Hayden (1972:48–49), Charles T. Hayden had bought the 80 acres from J. M. Cotton, L. Bailey, and Milton B. Grove on January 13, 1876 and sold it to B. F. Johnson and J. E. Johnson in 1882. A 1901 article in the *Arizona Republican* recounting the early history of Tempe states that the parcel went from a man named Freeman to James T. Priest in 1872, who sold it to Hayden in 1875, who later sold it to the Mormon settlers (Wright 1901). Regardless of which version might be more accurate, the matter cast a cloud over the title to the center of the townsite. A similar dilemma had plagued landowners in San Pablo, as William Kirkland had not stayed long enough to prove up a homestead when he donated his claim for the creation of San Pablo. In 1885, residents and lot owners had petitioned Probate Judge Joseph Campbell to resolve the issue of securing a patent. In that case, Campbell filed a cash entry to purchase the parcel for $1.25 per acre and received a patent for the 80-acre parcel November 17, 1886 (General Land Office [Tucson] 1886; Wright 1901). Judge Campbell adjudicated the problem in West Tempe in the same manner, and secured a patent on October 26, 1888 (Bureau of Land Management 2007). The development of the townsite could now continue as planned.

Tempe's Initial Boom Years: 1887–1891

Throughout 1888, new homes and businesses were erected in various parts of the townsite. In 1889, the business district of Tempe consisted of ... two hotels, five general merchandise stores, three public halls, several livery stables, a number of restaurants, a drug store, three blacksmith shops, a furniture store, an extensive butchering establishment, two bakeries, three harness shops, an agricultural implement depot, two lumberyards, several warehouses, a large flouring mill, real estate offices, a weekly newspaper, a bank, and the usual admixture of small shops and saloons [Tempe News 1889b:1].

A Tempe branch of the American Building and Loan Association was organized, with C. G. Linnington, A. M. Franklin, John Armstrong, M.G. Hill, A. J. Peters, Curt W. Miller, E. A. Murphy, A. K. Ross, and J. A. Carleton serving on the board. The organization was promoted as providing the opportunity for more local residents to build their own homes (*Tempe News* 1889a). Then in 1892, the Fidelity Building and Loan Association also organized a local board with members including F. A. Housh, C. J. Ulmer, A. M. Franklin, Benjamin Goldman, Jesse H. Root, C. T. Springer, E. A. Murphy, T. L. Schultz, and P. P. Daggs (*Tempe News* 1892b).

During these boom years, Tempe finally acquired its own newspaper. The *Salt River Valley News* was founded in 1886 by John B. Fitch and Thomas B. Martin. They set up the paper printing plant in an upstairs room of Hayden's warehouse building (originally the Hayden Blacksmith and Wagon Shop) located between the river and Hayden's flour mill. Their first issue was released on January 30, 1886. In 1887, Fitch sold to James McClintock, who then sold the paper to Curt W. Miller later in 1887. Miller promptly changed the name to the *Tempe News* (Smith 1990:43; Weisiger 1977). He remained the editor for 55 years and was an enthusiastic booster of Tempe in his columns, constantly extolling the virtues and benefits of living in the "Garden City of Arizona" (Simkins 1989:67–68). A new two-story brick school was built in 1892, with three rooms on each floor and a wood-burning stove in every room. The Tempe School District had recently expanded to encompass the entire south half of Township 1N, Range 4E (DeForest 1991:11–13).

In 1890, Hayden's flour mill was still the primary manufacturing industry, but now its main markets lay in the southeastern parts of the territory. The town became a major shipping point in the Southwest with regular outbound shipments of cattle, grain, hay, fruit, and honey. Tempe and Phoenix both were growing quickly and enjoying fairly equal prosperity. However, Tempe did not keep pace with Phoenix for long. By the mid 1890s, Tempe's booming economy slowed. An 1897 article in the *Tempe News* stated that "... the town has been at a standstill for a long time and needlessly so, for where can anyone find a town with more natural advantages than are possessed by Tempe?" (Tempe News 1897).

Hard Times Hit Tempe: 1891–1900

The Salt River Valley in the 1890s suffered from severe economic decline resulting from a national depression. Additionally, significant damages from extreme flooding of the Gila and Salt rivers were followed by a relentless drought that impacted the Valley through the first years of the twentieth century. But these issues could not have been foreseen in 1890 and 1891, despite a severe flood in 1890. Schultz & Franklin continued publishing enticing maps and pamphlets to attract potential residents to the Valley. In 1891, they distributed a Map of the Salt River Valley that portrayed an agricultural paradise with thousands of acres available for cultivation, with perpetual water rights:

> The branch here bends beneath the weighty pear,
> and verdant olives flourish round the year;
> the balmy spirit of the western gale
> eternal breathes on fruits untaught to fail;
> each dropping pear a following pear supplies;
> on oranges, oranges, on figs, figs arise;
> the same mild season gives the blooms to blow,
> the buds to harden, and the fruits to grow.
>
> [Schultz and Franklin 1891].

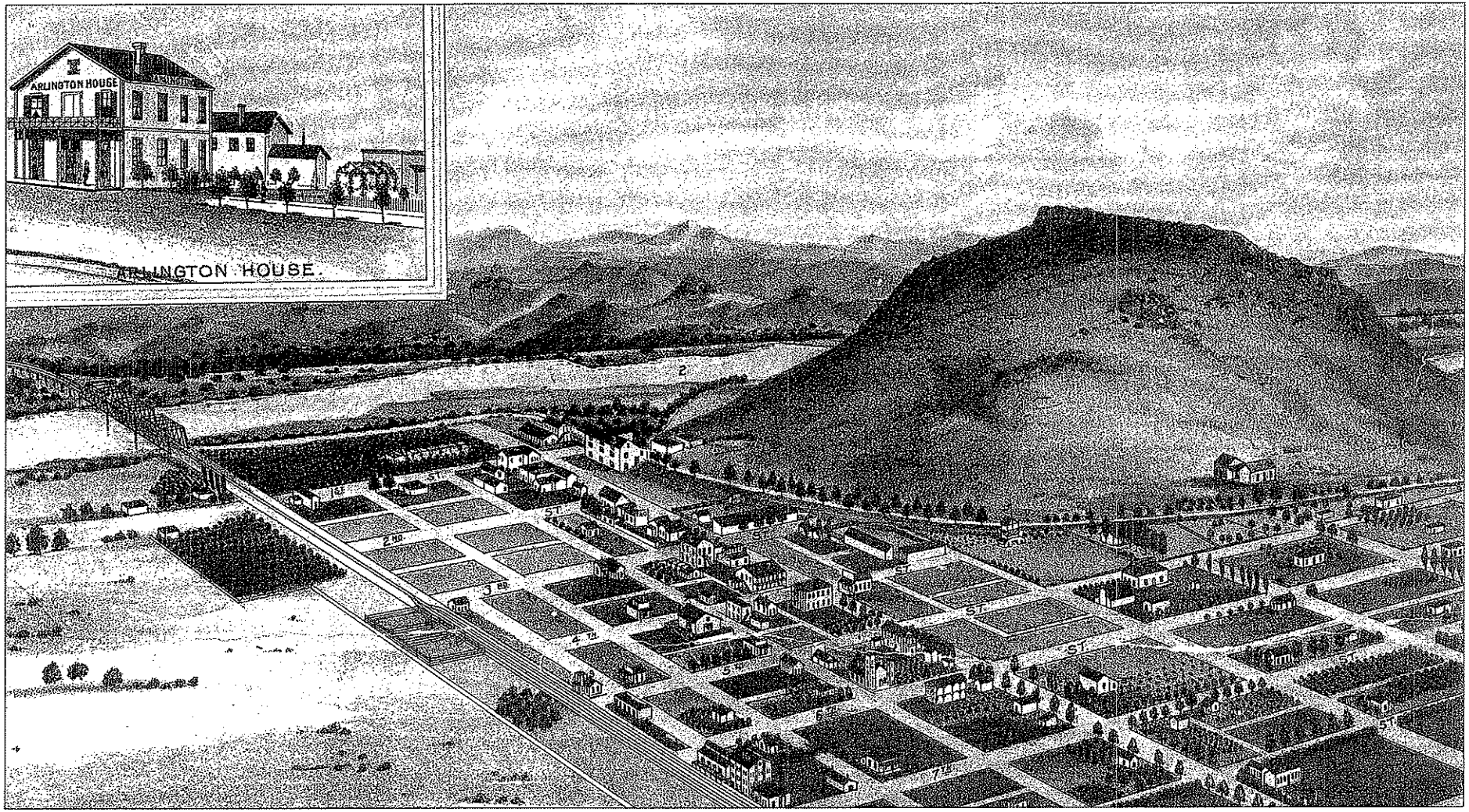


Figure 6.1. Portion of the panoramic map of Tempe, Maricopa County, Arizona, looking northeast (Dyer 1888).
The building numbered "3" is the Hayden Flour Mill.

In February of 1891, the greatest flood in local recorded history washed through the Valley. With flows estimated as high as 300,000 cubic feet per second, it had a devastating effect on the communities and the local economy. The railroad bridge collapsed after raging floodwaters scoured against its supports and floating debris smashed and accumulated against it. The river eventually receded after hitting its high point. The rain returned the following week and the river rose even higher. The Tempe Canal diversion dam was washed away, canals were damaged, crops and property were ruined, and some homes were lost. It was several weeks before a train connection between Maricopa and Phoenix was restored (*Tempe News* 1891a, 1891b).

There was a brief resurgence of prosperity in 1892 with the announcement that a railroad line would be extended from Phoenix through Tempe and onto Mesa, eventually connecting with another rail line to the southeast; this spurred a new building boom (1892c; *Tempe News* 1892d). The *Tempe News* (1892a) announced that L. W. Blinn's lumberyard had received 20 carloads of lumber in November of 1892 to supply the demand for construction materials. The TLIC jumped on the perceived opportunity and began clearing and sprucing up their lots for sale. Ben Goldman had previously subdivided a large parcel south of 8th Street and east of the Normal School and made plans to build brick houses (*Tempe News* 1893a). Another bank, the Farmers and Merchants Bank, opened in May of 1892, and early in 1893, the Tempe Board of Trade was formed, with the board of directors including such prominent citizens as S. C. Heineman, C. T. Springer, F. A. Hough, P. P. Daggs, A. M. Franklin, J. C. Goodwin, and Ben Goldman (*Tempe News* 1893b). John S. Armstrong and Neils Petersen bought an interest in the TLIC the same day (*Tempe News* 1893d). Things were starting to look up again for the town. Then the "Great Panic of 1893" hit in the first week of May, which led to a serious national depression.

In the late nineteenth century, the economy of the United States was being propelled by unprecedented expansion in manufacturing, agriculture, and railroad construction. While this brought prosperity to a growing number of Americans, federal fiscal policy was becoming increasingly unstable. The McKinley Tariff of 1890 impacted gold reserves while federal spending rose to one billion dollars. The Sherman Silver Purchase Act of 1890 required the U.S. Treasury to purchase silver produced in the West at a fixed rate rather than according to its value relative to gold. This caused a run on the banks as people tried to redeem silver notes for gold, setting off a chain of events. When federal gold reserves dropped below $100 million, bankers began calling in loans and general panic ensued with devastating results: the value of silver plummeted, hundreds of banks and thousands of businesses failed, one-third of U.S. railroads—including the Northern Pacific Railway, Union Pacific Railroad, and Santa Fe Railway—went bankrupt, and millions of people were unemployed (Hoffman 1956; Rezneck 1953). Tempe was quickly pulled into the national crisis, and development of the townsite immediately slowed. Construction of a new railroad was delayed (Lamb 1981), and in May of 1894, the Bank of Tempe closed its doors due to the "inability to realize an asset sufficient to meet the demand of deposits" (*Tempe News* 1894a)—evidence of yet more fallout from the Panic of 1893. The national economy began recovering in 1896 when Republican William McKinley was elected President (1897–1901) and economic confidence grew once again.

For several years, the TLIC had provided some services to the people of Tempe, such as maintaining graded streets and bridges, but eventually the company could not keep up with the types of improvements that the growing community needed. In 1894, residents of Tempe began planning incorporation to form a town government that would take responsibility for streets, civic improvements, and law enforcement. Hayden was vocally opposed to incorporation, claiming that it would remove the power from the hands of the residents and give it over to a council who would determine the direction of the community. He was quoted as saying, "the Czar of Russia is not clothed with such power" (*Phoenix Herald* 1894d:4). In a special election on November 26, 1894, a majority of the people voted for incorporation, and the County Board of Supervisors appointed the first town council (Ketelaar 1990). On December 13, 1894, the town council elected Dr. Fenn J. Hart to serve as the town's first mayor. Hart, a medical doctor, had moved to Tempe from government service at San Xavier in 1886. In Tempe he opened a medical practice, operated a drug store, and served on the Territorial Normal School Board of Education. George Compton, who had been the Tempe constable for five years, was hired as the first town marshal, the only full-time employee, who was also tax collector, superintendent of streets, zanjero, and garbage collector.

Despite the general optimism at becoming a true town, hard times in Tempe continued for most of the last decade of the nineteenth century. The Tempe Hotel, built six years earlier by the TLIC, burned to the ground and almost took the neighboring lumberyard with it (*Tempe News* 1894c). On July 5, 1895, one of Hayden's buildings also burned. It originally housed a wagon and blacksmith shop, workers barracks, and the *Tempe News* offices, but prior to the fire had been converted to a grain storehouse with some attached rooms for single male workers (Sanborn-Perris Map Company 1893). Though most of the structure was destroyed, the row house on the north side was saved from the blaze, as were 200,000 pounds of barley out of the 400,000 pounds stored in the warehouse (*Arizona Gazette* 1895). The building was insured, but the grain was not. It was a hard blow to Hayden.

Much attention was given to matters concerning the canal systems at this time. In 1892, Judge Joseph Kibbey's long-awaited ruling in a series of water-related lawsuits determined the priority of water rights in the Salt River Valley. The landmark Kibbey Decision favored Tempe farmers, recognizing that their lands had been among the first irrigated in the Valley. At the same time, the various independently operated canals on both sides of the river were being unified into larger and more efficient systems. Since 1874, the water used by Hayden's flour mill had been returned to the river, but in 1894, the mill's tail race was connected to the San Francisco Canal (Zarbin 1997:36). This, along with the opening of new branches, such as the Kyrene Ditch and the Wormser Extension, doubled the acreage irrigated by the Tempe Canal system. A year later, the head of the Tempe Canal was abandoned and water was instead supplied by A. J. Chandler's Consolidated Canal. These two modifications brought all of the irrigation works on the south side of the Salt River into one unified system under the Consolidated Canal.

However, increased efficiency in the delivery of water could not compensate for a suddenly declining water supply in central Arizona. The year 1897 began a decade-long drought, which seriously affected the water supply in the Salt River Valley. It rained very little for several years and the river dried up until it was just a slight trickle. Fruit orchards and planted fields withered, and the "Garden City of Arizona" began reverting back to desert land (Dudley 1991:28; Zarbin 1984:28). The lack of water caused a predictable decline to an economy that was primarily based on selling agricultural produce. Hayden's flour mill was forced to cease operation several times during the drought due to insufficient water flowing into the Hayden Canal (Hayden 1905b).

Despite the many problems that besieged Tempe in the 1890s, not all was bleak. The town council began municipal improvements in 1895, starting with surveying and graveling the streets to improve drainage. James C. Goodwin and his brothers ran Tempe's first public transportation system using mule-drawn street cars with tracks running along Mill Avenue and 8th Street (University Drive), past the Normal School to the canal. James and Robert Goodwin also constructed the Kyrene Irrigation Ditch, and in 1894, they incorporated the Phoenix, Tempe, and Mesa Railway. After many delays, trains began running on the new railway on December 9, 1895. That same day, the Phoenix, Tempe and Mesa Railway was consolidated with the M&P Railroad to form the M&P and Salt River Valley Railroad Company (Myrick 1980:519).

Tempe's Second Development Boom: 1900–1920

After 1900, the local and national economies were again expanding and new construction began to be seen across Tempe. M. H. Meyer and James W. Woolf were the leading home builders in Tempe in the early 1900s, using locally produced rusticated concrete block. Niels Stolberg was building wood-framed houses, one after another, and there were many home buyers waiting to move into new houses (Janus Associates 1983). The Pacific Creamery, a large dairy processing and shipping plant, was opened just east of town on the Tempe-Mesa Road (East 8th Street). The Southside Power and Electric Company obtained a franchise to provide the first electric power for the town, and limited telephone service was instituted (Lamb 1981). In 1901, Tempe voters authorized the sale of municipal bonds to build a domestic water system, which included a well and pump on East 7th Street, a 250,000-gallon concrete reservoir on top of Tempe Butte, and a network of iron pipes to deliver the water to every house in Tempe (Pry 2003:16–17, 21).

This resurgence of activity was good for the TLIC. George Gage and Peter Corpstein together handled most of the company's business in Tempe. In the 1890s, Corpstein frequently left Tempe to oversee Blinn lumberyards in California and Phoenix, and in his absence, Gage took over running the Tempe branch, as well as the TLIC office. Corpstein eventually acquired a part ownership in the TLIC and bought out Blinn's lumber operations in Phoenix and Tempe (Arizona Historical Foundation 1994; McClintock 1916b:337–338; Myrick 1980:501–503, 531–532).

Home lots sold at a slow but steady pace. Many felt that the TLIC land prices were too high, but the company believed that property values were depressed because Tempe farmers had not yet joined the new federally funded Salt River Project (Tempe Land and Improvement Company 1908). In 1908, W. J. Kingsbury, president of the Farmers and Merchants Bank, bought a large block of undeveloped lots in the northwest part of the townsite, and immediately began promoting sales. The *Tempe News* (1908: 3) enthusiastically reported on the development:

> ***Buy a Lot and Build a Home! Now's your chance.***
>
> For many years it has been a matter of common remark that the growth of Tempe has been retarded by the high price at which town lots were held by the Tempe Land and Improvement Company. It has been a fact, the obstacle to the town's growth has been removed. W. J. Kingsbury has purchased all of the lots belonging to the Tempe Land and Improvement Company, lying west of Maple Avenue and North of Fourth Street. There are 70 of these lots, all of them level, cleared, and well located; capable of being quickly transformed into beautiful home yards. It is Mr. Kingsbury's object to get these lots built up as speedily as possible

> and to that end he is putting them on the market at an extremely low price. Fifty dollars—ten dollars down and the balance in small monthly payments, will buy a nice lot, and if the purchaser will agree to build a house at once or within a reasonable time, he will be presented with an extra lot. It is not the intention to sell these desirable lots to people who will hold them for speculative purposes, but to home builders; to people who want to come here and send their children to school, and who are able to acquire a home at moderate cost.

By 1909, George Gage was in poor health and decided to retire. He subdivided the last undeveloped portion of the company's original holdings, an 80-acre pasture in the northwest quarter of Section 22, and platted the Gage Addition, stretching south from 8th Street (Ryden Architects 1997). He then moved to Los Angeles, where he passed away on May 15, 1913 (*Tempe News* 1913). In 1912, when the TLIC filed for renewal of its corporate charter, the remaining owners of the company included L. W. Blinn, C. A. Hooper, and Peter Corpstein, who represented more that 49,000 of 50,000 shares. In addition to those three original partners, other directors included Ben Goodrich and C. G. Lynch (*Tempe News* 1912a).

Roosevelt Dam, one of the first federal reclamation projects in the West, was completed in 1911. A year later, on February 14, 1912, Arizona joined the union as the 48th state. There was great optimism throughout the Valley as these two events seemed to remove the last obstacles to central Arizona's rapid development. Visible signs of progress in Tempe included the installation of electric street lights and construction of a grand city hall on 5th Street. In 1915, town marshal M. C. Browning was given the new title of city manager and an annual budget of $1,420.00 (Ketelaar 1990).

Just north of the Salt River from Tempe, the Papago Saguaro National Monument was established on January 31, 1914 (Figure 6.2). It had been set aside as public land since first surveyed in the late nineteen century and was a popular area for picnicking, hiking, bird watching, and other recreational pursuits. Local support for the nomination of the already established Papago Park as a National Monument was spear-headed by Representative Carl T. Hayden, attorney Charles Woolf, Phoenix Mayor Lloyd B. Christy. However, due to pressure from developers, state agencies, the City of Phoenix, City of Tempe, and others, the future of the national monument was in jeopardy. Finally, after many years of debate, the state requested that the Papago Saguaro National Monument be abolished and the land returned to the City of Tempe, Arizona National Guard, and the State of Arizona. On October 30, 1930, Senator Carl T. Hayden introduced a bill S. 2173 to abolish the monument. Congress passed Public Law 92 (71st Congress, 2nd Session) abolishing Papago Saguaro National Monument on April 7, 1930. The land was divided with portions going to the Arizona National Guard, the Town of Tempe for "municipal, park, recreation, or public-conveyance purposes," and SRVWUA for canal right-of-way—the remainder was deeded over to the State of Arizona (Gart, 1996:75-76).

By 1900, the name San Pablo was no longer used for the oldest neighborhood in Tempe. The area was quite unique, with its Sonoran-style adobe homes and dirt streets, and was occupied almost exclusively by Hispanic families. It was commonly known as "Mexican Town" by the Euroamerican community, and as *Barrio al Centro*, or simply the barrio ("neighborhood" in Spanish), by its residents. Though the neighborhood began in the 1870s as a Mexican American community, Tempe did not have strict segregation and blatant racial discrimination in its early years. Mexican Americans owned farms and businesses, and lived in all parts of Tempe, and Euroamerican and Hispanic children were taught together in the same classroom. However, after 1914, increased immigration brought by the Mexican Revolution and a national trend toward more racist attitudes and practices was reflected in Tempe. By 1920, there was very strict segregation in housing, employment, education, and leisure activities (Hormell 1992; Lamb 1981; Sánchez 1992; Solliday 1993:100–101; Windes 1983:84–85).

Impact of the Cotton Industry on Tempe

The completion of Roosevelt Dam in 1911 ensured a dependable supply of water for the Salt River Valley. This accomplishment was soon followed by the introduction of Arizona's first lucrative cash crop—Egyptian cotton. The U.S. Department of Agriculture (USDA) had been experimenting with this unique plant, which had never been grown successfully outside of Egypt. A hybrid was developed that grew well in the Arizona desert, where growing conditions were similar to those in North Africa (Fairchild 1944:142, 207; McGowen 1961:35–36). This particular "long-staple" variety produced long industrial grade fiber that would bring high prices for Arizona farmers. In 1912, USDA agent E. W. Hudson began distributing seeds to farmers in Mesa, Tempe, and Chandler. Thirty-two farmers planted a total of 303 acres in cotton in the first year, and the winter harvest produced a bumper crop of high-quality lint. The acreage planted in cotton increased nearly tenfold in 1913, and the Arizona cotton industry was firmly established (Solliday 2000; Stevens 1955:33–34). Central Arizona quickly became one of the leading cotton-producing regions in the nation.

One requirement for the new cotton industry was the immediate construction of cotton gins. Using modern high-speed equipment, a gin mechanically separated seeds from

the lint and turned the crop into a marketable product. The lint was pressed into 500-pound bales and shipped to Eastern mills where it was spun into thread and yarn for fabrics or manufactured goods. By 1913, gins were in operation in Chandler and Mesa. The Tempe Cotton Exchange (TCE) was formed in 1914. This cooperative of Tempe and Scottsdale growers built a 10-stand gin and bale compressor at 7th Street and Ash Avenue. The complex included a warehouse, a seed storage house, and a railroad siding (Stevens 1955:34; *Tempe News* 1914). More than a million pounds of raw cotton was processed in the first year, and by the final run of the season, 1,400 bales had been pressed at Tempe (*Tempe News* 1915).

Charles H. Waterhouse, first president of the TCE, encouraged local farmers to adopt strict growing practices to expand the market for their new crop. Textile mills required uniform consistency in quality, staple length, and color throughout any large order of cotton. To attain this standard, all plants had to be as genetically identical as possible. Within a year, Tempe growers began negotiating with the USDA to be the exclusive source for certified pure "Pima" long-staple seed (Solliday 2000). In order to receive such designation the growers were willing to allow all inferior plants to be destroyed. While this might have been an inconvenience to the farmers, any loss in yield was inconsequential, for the seed crop doubled the value of their cotton. The *Tempe Daily News* (1917: page number not available) commented on the importance of local farms:

> A one-stand double roller cotton gin is installed on Don Frankenberg's cotton plantation and is being operated under government supervision. The object is to keep the seed from these fields separate from other seed. Mr. Frankenberg's cotton is the highest grade that it is possible to grow.

The Goodyear Tire and Rubber Company of Akron, Ohio, needed a dependable supply of long-staple cotton, which was used in the manufacture of its new pneumatic tire. During the First World War, the European naval blockade and the outbreak of a boll weevil infestation in Georgia eliminated the company's only sources of long staple. Paul W. Litchfield, vice president of the Goodyear Company, came to Arizona in 1916 to encourage local farmers to grow cotton. He set up an office at the Tempe National Bank and secured contracts with many Valley farmers, but production was still far short of what the company needed. In January of 1917, Litchfield formed the Southwest Cotton Company, a subsidiary of Goodyear, to grow cotton for the company. By 1920, Goodyear's corporate farms had more than 38,000 acres planted in Pima long-staple cotton (Allen 1944:118–121; Litchfield 1954:159–160, 226; McGowen 1961:4). With the arrival of Goodyear, and the high prices that the company promised to pay, most of the Valley farmers were starting to look at raising cotton. In 1917, there were 33,000 acres planted in Pima cotton. As the price paid for long-staple cotton increased each year, the acreage continued to grow. In 1919, Pima cotton sold for more than a dollar per pound. By 1920, cotton acreage had increased to 230,000 acres, or three-quarters of all irrigated farmlands in the Salt River Valley (McGowen 1961:36; Stevens 1955:47–48).

The sudden interest in Arizona-grown cotton brought new crop-related businesses into Tempe. E. A. Shaw & Company, a Boston brokerage firm, opened an office in Tempe in 1916 to buy cotton directly from the farmers and ship it to Eastern mills (Arizona Directory Company 1916, 1917, 1918, 1920, 1930; *Tempe News* 1917a). In the following year, B. B. McCall and E. G. Attaway built a second gin in Tempe on East 4th Street. In 1918, the Arizona Cotton Growers Association opened an office on Mill Avenue, and Tempe became the first destination for field workers who were recruited in Mexico and brought to Tempe by train, and then taken to a camp between 1st Street and the river, where they stayed until they were sent to individual farms (Peterson 1975:17–22).

The shift from grains to cotton production meant that many more laborers were needed to tend and harvest the crops by hand. This agricultural boom coincided with the beginning of the Mexican Revolution, and the resulting violence and depressed wages in Mexico led thousands of people to flee to Arizona. The immigrants were welcomed by state leaders and businessmen, but working conditions were harsh, and the sudden arrival of so many Mexicans in the Valley aggravated racial tensions and led to strict segregation of the Hispanic population in housing, employment, and education (Reisler 1976:3–5). Most new migrant field workers lived in cotton camps scattered across central Arizona. These rural settlements were located on the farms where the workers were employed. Most people lived in tents with dirt floors, and cooked their meals outside. Federal regulations required employers to provide sanitary living conditions in the camps, but these were not always enforced (Solliday 1993:97–98; Tetreau 1939:321–323, 331–332).

In just a few years, the new cotton industry had brought prosperity to central Arizona, but reliance on a single crop eventually proved to be disastrous. In the spring of 1920, Pima cotton was selling for more than a dollar per pound, but by the time of the winter harvest, the market collapsed and prices fell to less than thirty cents a pound (Peterson 1975:53, 56, 74, 81; Stevens 1955:47–49). The Cotton Crash of 1920 brought the most severe economic depression experienced in central Arizona, leading to foreclosures and bankruptcies throughout the Valley. Within a few months, the young Arizona cotton industry was nearly destroyed (McGowen 1961:36; Solliday 2000; Stevens 1955:47–49).

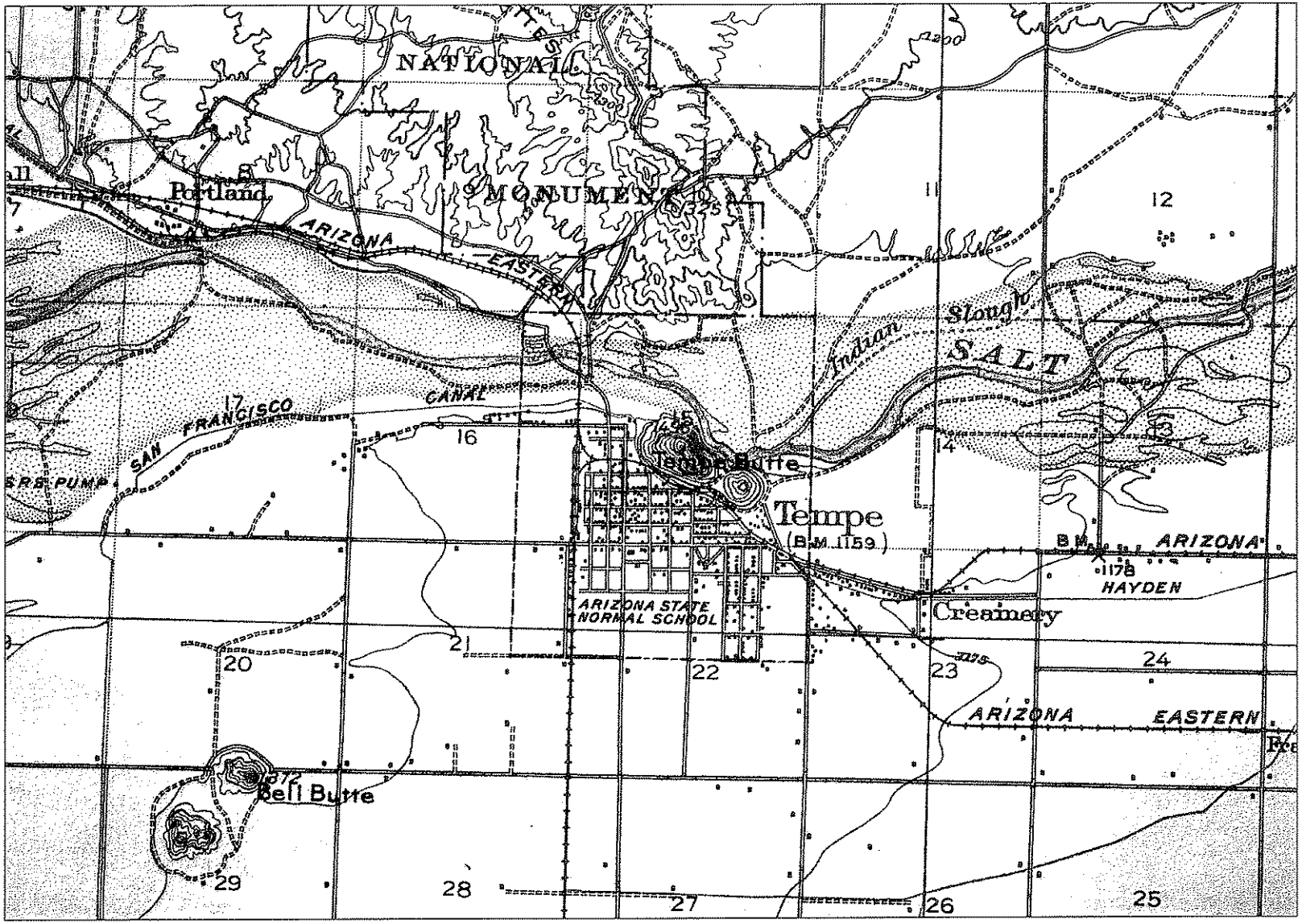


Figure 6.2. Portion of the 1915 Mesa 15' topographic quadrangle showing the boundary of Tempe.

However, Arizona had ideal growing conditions for cotton, and the industry did eventually recover after many nprofitable years, but farmers decided to grow a wider variety of crops, including the more common "upland" short-staple cotton. In 1924, the TCE built a new gin for short-staple cotton on the south side of 8th Street (University Drive) (*Tempe Daily News* 1924).

Economic Depression and Slow Growth: 1920–1945

The building boom of the early 1900s came to an abrupt halt after the Cotton Crash of 1920. Agricultural prices remained low throughout the 1920s, and then the Great Depression brought continued economic hardships into the 1930s. Only four new subdivisions were platted in those two decades, and construction of homes and businesses slowed to just a few a year. For a brief period, more people left Tempe than came (Janus 1983; Lamb 1981). The Great Depression was actually a period of recovery for Tempe, which was not as affected by the economic downturn as industrial cities. Due in part to a more diverse agricultural base, local farmers were exporting such crops as citrus fruit, cantaloupes, and lettuce, in addition to cotton. Federal recovery programs, notably the Public Works Administration (PWA) and Works Progress Administration (WPA), provided local construction jobs for work on improvements in streets and highways, drainage, parks, and other city infrastructure. Perhaps ıe greatest effect these programs had on Tempe was the construction of several new buildings on the campus of the teacher training school which in 1929 had been renamed Arizona State Teachers College. The college received nearly $2 million in federal grants and loans through the 1930s, which financed the construction of West Hall, Krause Dining Hall, Lyceum Theater, Moeur Activity Building, Irish Hall, and Dixie Gammage Hall (Ryden Architects 1997). However, residential development was mostly limited to small apartment buildings. Few single-family homes were built during the Depression because people did not have any money, and they could not get credit. The Federal Housing Administration (FHA) was created in 1934 to insure home mortgages, and in the process, stabilize the construction industry, but these loans were not available in Tempe until the end of the Second World War (Solliday 2001:17).

The Tempe City Council approved its first zoning ordinance, Ordinance No. 177, on April 14, 1938. City planning and zoning was a relatively new idea, having just begun in New York and other cities in the 1920s.The stated purpose of Tempe's ordinance was to avoid overcrowding, and facilitate the adequate provision of transportation, sewers, schools, and parks (*Tempe Daily News* 1938). It stablished building zones with restrictions on types of property uses within certain areas. The primary business district was located along Mill Avenue, from 3rd Street to 8th Street. Other zones were created for a mixed business and apartment house district, and areas for auto courts, tourist camps, and trailer courts. Areas reserved for residential development extended to the southern boundary of town at 13th Street. Industrial businesses were limited to both sides of the railroad tracks between 3rd and 8th streets, and on the west and east sides of Tempe Butte. These new restrictions were not considered onerous, mostly because they reflected the existing development and property uses in Tempe at that point (Ryden Architects 1997).

As the United States entered the Second World War in 1941, the national economy improved quickly as the country began mobilizing for war. Prosperity also returned to Tempe, as demand for cotton and other agricultural products was high, and military training and other war-related activities across central Arizona brought many people into town. The City's population was growing quickly, but wartime restrictions on lumber, copper wire, and other building materials soon brought all new construction to a halt. Tempe now faced a severe housing crisis, which worsened as the war started drawing to a close in early 1945 and the first wave of veterans was returning home.

Post War Expansion in Tempe: 1945–1960

By early 1945, when building restrictions were lifted, three new subdivisions were platted south of 13th Street, which was the City boundary, and four others were established just east of town, along U.S. Route 80 (Apache Boulevard). At the end of the year, more than 40 new homes had been completed. More new subdivisions were made in and around Tempe each year, and the City Council regularly approved annexations to incorporate the new neighborhoods (Solliday 2001:15–23). Much of the city's growth was due to the transformation of the teachers college into a four-year liberal arts college. The school officially became Arizona State College at Tempe on March 9, 1945. New or expanded programs in science, business, agriculture and industrial arts, and liberal arts appealed to returning veterans who were eligible for an educational allowance to go to college under the G.I. Bill of Rights. Immediately after the war, enrollment at Arizona State College soared. In the fall of 1945, there were 553 registered students, but a year later, the college had grown to about 2,200 students, and attendance doubled every semester (Hopkins and Thomas 1960:245–248, 252, 263–265, 274–277).

By the early 1950s, residential development had spread as far south as Broadway Road, and to the north side of the river (Figure 6.3). With this rapid expansion, the City had to construct new water works and a sewage treatment plant, residential irrigation systems, and paved roads. As homes spread in every direction, retail businesses also started moving away from downtown Tempe and closer to the new

neighborhoods. Tempe's first two shopping centers—the A. J. Bayless Supermarket Center on East Apache Boulevard and the $1 million Tempe Center at Mill Avenue and 8th Street—opened in 1956. The runaway growth of the City also brought the loss of much farmland. Farms and dairies ceased operation as lands were sold to builders and realtors. With fewer farmers in the area, the cotton gins and the creamery closed. However, at the same time Tempe emerged as a major shipping center for citrus fruit. Several new packing sheds and juicing plants built along the Southern Pacific Railroad tracks received fruit from orchards far to the south in the Kyrene District and at South Mountain. While farming did not disappear entirely from the Tempe area, the sustained growth of the city relied on the introduction of new nonagricultural industries. Penn-Mor Manufacturing Company (garments), Capitol Foundry Company (steel products), Superlite Block, and Solid State Electronic Controls opened plants in the late 1950s and became the largest employers in Tempe (Solliday 2001:27, 43–45, 49, 53–57).

In the post-World War II period, Tempe's population rose from less than 5,000 at the end of the war to 24,897 in 1960, representing a 400 percent increase in just 15 years. During this time more than 3,200 acres of new residential subdivisions were developed, extending neighborhoods as far south as Southern Avenue and to the City's present boundaries with Scottsdale, Mesa, and Phoenix.

Impact of Hayden Flour Mill on Community Planning and Development

From the community's founding in 1870 through the first half of the twentieth century, the economy of Tempe was based primarily on agricultural production. However, this involved more than farms and ranches; Tempe was also a center for the processing and shipping of agricultural products. This trend began with the Hayden Flour Mill, and was continued with the establishment of the Pacific Creamery, cotton gins, and citrus packing sheds and juicing plants. Even among these types of businesses, the Hayden Flour Mill has remained rather unique in that it has consistently been a major employer throughout most of Tempe's history. Even during times of economic depression, regional demand for flour and grain products remain fairly consistent, providing some stability to the community during hard times. By 1960, the loss of much of the farmland surrounding Tempe to residential development also brought a decline in the agriculture-related industries. With the exception of Hayden Flour Mill, which continued operations until 1996, the processing businesses were closing or facing declining production as Tempe was shifting to a manufacturing, education, and retail economy.

Hayden Flour Mill has always been a consideration in decisions regarding community planning and development, and its own history has been influenced by changes in the community. Electrification came to Tempe at the turn of the century. When the Hayden Flour Mill was rebuilt in 1917, it was designed to take advantage of the new power source, thus becoming one of the first major purchasers of electric power in Tempe. The mill also promoted the need for improved transportation infrastructure and municipal improvements, including railroads, streets, and bridges. The adoption of a municipal zoning ordinance in 1938 reflected the prior development of industrial activities on the west side of Tempe Butte, which included the mill, a lumberyard, and a cotton gin. Due to the iconic status that the Hayden Flour Mill has acquired since Tempe's centennial in 1971, the structure has continued to be an important component in City planning decisions regarding downtown development.

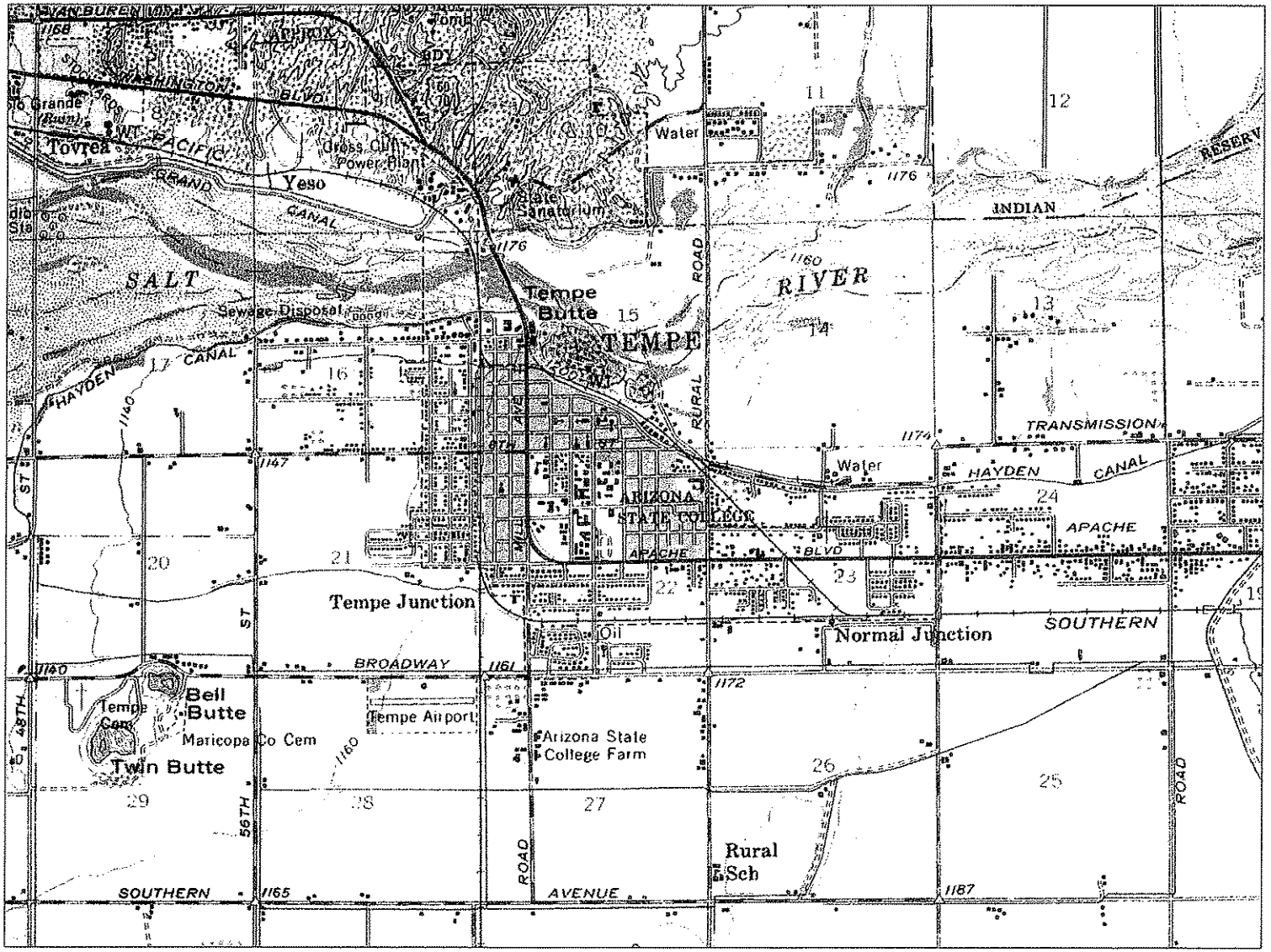


Figure 6.3. Portion of the 1952 Mesa 15' topographic quadrangle showing the continuing growth of Tempe after World War II.

Pimería Alta—Land of the Upper Pima: 1687–1848

Spanish colonizers were the first Europeans to explore ıe American Southwest; however, prior to 1687, no missions had been established in Pimería Alta—the northern region of Sonora that currently encompasses southern Arizona and northern Sonora, Mexico. Between 1687 and 1711, Father Eusibio Kino founded a number of missions in the region (with a 20-year exemption), building churches in friendly Akimel O'odham villages, or rancherias. In all, eight missions were established with principal *cabaceras* and dependent *visitas*. Father Kino and Captain Juan Mateo Manje visited missions in Pimería Alta in 1697. At this time, San Xavier del Bac comprised a population of 830 residents, with another 750 at San Augustin del Oaiur (Tucson); of the latter, Captain Juan Mateo Manje (Mabry 2005:116) wrote:

> ...after going six leagues, we came to the settlement of San Augustin del Oaiur.... Here the river runs a full flow of water, though the horses forded it without difficulty. There are good pasture and agricultural lands with a canal for irrigation.

However, despite the early achievements of Father Kino, very little missionary activity occurred for the next 30 years. The Province of Sonora at this time was experiencing bitter political battles between Jesuit missionaries, who fought for natives protected under mission districts, and the ıerchants and civil leaders who urged secularization of all missions. Because of the sparse development of Spanish towns and commerce, the missions of Pimería Alta were never threatened with secularization; however, the lack of Jesuit activity in Sonora ensured the missions established by Father Kino would not mature. Finally in 1732, the Jesuits resumed missionary activities among the Upper Pima; missions designated a generation before were reestablished. In 1751, a concentrated Akimel O'odham uprising near Saric (south of Tumacacori) forced the evacuation of Spanish missionaries from the southern villages of Pimería Alta; the uprising however, was not widespread among all Upper Pima. Nevertheless, the Presidio of Tubac was established in 1752 to protect missions in the northern periphery of Pimería Alta (Spicer 1986).

It is important to note that Spanish settlement and influence in Pimería Alta was far less significant than that of central Sonora, which was occupied by the Opata and Lower Pima. The political atmosphere in Sonora had suspended meaningful development and work along the Santa Cruz and San Pedro rivers; only a relatively few missions had been established on a frontier that was much larger than central Sonora. The Franciscans were able to maintain and expand ɔme of the missions, like San Xavier and Tumacacori, after 1767; however, intensive settlement and industry were not undertaken.

Perhaps more important, however, was the Apache problem, which had affected northeast Sonora and portions of Chihuahua since at least the 1690s and had effectively checked expansion and development northward into Pimería Alta, and isolated the New Mexico settlements on the Rio Grande. The Spanish authorities, however, offered no meaningful strategy to combat the Apache raids. Presidios were constructed in Pimería Alta to combat the problem, including Terranate (1776) and the relocation of troops in Tubac to Tucson (1776). By this time, Sobaipuri settlements along the San Pedro River were abandoned, as the natives migrated to the Santa Cruz River. The northern territories of Sonora and Chihuahua in the closing years of the eighteenth century had destabilized, with the desertion of settlements and missions; Apache raids expanded to established Akimel O'odham villages along the Santa Cruz River. Finally, in 1786, a new policy was implemented, known as the Galvez Instruction, or Galvez Peace Policy. In effect, Spanish policy sought to avoid conflict with the Apache by mutual contacts and negotiations; fostering economic sustenance among Apache villages; and rationing of foodstuffs, such as grain, meat, sugar, and tobacco. In return, Apache bands moved closer to established presidios or towns, limited travel and movement to hunting patterns, and informed Spanish authorities regarding rebel bands. Spanish policymakers were confident the Apache would eventually become dependent on the Spanish as they abandoned their traditional hostility to Spanish colonization (Griffin 1985; Spicer 1986). The policy was very successful into the first decades of the nineteenth century, but no further settlement into Pimería Alta was undertaken; by this time, Spanish hegemony in New Spain was disintegrating in the southern provinces.

Milling in Pimería Alta

After expulsion of the Jesuits from the New World in 1767, Franciscan missionaries went north from Magdalena, Sonora, and introduced their well-adapted strain of Sonoran wheat to the Native American tribes along the Gila and Colorado rivers. The Piipaash and Yuman populations successfully adapted to production of wheat by utilizing floodplain farming techniques, rather than an irrigation system (Wilson 1985). The Akimel O'odham along the Gila River were particularly interested in establishing the new crop, and later found it to be a very valuable commodity for trade. However, the northern frontier was still sparsely populated and was reflected in their local industries. In an 1804 evaluation of colonial outposts in the Sonoran Province, Tubac and Tucson reported the following:

Tubac:

Agriculture:

The Tubac district reaps an annual corn harvest of 600 bushels, evaluated at 1200 pesos. Our annual wheat harvest of 1000 bushels is worth 2000 pesos. We raise no cotton, tobacco, barley, sugar, sarsaparilla, cacao, vanilla, or indigo. The only dyewood that grows here gives a yellow dye. The best lumber produced in the region is pine.

Industry:

Animal slaughtering is a private occupation, not a commercial or an industrial one here. Wool weaving has produced some 600 blankets, selling at a little over five pesos apiece. Over 1000 yards of coarse serge has been woven, selling at about half a peso per yard. Cotton, silk, and lace are not woven here, nor are fancy ribbons. There is no production of saltpetre or gunpowder. No brandy, whiskey, or tequila is distilled. The only chinaware made is the pottery produced by the poor from clay. No glass is manufactured.

Tucson:

Agriculture:

We produce 600 bushels of corn a year, and it sells at two and a half pesos a bushel. Wheat sells at two pesos a bushel, and our area harvests 2800 bushels annually. Beans and other vegetables sell at four and a half pesos a bushel. About 300 bushels are produced annually. Cotton is raised only by the Indians. With it, they weave a domestic fabric for their own use. We grow no sugar, tobacco, cacao, vanilla, sarsaparilla, Tabasco pepper, Jalapa purgative, indigo, cochineal, Campeche wood for dyeing, or wood for fine lumber.

Industry:

Animal slaughtering accounts for 300 beeves killed each year, including the 130 slaughtered at the expense of the royal treasury to maintain the peaceful Apaches. Two hundred sheep are slaughtered. A dressed beef sells at six pesos, a dressed sheep at one peso.

Soapmaking accounts for 1000 pesos spent annually by this population, including the soap needed to provision the garrison. It is difficult to estimate the quantity involved, since soap is sold here in bars and not by weight. Over half of this soap is made here in Tucson and at San Xavier. The rest is bought in Arizpe.

No brandy, whiskey or tequila is distilled. No gunpowder, chinaware or glass is manufactured

[McCarty 1976:84–89].

It is perhaps not surprising, considering the poor economic and cultural conditions, that no evidence to date has been established to suggest the presence of a Spanish water mill in Pimería Alta. It is quite probable that cattle or burro mills were used in missions throughout Pimería Alta (Figure 8.28). Consultation with Jeremy Moss—Resource Manager and Archaeologist at Tumacacori National Historical Park near Tubac (personal communication, March 16–23, 2007)—confirmed that at least two missions were equipped with large millstones operated by a burro or horse. Two millstones were recovered from Room 8 of the Convento in the course of archaeological excavations in 1964 (it was later backfilled to prevent deterioration) (see Figure 8.3). A separate milling room was also identified near the Granary and Convento, but photographs have not been located. The mill in Room 8 of the Convento was constructed sometime after 1774, but no date has been established for the second mill. While Mr. Moss concludes the mills at Tumacacori were likely powered by animal, he does note that the presence of a small, brick-lined ditch extending from cisterns in front of the Church to the Convento may suggest at least the possibly of a water mill; however, the limited archaeological excavations do not indicate as much. A mill was also identified in the walled garden of San Augustin; however, no other data is available (Jeremy Moss personal communication, March 16–23, 2007). Jesuit and Franciscan missionaries in remote areas may have also relied on native peoples to grind flour from corn or wheat from the traditional metate, or a hand rotary quern (see Figure 8.7); interestingly, the 1999 Arizona Archaeology Awareness Month poster exhibits a painting by William Arendt in which two women are grinding corn or wheat using a wooden shaft to turn a large milling stone on a fixed stone platform.

The fragile welfare of missions and native villages of Pimería Alta were compounded after 1821 when Mexico won its independence from Spain. Over the next decade, all missions were secularized and many deserted as Franciscans were forced to evacuate; missions and presidios throughout Sonora were abandoned. The Mexican government continued implementation of the Galvez Policy through the remainder of the decade. However, by 1830 the policy deteriorated and warring factions of the Apache again reigned freely across southern Arizona; Sonora erupted in violence, despite limited Mexican resistance (Griffin 1985; Kessell 1976; Trimble 1977). The Mexican population in northern Sonora and southern Arizona (Tucson and Tubac) was sparse and many of the Sonoran missions were abandoned, or severely depleted. The isolated settlements of Tubac and Tucson continued to rely on the burro mill, as had the Spanish Missions in Tumacacori and San Augustin (see Figure 8.28). Indeed, some of the first United States citizens passing through Tucson in the 1840s noted the use of burro-powered grist mills in almost every household (Dr. F. Arturo Rosales

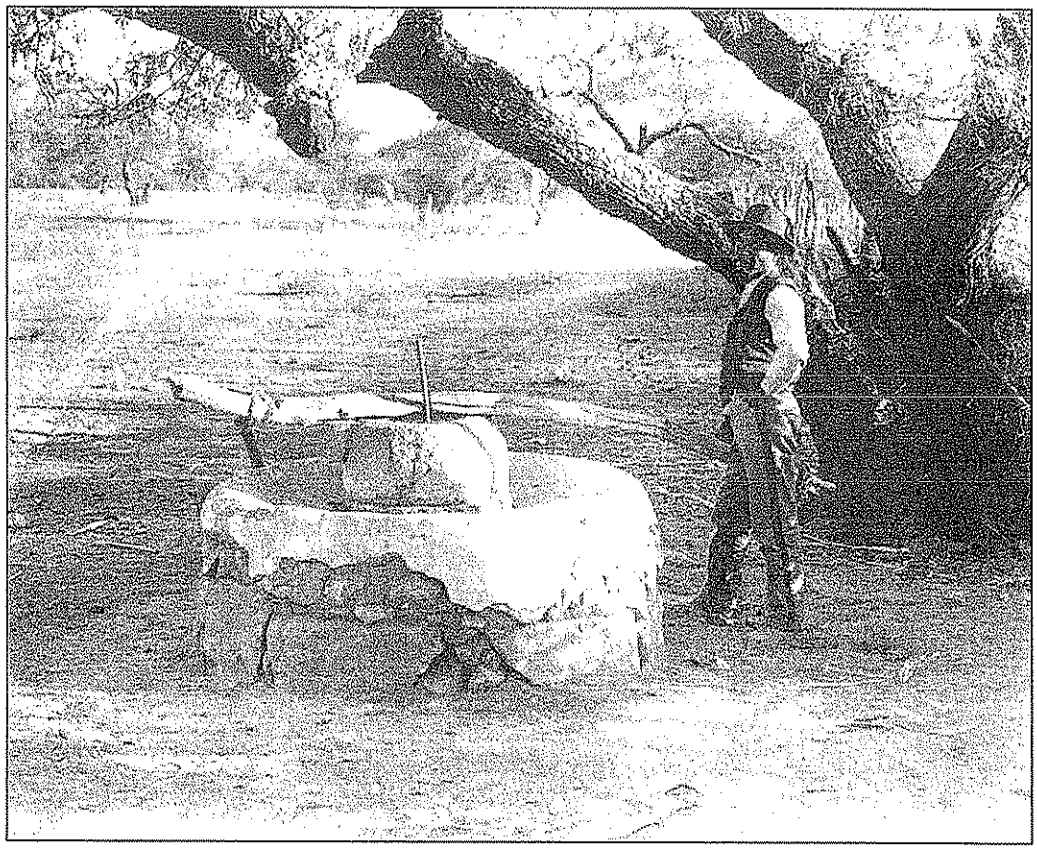


Figure 8.28. Mexican burro flour mill. Millstone is made from a tough volcanic rock at Poso Noriega
Photograph and caption by William Dinwiddie November 8, 1894 (Special Collections: CP-SPC 58-3 Arizona State University, Hayden Library Arizona Collection).

personal communication 2000; Officer 2007:80, 213, 227, 363; Sheridan, 1627:38–39). One of these American witnesses was Brevet Second Lieutenant Cave Johnson Couts, an officer of the First and Second U.S. Dragoons; the dragoons were en route to California shortly after the Mexican-American War. Couts recorded his experience with the dragoons and travels through the newly conquered territory in his diary. In October 1848, the dragoons passed through Tucson; Couts (Cosulich 1953:66–67) described Tucson as such:

> ...every house in Tucson is furnished with a Baro [Burro] flour mill and kept going incessantly, probably grind a half bushel of wheat in 24 hours [approximately 0.15 barrels, or 30 pounds]. They are made of two large and rough stones, about the usual size; the under one fastened upon a pillar about two feet high, and of the same diameter as the stone, the upper one is placed on this and kept in its place by a wooden spindle which passes through its center and the hole serves as a hopper; taking about a handful of wheat at a time.

The closest grist mills of any significance were located beyond the boundaries of what would become the Arizona Territory; namely Santa Cruz and El Paso. These mills have been mentioned in the narrative written by John Russell Bartlett, who was appointed Commissioner to lead the American boundary delegation to mark the boundaries of Mexico and the United States as part of the Treaty of Guadalupe Hidalgo (Bartlett 1854b).

Flour was procured for Barlett's initial boundary survey party in El Paso, which had two water mills in the vicinity—one owned by Mexican resident Ponce de Leon, and another owned by an American by the name of Simeon Hart. El Molino Norte was constructed by Simeon Hart in 1849 and was characterized as a one-story limestone structure with a water wheel and set of stones. The mill supplied flour to area residents and military establishments, including a one-year contract with the Boundary Commission at an average price of 10–12½ cents per pound (Bartlett 1854b:178; Cocke 1938; Timmons n.d.). A 1936 photograph of the ruin indicates this mill was a horizontal mill similar to those of the Spanish era (Figure 8.29). Operation of the mill prevailed through at least 1874 when Simeon Hart died; it is unclear how long the mill operated after his death. Regardless, however, El Molino Norte was one of the few merchant mills operating in the newly acquired Southwestern territories prior to the American Civil War.

Figure 8.29. West-facing photograph of the ruins of Simeon Hart's Mill near El Paso showing the millrace arch.

Architecturally, this structure compares favorably with horizontal mills of the Spanish era (see figure of the Mission San José grist mill) (Cocke 1938:HABS TEX, 71–ELPA, 1-1).

The Border Commission survey traveled from El Paso to the Gila River and into San Diego, crossing vast areas of unoccupied territory. Consequently, provisions and goods not immediately available in the scattered settlements and Indian villages had to be acquired from towns in northern Mexico; Bartlett followed the commissioner of the Mexican delegation through northern Sonora to acquire necessary supplies. In the Presidio of Santa Cruz, south of Tubac and the current Arizona border, Bartlett and his men were able to purchase a stock of flour from a small grist mill operated by the local commandant. This was the only mill known to the delegations outside of El Paso (Bartlett 1854b:381–382). Though subjective, the brief description and the location of the grist mill in Santa Cruz suggests that it, too was a horizontal mill constructed during the era of Spanish occupation. Had the survey party journeyed farther north to Santa Fe, they might have procured flour from another Spanish mill:

> In my rambles around the village I came across an old-fashioned Spanish grist-mill, the first one of the kind I had seen in the country, which was something of a curiosity in a small way. The building was not more than ten or twelve feet square, with one run of stone, turned by a small tub-wheel by the water from a neighboring *acequia*. The upper stone was made in the form of a basin, with a rim around it some four inches wide, and fits down over the lower stone, made fast to the floor, and is about eighteen inches high. The grain is mashed by the revolution of the upper stone, and the meal falls down into a box built around the lower one. The hopper was made of bull-hide, and fastened to the beams overhead. The old miller was hard at work in his little mill, and I have no doubt he considered his simple apparatus the perfection of machinery [Davis 1857:341–342].

These Spanish mills of Santa Cruz, Santa Fe, and San Antonio (Molino Blanco) (and no doubt within Sonora, Mexico) witnessed continued use through the Mexican period of the Southwest, and may have provided a template for construction of early American mills in the newly acquired territories, such as El Molino Norte (see Figure 8.29).

Pioneer Grist and Flour Mills in Arizona: 1859–1865

In the short period of settlement before the Civil War, many emigrants traveling through southern Arizona came as entrepreneurs, with high hopes of success in a promising new country. Early secondary accounts of conditions in Arizona between 1848 and 1861 reveal the great expense and difficulty in obtaining necessary supplies and goods from peripheral localities (Cosulich 1953; Farish 1915a). It was in this early period of territorial development that at least four American flour mills were operating along Sonoita Creek and in Tubac, Tucson, and the Pima Villages (near the Gila River). All would be dramatically affected by the onslaught of the Civil War; consequently, only two appear to have survived the turmoil of the early 1860s. Following is a brief discussion of Arizona's early flour mills (Figure 8.30).

Findlay and Sharp's Mill on Sonoita Creek

A flour mill was located on the property of Findlay's Ranch on Sonoita Creek and jointly owned by Findlay and Sharp (full names are currently unknown). Hartley's 1865 Map of Arizona (Hartley 1865) lists seven landowners along Sonoita Creek between Calabasas and Fort Buchanan; among them is Finley, located near Calabasas. Though subjective, Finley's Ranch on the map likely corresponded with newspaper accounts of Findlay's Ranch. The *Weekly Arizonian* (1859b:3) announced construction of the Tubac and Sonoita Creek mills in March, 1859:

> A mill for grinding wheat and corn will soon be erected at Tubac on the Santa Cruz River. Also a mill of the same description on the Sonoita, near Findlay's Ranche. It is expected that with both these attributes of civilization in full operation breadstuffs will not be quite so high as at present. Flour ought to be afforded at six cents per pound, and corn meal at four cents, instead of the high rates now charged.

An April 14 notice in the *Weekly Arizonian* (1859d:2) noted the machinery would soon be installed and also provided a brief architectural description:

> There will be two run of stones, one pair the best French burr stones that can be procure. The mill is a substantial structure, the lower story being a very heavy timber, and the upper story of adobes. About the 20th inst. [sic], the grist mill at Tubac will be commenced.

The French burr stones would have ground wheat, while the second set used for production of corn meal. Other machinery present might have included a bolt and storage bins.

Apparently there were delays in commencing operations of the flour mill. A June 16 update on the mill declared that the mill was "nearly ready for raising" (*Weekly Arizonian* 1859e:3). Presumably, this was in reference to the conveyance of water from Sonoita Creek; the same article noted that if the water did not fail, it would be a substantial property. Unfortunately, nothing further has been identified in relation to operation and eventual closing of the mill; the grist mill was not listed in the 1881 *Arizona Business Directory and Gazetteer*. The entire area was largely deserted after commencement of the Civil War; presumably, the mill was abandoned and possibly destroyed in the turbulent period of the Civil War.

Tubac Flour Mill

The Tubac Mill is mentioned in conjunction with Findlay and Sharp's Mill in the local *Weekly Arizonian* newspaper (see quotations above). However, other than the newspaper references, archival data has offered very little information on the Tubac water mill. Dobyns (1959:652) mentioned only that the flour mill appeared to have taken water from the old Spanish-period irrigation ditch. The mill was constructed at the height of extensive mining in and near the Santa Cruz valley. By 1859, ownership of the struggling Sonora Exploring and Mining Company (with its headquarters in Tubac) had been assumed by Samuel Colt (inventor and founder of the Colt Manufacturing Company) (Sheridan 1996); his brother-in-law, R.W.H. Jarvis, became treasurer of the mining company (*Weekly Arizonian* 1859e:3). Local newspapers are vague as to the details of the mill, only that construction was concurrent with the Sonoita Creek Mill.

A December 1862 affidavit written by Theodore Mohrmann in defense of the Silver Lake Mill property provides insight into original ownership of the Tubac Mill. It appears that Mohrmann was an agent for Samuel Colt and R.W.H. Jarvis for the mining company in 1861 when Tubac was being deserted. In the affidavit, Mr. Mohrmann claims to have authorized Mr. J. Ruhrdan to take the mill machinery from the Tubac Mill for use in the Silver Lake Mill until such time the machinery was reclaimed by Mr. Mohrmann, or the proprietors, Samuel Colt and R.W.H. Jarvis (Mohrmann 1862). The Tubac Mill was apparently a company mill built and operated by the Sonora Exploring and Mining Company to provide affordable flour and meal to workers and their families—most of whom were Mexican. Sheridan (1996:64–65) notes that Mexican workers were often paid with goods, rather than money; this statement is confirmed by a series of letters written by Jonathan Richmond to his parents

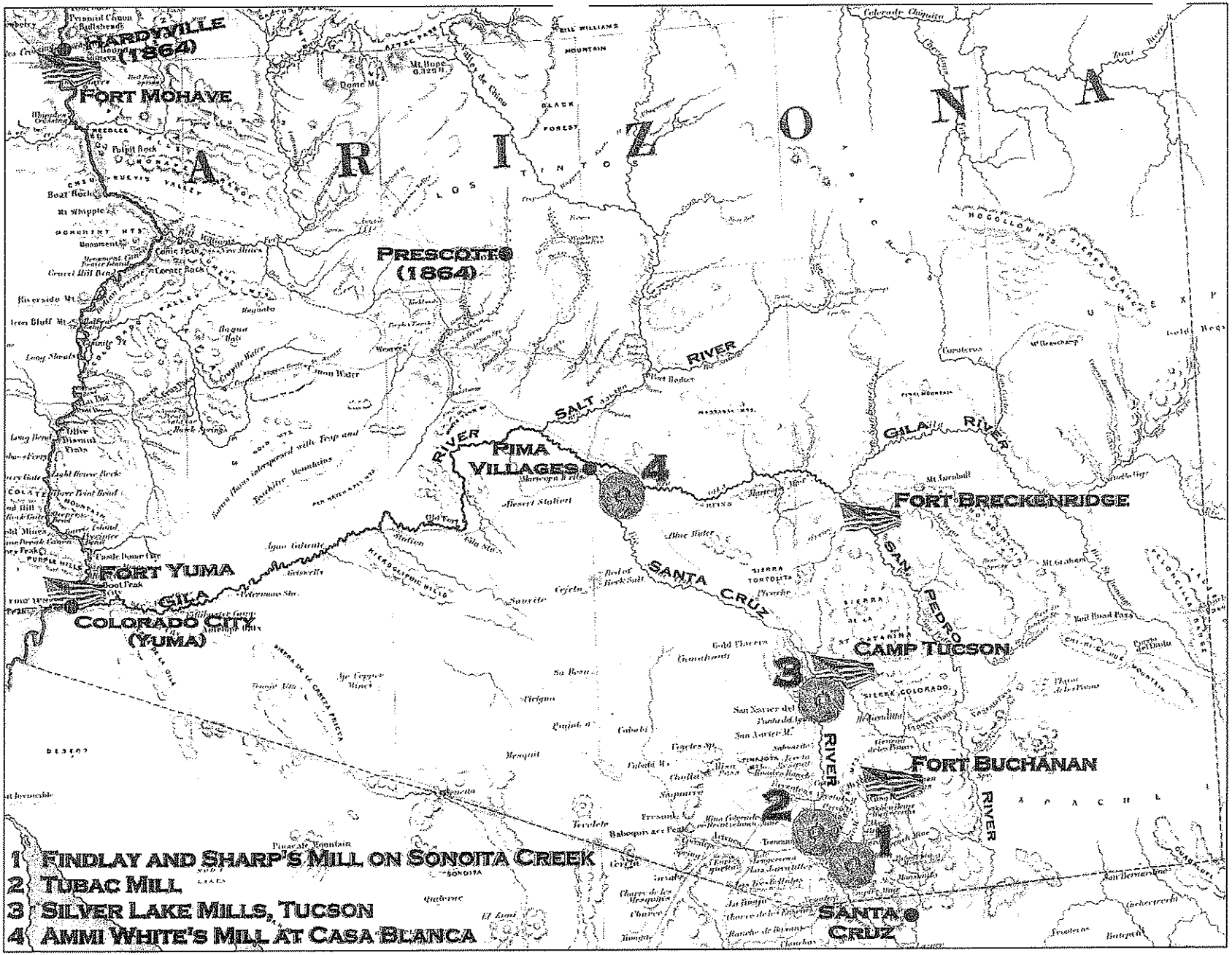


Figure 8.30. Portion of Hartley's 1865 Map of Arizona showing locations of water mills operating between 1859 and 1865 (Hartley 1865) (supplemental text and graphics by author).

while in the Arizona Territory between April 1864 and May 1865. Richmond accompanied government officials on a tour through the territory, with high hopes of prospecting promising mineral claims. In an October 3, 1864 letter to his father, Richmond (Farish 1916a:238–239) describes the pay rates for Mexican labor:

> The Mexicans who are employed are allowed as stated above, 60¢ a day and a ration of 16 lb. flour a week; their coffee, sugar, &c., they are obliged to purchase at a light advance on the cost. A good supply of goods are kept on hand at all the principal mines, their Peons, (Mexicans), being good customers, oftentimes drawing goods to the amount of their wages. It would be to the interest of the mine when once opened to purchase their supplies in the States.

The Tubac Flour Mill was apparently in operation between approximately late 1859 and 1861; it is currently unknown if the mill was operating prior to the mill on Sonoita Creek; what is known, however, is that both mills were early casualties of the Civil War.

Consultation with Tubac Historical Society Librarian Mary Bingham reveals that the mill ruin is currently on private property and that it indeed took water from the Spanish-period irrigation ditch. José Guaydacan acquired the property in 1940, and constructed a small house over the cobble foundations of the mill. Mr. Guaydacan passed away in 1982, but the property is still owned by the family (Wilson 2001). Bob Barnacastle—former manager of the Tubac Presidio State Historic Park—took photographs and measured drawings of the mill in 1992. The documentation is in a central Arizona State Parks database (Barnacastle, personal communication 2007). Ms. Mary Bingham, Mr. Bob Barnacastle, and Dr. Lyle Stone were kind enough to escort the author to the site to take photographs of the mill ruins. The field visit revealed surface remnants of the old Spanish ditch; a segment of the ditch near the mill was stone lined with a 4-ft (1.22-m) interior width. A 15-ft- (4.57-m-) wide stone-lined millpond was also apparent immediately adjacent to the structure and cobble and mortar foundations surrounding a covered stone-lined wheel pit (Figures 8.31–8.33). From these observations, the Tubac Flour Mill may have represented a horizontal mill. Initial field observations suggest that the wheel pit appeared too small for housing a vertical wheel (compare with the plan view of the San José mill in Figure 8.18).

The Silverlake Mills near Tucson

In 1856, two brothers arrived in Tucson from the East Coast and were granted permission from the townspeople to construct a dam on the Santa Cruz River for a flour mill (Department of the Pacific 1863). William M. and Alfred M. Rowlett promptly began construction of the dam just south of Tucson and by late 1859, advertised the opening of their mill:

> ROWLETT'S FLOUR MILL!
>
> The Subscribers are now prepared to offer unusual facilities
> to parties wishing to have their
> WHEAT GROUND INTO FLOUR !
>
> We are enabled to make a finer article of Flour than ever before offered for sale in Tucson or this vicinity.
> Having purchased in San Francisco the most improved milling stones and bolt, we defy competition
> All orders punctually attended to and
> WHEAT AND FLOUR FOR SALE!
> on liberal terms.
> Wm. M. & Alfred M. Rowlett
> Tucson, October 27th 1859
> [*Weekly Arizonian* 1859f:3]

The brothers sold their property and water rights for $5,500 to Mr. William S. Grant, a merchant who had contracts with local military establishments, as well as Fort Fillmore in New Mexico. This buyout must have occurred by early 1860, as Grant promptly renovated the flour mill and began construction of another mill immediately adjacent to the original. Grant obtained the mastic roof and equipment for the new mill from San Francisco via Yuma. The total cost of the new mill was $18,000, more than three times the amount paid for the original mill and water rights. The newly constructed mill produced an hourly capacity of 10 bushels (3.05 barrels; 600 pounds) and apparently ran constantly (Cosulich 1953:273). Considering that Tucson, Sonoita Creek, and Tubac were effectively isolated, sparsely settled communities, it is unlikely the Silver Lake mills would be running constantly (at least prior to ca. 1880). Rather, it was likely a seasonal operation, wherein flour and meal were ground in the fall after harvest.

Unfortunately for Grant, the Civil War in 1861 brought an end to a promising industry in Tucson; in July of that year, retreating Union troops set fire to the mills and all his merchant property in Tucson. Grant was also forced to leave Tucson as well for fear of reprisal; he was escorted temporarily to Fort Buchanan. While at the fort, Grant sold what remained of his Tucson properties (including the mills and equipment) to Mr. G.M. Jones, who returned to Tucson and invested in the reconstruction of the water mills; as stated above, Ruhrdan transported machinery from the Tubac Mill for installation in the renovated Silver Lake Mill (Cosulich 1953; Mohrmann 1862). Presumably, Jones only renovated the second mill, leaving the original in a state of ruin; sources after this time refer only to a single mill operating at Silver Lake.

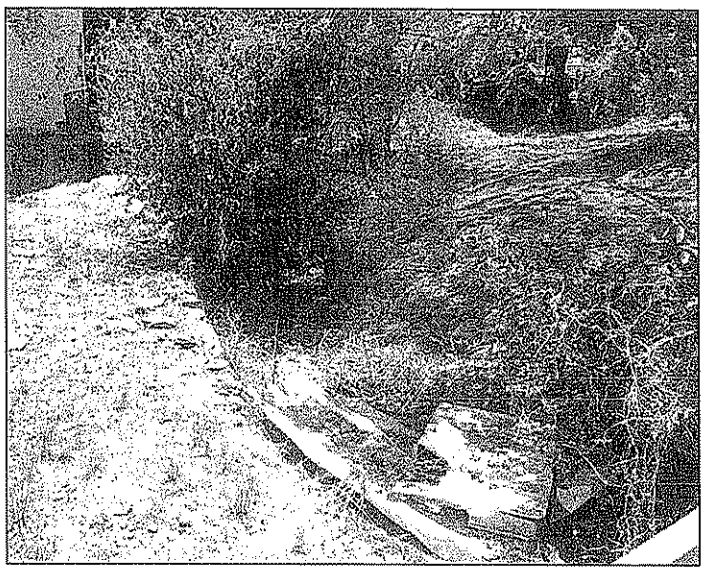


Figure 8.31. Northeast-facing photograph of the Tubac Mill ruins showing surface remnants of the stone-lined millrace.

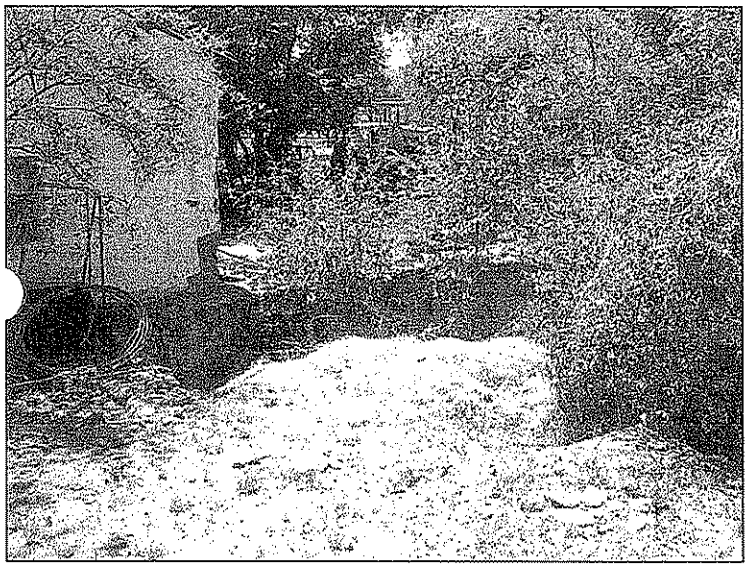


Figure 8.32. Northeast-facing photograph of the Tubac Mill ruins showing the surface remnants of the stone-lined millpond. The 1940 Guaydacan house is visible.

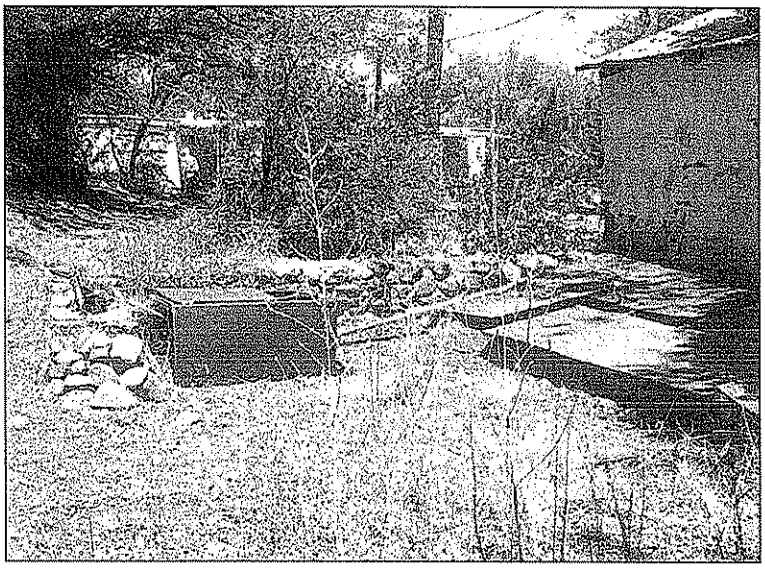


Figure 8.33. Southwest-facing photograph of the Tubac Mill ruins showing the remnants of the cobble and mortar foundation of the mill. The wheel pit is covered with sheets of plywood.

When Union troops returned to Tucson in May 1862, they seized the Silver Lake Mill property and employed T.T. Lally to produce flour for military rations; apparently, flour was sold to the community at much higher rates. The military confiscation of the flour mill infuriated locals, who were deprived of affordable flour from the renovated mill. In December 1862, 10 affidavits were submitted to the Provost Marshall by prominent Tucson residents arguing that the water rights for the mill were in possession of the community (Department of the Pacific 1863); they further stipulated that G.M. Jones was the rightful owner of the flour mill, having purchased the rights legally from William Grant (Theodore Mohrmann's affidavit referenced above was one of the 10 submitted). Apparently, the appeal was decided in favor of Jones, who partnered with Ruhrdan in the operation of the mill. Hayhurst (ca. 1940–1950) stipulates that the partnership was dissolved and G.M. Jones died sometime in late 1863, or early 1964, after which the property was maintained by William Tonge—an arbitrator of the Jones estate. In May of 1864, Charles T. Hayden attempted by court action to gain ownership of the mill. Citing past debts unpaid by William Grant, Hayden tried to have the court foreclose on the property so he could retrieve the debts. James Lee and Jack Swilling argued on behalf of the Tucson community that the mill and water rights were essentially owned by the community and could not be regarded as under ownership to William Grant (Hayhurst ca. 1940–1950).

The decision of this case is unknown; however, Cosulich (1953:274) reports that James Lee and W.F. Scott finally took control of the Silver Lake mills in 1864. For several years, the partners ran the mill, even after construction of their steam mill within the town limits of Tucson in 1870 (the Eagle Flour Mill). According to the 1881 *Arizona Business Directory and Gazetteer*, the Silver Lake Mill was still operating and owned by James Lee until he died in 1884; after which the property was sold. Through the 1880s, Silver Lake was plagued by several floods—including the 1891 flood—that caused severe damage to the dam (Cosulich 1953). Given the current absence of a definitive date, it can only be assumed the Silver Lake Mill was abandoned sometime before, or around, 1900.

Architectural descriptions of the Silver Lake mills are yet to be identified; however, available archival records offer at the very least, a suggestion of their architectural character. Given that Grant constructed an entirely new mill adjacent to the original, it would appear the Rowlett Brothers constructed a simple horizontal mill that could not be substantially expanded and improved upon. The cost of Grant's new mill, and the fact he hired Daniel Brown, a miller from San Francisco, to equip the new flour mill suggests it may have been a more complex mill run by a vertical wheel. This mill, having been reconstructed by successive owners through the course of the Civil War, was likely a two-story mill equipped with multiple run of stone (for wheat and corn), as well as bolters, and possibly a smutter, or rolling screen.

Ammi White's Flour Mill at the Pima Villages

As stated previously, Father Kino had introduced the Akimel O'odham on the Gila River to the Old World grain in his travels through the Pimeriá Alta. By 1774, wheat fields along the Gila River were:"...so large that, standing in the middle of them, one cannot see the ends because of their great length" (Wilson 1985:135).

The villages took advantage of their prominent location on the well-established Gila Trail (incorporated into Cooke's Wagon Road, and later the Butterfield Overland Stage Line) to profit off speculators and other travelers heading to California in the mid-nineteenth century (Officer 1987:235, 244; Sheridan 1995:97–98; United States Department of Agriculture 1937:210). Between 1858 and 1860, for instance, the Butterfield Company and other private freighters purchased approximately 750,000 pounds of wheat; in 1862, the government purchased over 1,000,000 pounds of wheat. By the time John Ross Browne visited the Pima Villages in 1864, it comprised a collection of 10 Akimel O'odham villages, two Piipaash villages, and an estimated 1,000 individual houses; the area boasted a total population of about 6,000 individuals (Browne 1871:100–101). A reservation was set aside for the community in 1859. Unfortunately, the reservation enjoyed prosperous conditions for only a limited time as Euroamerican settlement along the Gila River intensified through the 1880s and 1890s. John Ross Browne traveled with Charles Poston to Arizona in 1863 and 1864 to document and illustrate the new federal territory. His narrative was later published and printed as *Adventures in the Apache Country* (Browne 1871). His visit to the Pima Villages was documented thoroughly, and he provides perhaps the only illustration of Ammi White's flour mill at Casa Blanca.

Ammi White established a flour mill near the Casa Blanca stage station along the Butterfield Trail in 1860 with his partner E.S. Noyes. Initially arriving at the Pima Villages as a merchant, he has also been described in the literature as a Federal Indian agent chosen to oversee the interests of the Akimel O'odham and Piipaash, although the position was never officially confirmed (Wilson 1999:208). While Browne (Browne 1871:26) hails White as a friend who shunned the comforts of wealth, he has been viewed by contemporary Native American community leaders as an agent who seized control of the wheat market and invested in native lands left out of the original reservation survey (Pima-Maricopa Irrigation Project 2003–2004:Part 5). It is currently unclear when the grist mill was operating; the earliest reference to the mill was apparently late 1861, when White boasted

a daily capacity of 2,000 lbs. (approximately 10 barrels) (Wilson 1999:181). The flour produced by White was sold to the local Native Americans, agents of the Overland Mail Company, travelers along the road, and residents of southern Arizona, including Tucson. He also sold wheat in bulk to William Grant, owner of the Silver Lake mills (Wilson 1999).

Because of the Pima Villages' strategic location along the Butterfield Trail, and the fact that Ammi White was an ardent Union supporter, the Casa Blanca mill is mentioned prominently in the literature highlighting the events of the Civil War in Arizona. Arizona was designated a Confederate Territory in January 1862 as part of the Confederacy's policy of controlling all Southwestern territories; Mesilla was chosen as the Territorial capital (ironically, formal declaration of the Confederate Territory was on February 14) (Farish 1915b:96). Confederate troops under Captain Sherod Hunter occupied Tucson by February and focused their operations on the confiscation and destruction of supplies along the Butterfield Trail to deter Union advances from California. After suppressing Confederate secessionists in southern California, the California Column—consisting of more than 2,300 Union volunteer soldiers—prepared for an eastward march to relieve federal forts along the Rio Grande. Under the leadership of Col. James Carleton, the Column planned to march into Arizona via the Butterfield Trail and through the Pima Villages and Tucson (Neeley 1976). Ammi White prepared for the expected invasion of Arizona by hoarding a supply of flour and grain for the Union troops.

However, in March 1862, Captain Hunter and a detachment of Confederates arrived unexpectedly at the Pima Villages, confiscating stores and supplies for redistribution among the local natives. After capturing a small advance party of the California Column at the Pima Villages, Captain Hunter ordered J.W. Swilling to proceed as far west as Stanwix Station (west of Gila Bend) to burn all hay and supplies that might be used by the advancing California Column. Upon returning, Swilling, with a small party of men, escorted the captured Union Captain, William McLeave, and Ammi White to Mesilla (it has been claimed previously that Swilling was present at the battle of Picacho Peak on April 15, 1862, but this is not accurate) (Perkins 2000; Zarbin 1985).

Ammi White was released as a Prisoner of War after the California Column had taken control of New Mexico in the final months of 1862 (Arizona was officially designated a Territory of the United States of America on February 12, 1863). According to eyewitness accounts, machinery within the mill had been dismantled, the bolting cloth was destroyed, and all flour, grain, and other foodstuffs confiscated for redistribution among the natives (Wilson 1999). Until White returned (late 1862), his partner E. Noyes attempted to return the mill to operating condition. However, Union troops had established Fort Barrett on the property once occupied by White and Noyes (Fort Barrett was temporarily established after the Battle of Picacho Peak in honor of deceased Lt James Barrett.). Apparently, the mill and associated outbuildings were enclosed within the fort (Wilson 1999:182–190). An inventory of the buildings claimed by White and Noyes was ordered by the Union commanders; the inventory included the mill, a store with two room additions, and a kitchen. Of the mill structure, the inventory read:"One Building 30 × 15 feet used as a mill, with common adobe walls, covered with poles, and a thatched roof, without windows, or doors, or floor" (Wilson 1999:188). The structure appears to have been a single-story building with no indication of a millrace; indicating the original mill was powered by steam or animal.

Ammi White began producing flour again with the help of the U.S. Army and also began major renovation to his mill; by the summer of 1864, the mill had been completely renovated and was now known as the Pima Steam Flour Mill. The Pima Steam Flour Mill continued to operate principally for local natives, travelers, and residents of southern Arizona, although developing communities north of the Gila River sometimes conducted business with White's mill (prior to ca. 1867, White's mill was the northernmost operation in the Arizona Territory). In the winter of 1864, Prescott was experiencing significant shortages of food and supplies, which included flour and grain. Robert Postle and two others volunteered to make the difficult journey south to the Pima Villages to obtain a quantity of flour from Ammi White (Bates 2001).

Figure 8.34 presents an illustration drawn by J. Ross Browne as he accompanied Ammi White to the Pima Villages from San Francisco in 1864. The tents and soldiers in the image are probably associated with Fort Barrett. Unfortunately, it is impossible to determine if the two-story structure in the center is the mill.

Ammi White sold the mill to W. Bichard & Co. sometime between 1865 and 1867 and retired to San Francisco. Described by Farish as a "primitive flouring mill," the Pima Steam Mill operated several more years before it was destroyed by the Gila River floods in late 1868 (Farish 1918b:48; Wilson 1999:218).

Summary of Pre-Civil War Mills in Arizona

The flour mill has always represented an essential component of successful reclamation of an undeveloped region; Arizona's pioneer mills were constructed in locations that offered the potential for settlement and industrialization in the newly conquered territory. Unfortunately, the Civil War and subsequent abandonment of strategic military forts left these settlements, ranches, and mines unprotected.

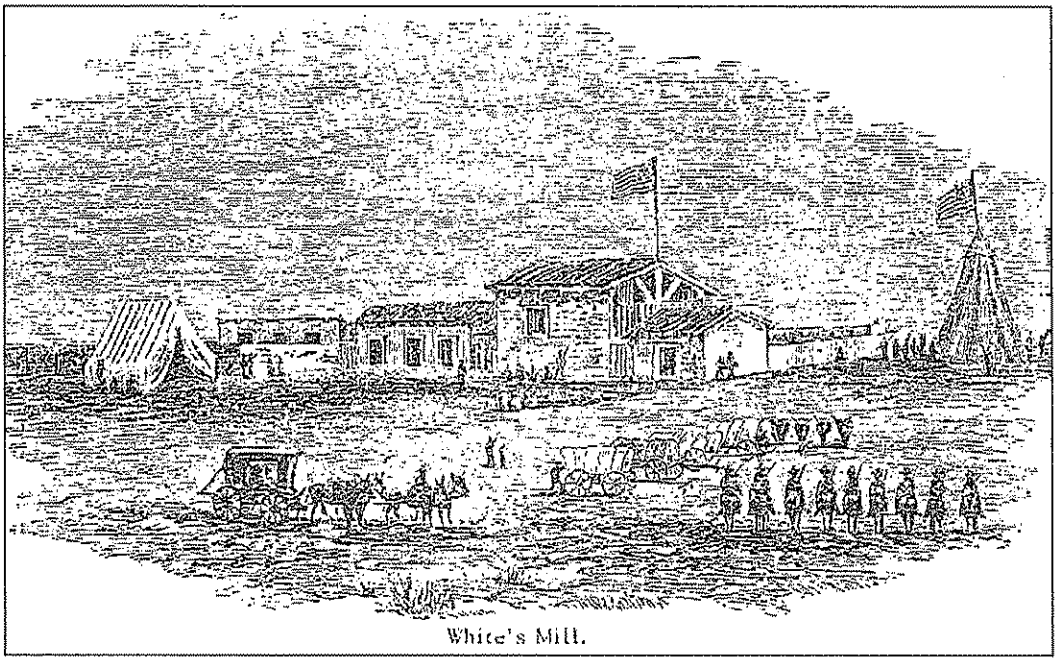


Figure 8.34. Illustration of Ammi White's Steam Mill in 1864 at the Pima Villages (Browne 1871:98).

Consequently, only one of the Silver Lake mills in Tucson and Ammi White's Pima Steam Flour Mill on the Gila River survived the ensuing chaos. Most of the pioneer mills appear to have been traditional horizontal water mills with multiple ın of stone to grind wheat and corn; unfortunately, a definitive architectural and functional interpretation of these mills is currently very limited.

Ammi White's reconstructed Pima Steam Flour Mill could be considered the first steam mill in Arizona (the original Casa Blanca Mill, completed in ca. 1861 may have been as well, but it is currently unclear). With the possible exception of the second mill on Silver Lake, the pioneer mills were custom mills, operating on a seasonal basis. The renovated Silver Lake Mill was able to operate through at least the late 1880s, competing with two other local flour mills (Eagle Flour Mill and Solomon Warner's Mission Flouring Mill) before succumbing to flooding and subsequent development of the area as the population increased. As the various summaries describe, most pioneer mills were equipped at the very least, with a bolter and cloth for producing a fine flour; whether these early mills had all the machinery for a clean, high-quality product (i.e., rolling screens, smutters, and aspirators), however, is debatable. When Major David Fergusson sampled some of Ammi White's product in late 1862, he remarked that while the flour was ground "in a very superior manner...it is moldy, and tastes as if it had been buried in the ground" (Wilson 1999:189).

It would appear that the distinction of Arizona's first operating flour mill belongs to either the Tubac company mill, or Findlay and Sharp's mill on Sonoita Creek (the Silver Lake grist mill in Tucson was completed and operating several months later). A number of writers have recognized other flour mills as Arizona's first without mention of their true pioneer predecessors. Farish (1915a:46) asserts that Solomon Warner built the first mill in Tucson. While it certainly cannot be argued that Solomon Warner was one of Arizona's pioneer merchants and citizens, Warner's Tucson flour mill was actually built between 1874 and 1875—at least 15 years after the aforementioned flour mills and five years after completion of his close competitor—James Lee's Eagle Steam Flour Mill. Consulich (1953) corrects the mistaken assumption that James Lee constructed the first flour mill in Tucson. James Lee and his partner took control of the Silver Lake Mill property in 1864 and later constructed the steam-powered Eagle Flour Mill in 1870. The Bichard Brothers' mill in Adamsville has also been claimed as the first mill in the territory (Hinton 1878:263; Hodge 1965:153). In defense of Hinton, he merely reiterates the claim, correctly asserting that the Silver Lake Mill was operating by 1859 (1878:266). While an argument might once have been made that the Bichard Brothers' mill was the pioneer "Arizona Territory Mill" (post 1863), or perhaps the first mill built in the post-Civil War era, this now appears unlikely. Newspaper accounts suggest the Lamberson Mill in Walnut Grove was operating sometime in late 1866, or 1867 (see Table 8.2). Farish perhaps may be accurate when he states that the Bichard Brothers built the first "modern" flouring mill (Farish 1918b:48); however, until additional data relating to the early flour mills is identified, this claim is unconfirmed.

Post-Civil War Settlement of Arizona Territory: 1865–1900

Agricultural development in the pre-Civil-War Era had initially converged around Tucson, Tubac, and Yuma (a.k.a. Colorado City and Arizona City). By the end of the Civil War in 1865, settlement gradually spread along all parts of the major rivers in Arizona Territory. The 1865 *Hartley's Map of Arizona* provides a visual display of new settlements like Hardyville and Prescott, as well as a number of small ranches and homesteads (Figure 8.30). By 1870, concentrated settlement had resulted in at least 34 communities in four counties. Populations of these emerging communities ranged from a handful (Hardyville boasted 20 citizens) to populous towns (Tucson had grown to a respectable 3,224) (Sloan 1930). American and Sonoran settlers started building new canals and irrigation works, and growing wheat, barley, and alfalfa. Grain crops were particularly favored because they were easy to start producing, were drought tolerant, and required minimal field preparation and little care during the growing cycle. Grain was a commodity that was in great demand, and there was a ready market at army posts and mining camps throughout the Arizona Territory from the 1860s through the 1880s.

Most of the region's grain production was centered in the Salt River Valley, which in 1872, just five years after initial settlement, had 8,000 acres under cultivation. Homesteaders grew corn, beans, pumpkins, fruits, and vegetables for local consumption, but most fields were planted entirely in barley and wheat—much of which was destined for sale at Fort McDowell (Sheridan 1995:200; Smith 1986; Smythe 1969:254; Zarbin 1997:9, 12–16, 24, 26). The soil and climate of the Salt River Valley were ideal for grain production, yielding considerably more than any other developed farmlands in the territory. The first farmers cleared small patches of their land for planting until they eventually brought all of it under cultivation. This incremental development of farmland preserved the basic contours of the land and created many individually terraced fields of grain and alfalfa. Irrigation water was diverted to flood across the fields and continued down the terraces to other patches.

One man with a sickle could reap, bind, and shock half an acre or more in a day, and teams of men working with a cradle could harvest one acre a day per man (Shannon 1945:140–141; Solliday 1993:64–67). Prices paid to farmers were generally about two cents, and sometimes up to four cents per pound for wheat, and slightly less for barley, and the fields often yielded 50 bushels, or 3,000 pounds per acre; a 160-acre family farm could net as much as $5,000 per harvest (Maricopa County Records 1879; *Phoenix Herald* 1880a) . Due to the value of grain and the scarcity of hard cash in the fledgling settlements, wheat and barley were essentially used as currency:sacks of threshed grain could be used as cash for payment for goods and services, and the crop in the field was often accepted as collateral to secure a loan (Maricopa County Records 1872; 1879; 1886; 1887; *Phoenix Herald* 1879c:1; Zarbin 1997:39, 45).

When the first railroad was extended into central Arizona in 1887, farmers had the means to ship their produce to more distant markets. In 1889, 600,000 pounds of barley, 2,000,000 pounds of wheat, and 350,000 pounds of flour were shipped from Tempe alone. However, by this time, agricultural production in Maricopa County was becoming more diversified as farmers started growing new cash crops such as dates and citrus fruits. In 1892, Schultz and Franklin, leading land promoters in Tempe and Mesa, published a pamphlet which encouraged prospective farmers to consider planting fruit trees, vineyards, and alfalfa. While they acknowledged that grains produced a good yield, they did not recommend the crop "as our lands are too valuable and productive, and capable of much greater returns than grain-planting can possibly give" (Schultz and Franklin 1892). Dwight B. Heard, who established the Bartlett-Heard Land and Cattle Company on more than 6,000 acres between the Salt River and South Mountain, created a model ranch in 1900, where he grew primarily alfalfa, but also oats, wheat, corn, sorghum, and barley, as well as fruit orchards and vineyards (Schultz and Franklin 1892; Ziemann 1986:13–21).

In this new era of settlement, flour mills appeared in regions characterized by intense agriculture:along the Gila River (Adamsville and Florence); the Hassayampa and Agua Fria rivers (Walnut Grove and the Agua Fria valley near Prescott); the Santa Cruz River (Tucson), and the Salt River (Phoenix and Tempe). Mormon settlement in northern and southeastern Arizona after 1873 prompted community and agricultural development along the Little Colorado River and its tributaries (Brigham City, Joseph City, St Johns, and Springerville), along the Gila River (Safford and Solomonsville), and on the Salt River (Lehi and Mesa). Custom mills were initially constructed to supply the needs of families and small communities; in time, some custom mills would be characterized as small-scale merchant mills. Primary and secondary resources were scrupulously investigated to produce an inventory of at least 41 flour mills established in the Arizona Territory between 1865 and 1900 (Figure 8.35; Table 8.2). The reader should note that while every effort has been made to identify all flour mills, this initial inventory is undoubtedly incomplete. Furthermore, specific data on listed mills—including ownership, estimated daily capacity, structural and operational components and finally, duration of operation—is also fragmentary, pending additional research and documentation. A comprehensive discussion of Arizona's "second-generation flour mills" will focus on establishments in the Salt River Valley, that more or less represented direct competition to Charles Hayden's Flour Mill at Tempe Butte.

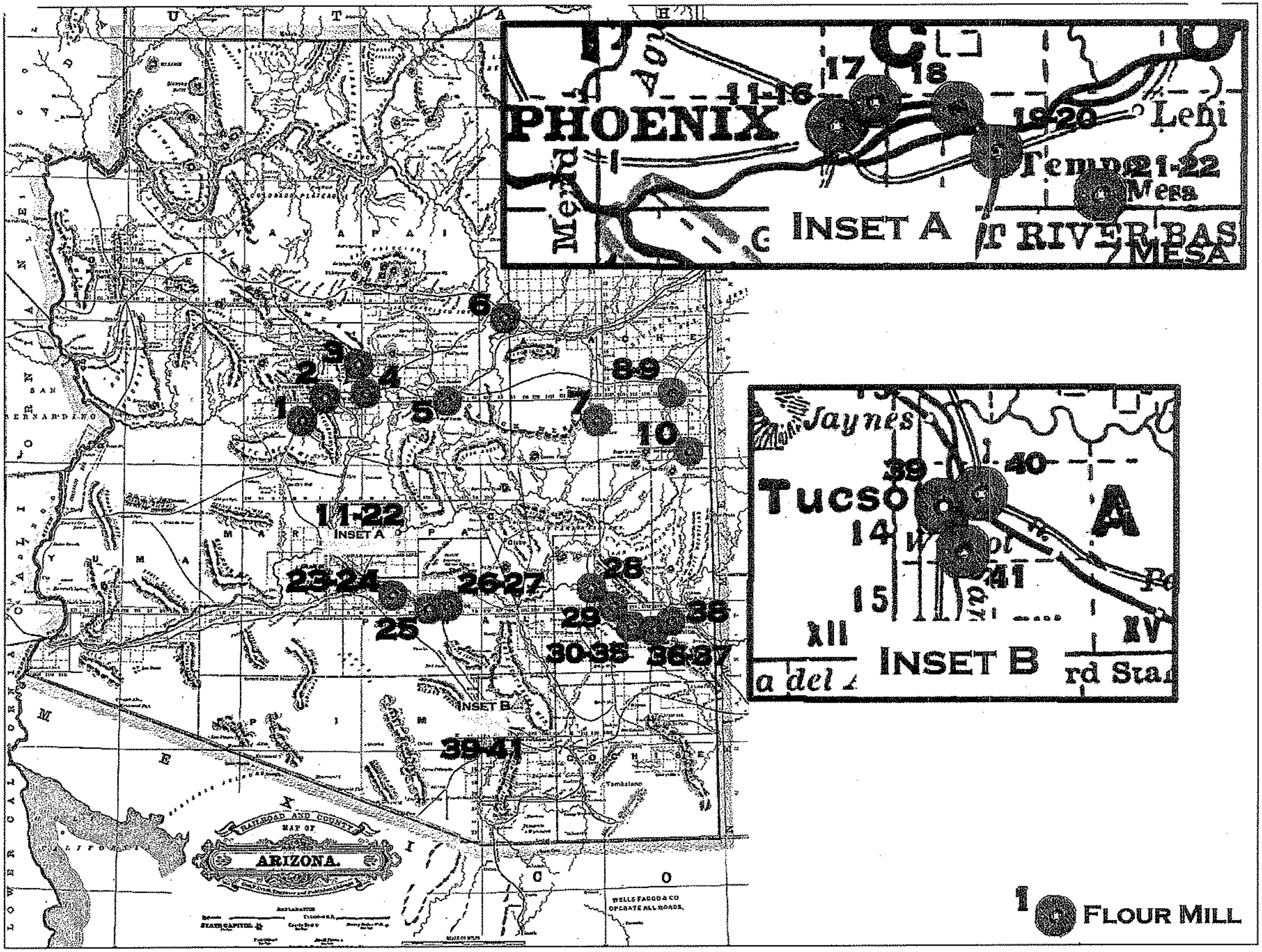


Figure 8.35. Portion of the 1888 Railroad and County Map of Arizona (Cram 1888), showing mills operating in the Territory between 1865 and 1900 (text and graphics added by author).

Numbers correspond with the inventory in Table 8.2, which provides additional information on each grist, or flour, mill.

Table 8.2. Table of Arizona Mills.

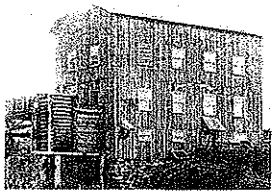
Mill Number (Figure 8.35)	Location	Name of mill (dates of operation)	Structural Description	Motive Power / Estimated Daily Capacity	Owners/ Proprietors/ Managers	Image of Mill (if available)	Comments (References)
1	Walnut Grove	Lamberson (Lamberton) Grist Mill (ca. 1867–1881?)	Unknown	Water/ ??	Lamberson (Lamberton)		Probably a custom grist mill; Farish (1918b) noted the grist mill was occasionally employed for flour (Arizona Miner 1866 and 1867). Not listed in the 1881 *Territorial Business Directory* (Disturnell 1881), or in *Resources of Arizona* (Hamilton 1881)
2	Agua Fria Valley (near Prescott)	Agua Fria Mill (ca. 1870–1881?)	Unknown	Unknown	Bowers & Co.		Farish (1918:228-229) notes the mill was operating near Prescott in early 1870. The mill was not listed in the 1881 *Territorial Business Directory* (Disturnell 1881), or in *Resources of Arizona* (Hamilton 1881)
3	Scott's Crossing (near Bridgeport)	David Scott's Grist Mill (1880s–??)	Unknown	Water/ ??	David Scott		A small custom mill for grinding meal; white flour was acquired elsewhere. Briefly mentioned in *Those early Days, Oldtimers' Memoirs* (Sedona Westerners 1968:105, 200).
4	Verde	Jordon Bros. Mill (ca. 1880s?)	Unknown	Unknown	Jordan Bros. (Frank Jordan)		Listed in the *1881 Territorial Business Directory* (Disturnell 1881); see also *Sedona Westerners* (1968:85).
5	Pine	Logan & Co. Grist Mill (1887–??)	Unknown	Water/ ??	Logan & Caffrey		Mentioned briefly in newspaper updates of settlement in the Pine area (*Arizona Champion* 1887:1 and , 1887:4)
6	Brigham City	United Order Mill (1878–1881)	Lumber frame structure	Water/	United Order Community		Structure measured 40ft x 26ft and was 2½ stories in height. Equipped with a 58in waterwheel under 11ft of head, with one run of French burrs, a Eureka smutter, a McLane separator, 22ft of bolt on a reel (Stone, 1980). After abandonment of community in 1881, mill and equipment was proposed for transfer to Woodruff, but transfer never occurred (Porter, 1956).
7	Shumway	Shumway Grist Mill (1880s–1900s) Silver Creek Mill (ca. 1911–1970s?)	Lumber frame structure	Water/ ??	Charles Shumway:1880s–??; Arizona Cooperative Mercantile Institution (??–1917); Snowflake–Taylor Mill and Power Company (1917–1944); Spencer Black and Marshall Flake (1944–1973; Tom Washburn (1973–??)	 Shumway Grist Mill, n.d. (Levine, 1977:121)  Silver Creek Mill, n.d. (Levine 1977:121)	Appears to have been predominantly a custom/merchant mill for the surrounding communities. Black moved the mill to Snowflake where it remained through at least the 1970s (Levine 1977).
8	St. Johns	Apodaca Flour Mill (1878–??)	Unknown	Water (turbine)/ ??	Serafino Apodaca		Presumed completed by 1878, but no other information available (*Weekly Arizona Miner* 1878b:3)
9	St Johns	Co–op Mill (1882–late 1890s)	Unknown	Water/ ??	St John's Ward		Reportedly constructed in ca. 1882 as a cooperative mill for the community. Was Operated between 10 and 15 years before closing due to hardship (Udall 1959 :87).

Table 8.2. Table of Arizona Mills.

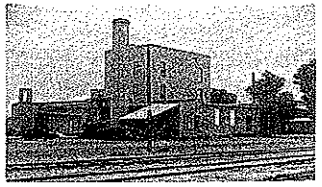
Mill Number (Figure 8.35)	Location	Name of mill (dates of operation)	Structural Description	Motive Power / Estimated Daily Capacity	Owners/ Proprietors/ Managers	Image of Mill (if available)	Comments (References)
10	Springerville (Round Valley, Eagar)	Milligan Grist Mill (1876–ca. 1918?)	Wood frame construction with 2ft stone foundation	Water (overshot)/ ??	Udall Brothers	 Udall Brothers Grist Mill on Mill Farm, n.d. (Udall 1959:162).	Constructed by William Milligan in 1876 on his farm; purchased by David King Udall in 1889 and used as a custom mill for surrounding communities. Converted to roller mill in 1890s (Franklin 1876:1; Udall 1959). Listed in Arizona Business Directories between 1911 and 1918 as owned by John Rothlisberger (Gazetteer Publishing Company, 1915–1916). Another mill in St John's was listed as owned by David K. Udall; however, does not indicate running a mill in St John's at this time, only an electrical company (Udall 1959:192). Mill site may currently be located on the River Run Golf Course on Grist Mill Rd in Eager.
11	Phoenix	Bichard & Co. Flour Mill (July–Sept 1871)	Adobe multi-story	Steam/ ??	W. Bichard & Co.		Mill burned down after only a few months. Despite initial plans to rebuild, reconstruction never took place (see summary of Valley mills).
12	Phoenix	Phoenix Flouring Mills (1876–ca. 1890)	Adobe structure, converted to stone	Steam/ 128 barrels (probably an exaggerated estimate)	JYT Smith, C.W. Stearns, King S. Woolsey (1876–1881) JYT Smith (1881–1890) Phoenix Milling and Trading Co. (1890–1897)	 Goldwater Store and Smith Flour Mill, n.d. (Arizona Historical Foundation, FP Foundation Photograph Collection:FP MC–H–199)	The mill was originally constructed along First Street and Jefferson. The entire business was relocated in 1890 after construction of Phoenix Steam Flour Mill (see summary of Valley mills).
13	Phoenix	Phoenix Steam Flouring Mills (1890–ca.1936) Valley Flour Mills (ca. 1936–ca.1961)	Three story brick structure	Steam/ 100 barrels (initially 12 hour days, so true capacity was 40 barrels)	JYT Smith (1897–1899) C.E. DeMund (1899–ca. 1900s) H.M. Kennedy (ca. 1900s–1917) Viault Brothers (1917–1936) Valley Flour Mills (ca.1936–ca.1961)	 Phoenix Steam Flour Mill, ca. 1948 (Courtesy of Phoenix Museum of History).	Roller mill constructed between 1887 and 1890 along the M&P Railroad along 9th Street and Jackson (see summary of Valley mills).

Table 8.2. Table of Arizona Mills.

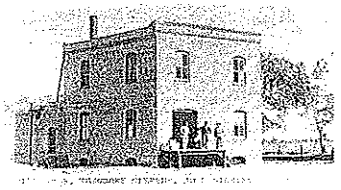
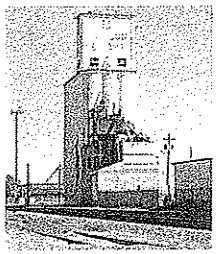
Mill Number (Figure 8.35)	Location	Name of mill (dates of operation)	Structural Description	Motive Power / Estimated Daily Capacity	Owners/ Proprietors/ Managers	Image of Mill (if available)	Comments (References)
14	Phoenix	J.M. Bryan's Mill Salt River Valley Canal (?)	Unknown	Unknown	Unknown		Nothing is known of this mill, or whether it was constructed; available secondary sources do not indicate it was in operation (Farish 1918b, Hamilton, 1881, Hodge 1965, Zarbin, 1997).
15	Phoenix	Gardiner Flouring Mill (1894–1900s)	Three story structure (likely brick)	Steam/ 100–120 barrels	J.J. Gardiner until 1900, then leased for an unknown period of time		Roller mill located at corner of Second Street and Adams. Mill and warehouse measured 300ft x 300ft. Produced Extra Patent, Extra Family and Superfine flour. (see summary of Valley mills).
16	Phoenix	Valley Flour Mills (ca. 1915–1917)	Unknown	Unknown	Viault Brothers		May have originally been a jobbing, or feed company; purchased Phoenix Flour Mills in 1917. (see summary of Valley mills).
17	East Phoenix (Mill City)	Salt River Flouring Mill (1871– ca. 1880s)	Adobe three-story structure with lumber roof	Steam (48HP)/ 51–82 barrels	William Hellings:1870–ca. 1875 C.H. Veil:ca. 1875–1880 Nathaniel Ross:post 1880		Located near the Territorial Asylum for the Insane, this region was variously known as Mill City, or East Phoenix. Mill burned down in 1891 after it had ceased operations. (see summary of Valley mills).
18	Tempe vicinity	Grand Canal Flour Mills (ca. 1882–1884)		Water (Turbine)/	Charles Crismon and J.R. Turman		Located on Grand Canal, southeast of 48th Street. Constructed by George W. Sirrine and owned by Charles Crismon (see summary of Valley mills).
19	Hayden's Ferry/ Tempe	Hayden Flour Mill (1874–1917) (1918–1998)	See Chapter 14	Water (Turbine) / variable capacity (see Chapter 9)	See Chapter 9 for owner details	See Chapter 14	Mill is discussed in detail in various chapters, including Chapters 7, 9, 14 and 16
20	Tempe	Tempe Milling Co. Mill (?)		Steam	Tempe Milling Co.	See Figure 8.37	Apparently, Dyer illustrated a proposed model of the steam flour mill, but only a grain warehouse was constructed that would be leased, or owned by A.J. Peters between 1898 and 1915
21	Mesa	Mesa Flour Mill Arizona Mill (1895–ca. 1960s)		Steam/ ??	Mesa Co-Operative Milling Company Mesa Flour Mill Arizona Flour Mill	 Mesa Flour Mill, ca. 1895 (Merrill 1970:196).	Constructed by George W. Sirrine, who had previously worked with Charles Crismon on the Grand Canal Flour Mill (see summary of Valley mills).
22	Mesa	Western Grain Elevator Co. (1948–ca. 1980s/1990s)	Reinforced concrete elevator and silos		F.P. Neilson & Sons:1948–1964 Chuck Kolhase and John Hogle:1964–1980s/1990s	 Photograph of the elevator and silos taken by Ilya Berelov	See summary of Salt River Valley mills.

Table 8.2. Table of Arizona Mills.

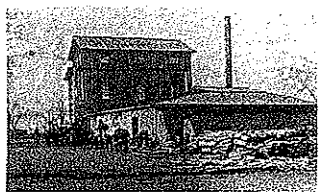
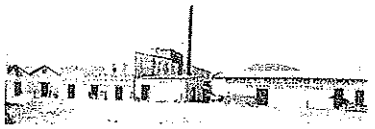
Mill Number (Figure 8.35)	Location	Name of mill (dates of operation)	Structural Description	Motive Power / Estimated Daily Capacity	Owners/ Proprietors/ Managers	Image of Mill (if available)	Comments (References)
23	Pima Villages (Casa Blanca)	Casa Blanca Grist Mill (ca. 1861–1864) Pima Steam Flour Mill (1864–1868)	Original mill may have been a Spanish mill, powered by animal. Rebuilt as a steam mill by 1864.	Steam/ 3.05 barrels per hour; daily capacity unknown	Ammi White:1860–ca. 1865 W. Bichard & Co.:1865–1868		One of Arizona's pioneer mills, the mill was sold to the Bichard Brothers between 1865 and 1867. Floods destroyed the mill in 1868. See summary of Pioneer Mills.
24	Pima Agency (Sacaton)	Pima Reservation grist mill (1892–??) (1929–??)	Unknown	Steam?/ 30 barrels	Pima Reservation		Custom mill constructed and operating for the Akimel O'odham community by 1892. Apparently it was out of service for sometime before resuming operations in 1929 (Wilson 1999:280–281).
25	Adamsville	Bichard & Co. (1869–1870s)	Unknown	Water/ ??	W. Bichard & Co.		Not in *Territorial Business Directory* (Disturnell 1881). Described in *History of Arizona* (Farish, 1918b).
26	Florence	Gila Flour Mill (1880s–??)	Unknown	Unknown	P.R. Brady		Listed in Territorial Business Directory (Disturnell 1881).
27	Florence	Owens Mill (1880s–??)	Unknown	Unknown	Owens & Weed		Listed in Territorial Business Directory (Disturnell 1881).
28	Camp Thomas	Clanton Grist Mill (1877–??)	Unknown	Unknown	John W. Clanton		It is unclear if the mill was ever completed. Burgess (1990) notes that the extended Clanton Family moved from the Camp Thomas vicinity to Tombstone in 1878 (Billy Clanton-John's younger brother- was killed in the infamous Gunfight at the OK Corral). Terry Clanton (1996-2005) states, however, that John W. Clanton relocated to California with his own family, while his father and siblings remained in Arizona along the San Pedro River near Charleston (southwest of Tombstone).
29	Matthewsville (Glenbar)	Harve Blair Flour Mill (1883–??)	Unknown	Unknown			Mentioned in *Arizona Place Names* (Granger 1979:126-127). Burgess (1990) claims it was constructed in 1895.
30	Safford	Jacobs–Cottreal Mill (1878–??)	Unknown	Water/ ??	B.M. Jacobs and George Cottreal		First Safford Flour Mill constructed. May correspond with the Star Mill; however, this is uncertain at the moment (Burgess, 1990:216-217).
31	Safford	Star Flour Mill (1880s–??)		Steam/	Hyatt and Co. (1880s–1890s?) Union Mill and Trading Co. (ca. 1890s–??)	 Union Milling and Trading Company mill, ca. 1900 (ASU Hayden Library Arizona Collection, RR Ryder Ridgway Photograph Collection CP RR 61)	Listed in *Arizona Territorial Business Directory* (Disturnell, 1881). Uncertain when mill was acquired by Union Milling and Trading Co.; photo also shown in *Railroads of Arizona, Vol. II* (Myrick, 1980:838). May correspond with the Jacobs-Cottreal Mill listed above.
32	Safford	I.F.–John Campbell Mill (1892–??)	Unknown	Unknown	John Campbell		Mentioned briefly in *Mt Graham Profiles* (Burgess 1990:216–217).
33	Safford	Co-op Mill (1895–??)	Unknown	Unknown	William Telfer		Mentioned briefly in *Mt Graham Profiles* (Burgess 1990:216–217).
34	Safford	Owens Flour Mill (1890s–??)	Large brick structure	Unknown	J.T. Owens		Mentioned briefly in *Mt Graham Profiles* (Burgess 1990:216–217).

Table 8.2. Table of Arizona Mills.

Mill Number (Figure 8.35)	Location	Name of mill (dates of operation)	Structural Description	Motive Power / Estimated Daily Capacity	Owners/ Proprietors/ Managers	Image of Mill (if available)	Comments (References)
35	Safford	Gila Valley Milling Co. Flour Mill (1920–??)	Unknown	Unknown	Constructed by Turner and John West, but apparently owned by Gila Valley Milling Co.		Mentioned briefly in *Mt Graham Profiles* (Burgess 1990 :216–217). Listed in State Business Directory between 1919 and 1936, when it was acquired by Arizona Flour Mills (Gazetteer Publishing Company 1936 and, 1937).
36	Solomonville	Montezuma Flour Mill (1880s–??)	Unknown	Water? /			Mentioned in *Resources of Arizona* (Hamilton, 1881:107)
37	Solomonville	North Roller Mills (1890s–??)	Large three–story structure	Water? / ??		Ca. 1900s photograph on file, Arizona State Library, Archives and Public Records:Record Group 99, SG 12 Historical Photographs:95-3485.jpg	May have been constructed as early as 1880s; two flour mills were listed in *Resources of Arizona* (Hamilton 1881:107). If so, the mill was converted to roller mills in 1890s, or early 1900s.
38	San Jose (near Solomonville)	Victoriano Mestas Grist Mill (1870s–1882)	Unknown	Unknown	Victoriano Mestas		Constructed on a ranch, the grist mill functioned as a custom mill. Mestas and his family were brutally killed in an Indian attack attributed to Geronimo. The site is currently known as Deadman Tank. Currently, the millstone is displayed at the Safford Public Library (Burgess 1990:124).
39	Tucson	Mission Flouring Mills (1875–1886)	Two story adobe mill with stone foundation.	Water:1875–1876 Steam:1876–1886 10–60 barrels	Solomon Warner	 Photograph of Mission Flouring Mill, n.d. (courtesy of UA Special Collections)	Structure measured 51ft x 30ft with eight rooms. Original motive power was a 25 in. turbine; mill was equipped with two run of French burrs, packer, smutter, bolter (*Arizona Citizen* 1875a:2-3)
40	Tucson	Eagle Steam Flour Mill (1870–1943)	Original was a two-story structure with multiple outbuildings; reconstructed as 4–story brick structure in 1899	Steam/ ??	Lee and Scott:1870–1874 E.N. Fish:1874–1898 Lee Goldschmidt:1898–1920 Harold Viault:1920–1936 Fred Ginter:1936–1943	 Eagle Flour Mills, ca. 1897 (Hilzinger, 1897:133)  Eagle Flour Mills, ca. 1900 (courtesy of UA Special Collection)	Second mill constructed in Tucson, the mill was rebuilt as a roller mill in 1899 and operated through the first half of the 20th century. Harold Viault was co-owner of the Phoenix Flour Mills, while Fred Ginter was manager of the Gila Valley Milling Co. in Safford (Arizona Historical Society Tucson:MS–0236). After 1943, the business enterprise of Eagle Mills apparently moved to Casa Grande in the early 1940s as an animal feed producer (Eagle Milling Company 2007).
41	Tucson	Silver Lake Mill(s) (late 1859–1890s?)	Multi-story	Water/	See Summary of Pioneer Mills.		See Summary of Pioneer Mills.

Flour Milling in the Salt River Valley

The rapid agricultural and industrial development of the Salt River Valley influenced construction of a number of flour mills in Phoenix, Tempe, and Mesa in the late nineteenth century. An annual assessment of flour production was summarized in 1878 by the *Phoenix Herald* (1878:2):

> The production of flour, during the last year, at the three flouring mills situated in this valley, amounts to three million four hundred thousand pounds and all from wheat produced on lands watered from the Great Salt River....

The three flour mills named above were the Salt River Flouring Mill, Hayden Flour Mill, and Phoenix Flouring Mills. Just as Arizona's grain production was centered around the Salt River Valley—so too was the production of flour:

> Maricopa county manufactures nearly three fourths of all the flour produced in the Territory. It has four flour-mills in active operation; one at Phœnix (*Phoenix Flouring Mills*), one three miles east of Phoenix [Salt River Flouring Mill], one on the Grand Canal [Grand Canal Flour Mills], and one at Tempe [Hayden Flour Mill]. All these mills are supplied with the best machinery and the latest improvements, and turn out a quality of flour preferred by some to the best California [sic] [Hamilton 1881:106].

Following are brief summaries of the Salt River Valley mills that were in operation through the late nineteenth and early twentieth centuries; several feed and jobbing companies are also summarized as they were associated with the larger merchant mills in the Valley. The reader will note that the summaries are far from complete and require research beyond the scope of the project.

W. Bichard & Co. Flour Mill: 1871

The Bichard Brothers, under the name W. Bichard & Company, had already made a name for themselves in milling by purchasing the Pima Steam Flour Mill and constructing another mill in Adamsville (see Table 8.2). In the early months of 1871, town commissioners donated Block 64 (fronting Jefferson between Central and 1st Avenue) to the company for construction of a steam-powered flour mill; the mill was completed by summer at a cost of approximately $10,000 and was grinding wheat on July 4, 1871. However, the mill operated for only two months before burning to the ground on September 2nd (Farish 1918b:216–219). The company seemed to offer assurances that the mill would be rebuilt over the charred ruins of the original (Weekly Arizona Miner 1872a), but no work was undertaken to do so. Farish (1918b) reported that they kept a store to distribute flour from their Adamsville mill. Perhaps the completion of William Helling's mill within months of the fire dissuaded W. Bichard & Co. from another large investment. For a number of years, the ruins of the mill were left exposed before other development occurred on the property; Phoenix's first flour mill is apparently under the Luhr's Building.

The French burr stones of the flour mill were kept for a number of years by Mr. A.W. Gregg, who used them to grind lime for use in the construction of various buildings; in 1930, the burr stones were donated to the Arizona Museum in Phoenix (Oldaker 1930). They may still be on display at the Phoenix Museum of History.

Salt River Flouring Mill: 1871–ca. 1880s

Although William B. Hellings began construction of his mill before the W. Bichard & Co. Mill, it would not be completed and operating until after the untimely destruction of the former. Hellings appears to have come to the Valley in early 1870 to begin construction of a large flour mill and two granaries in the southeast quarter of Section 2, Township 1N, Range 3E (near the site of the Territorial Asylum for the Insane, which was constructed between 1885 and 1888). By December, 1871, the mill was operating and producing flour (Farish 1918b:229–231). The Salt River Flouring Mill can be considered the first successful merchant mill in the Salt River Valley, operating from late 1871 until sometime in the 1880s.

The mill itself was a three-story adobe structure powered by steam using a 48 HP engine on two run of stone. The equipment had been shipped from San Francisco to Ehrenburg, thence transported by freight to the Salt River Valley. At its peak, the mill's capacity was estimated at an average of 51 barrels (10,000 lbs.). Three flour products were sold, as was typical of New Process mills:a high-quality flour from the reground middlings, a lower-quality coarse flour called Semetilla, made from the first grinding, and a Graham flour, which combined fine-ground white flour with ground bran (Farish 1918b:231). Because milling by-products had no market at the time, William B. Hellings & Co. began raising hogs, opening a meat market on the mill property as well. Over time, the property expanded with the construction of additional outbuildings; in 1873, as part of his expansion, Hellings purchased the adjoining property previously claimed by Jack Swilling (*Arizona Republic* 1981; Farish 1918b:99–101, 230–231; Willson 1958). For many years, the region around the mill was known alternatively as Mill City, or East Phoenix; a post office was established for East Phoenix in 1871, but discontinued by 1876 (Barnes 1960:191).

The mill was eventually acquired by Charles H. Veil in 1875 over a legal dispute with Hellings. Veil had been a partner with Hellings since 1872, supervising operation of

the mill and general store (Veil 2004). Through the decade of the 1870s, the Salt River Flouring Mill, Phoenix Flouring Mill, and the Hayden Flour Mill were featured prominently in Territorial newspapers as principal merchant mills of the Salt River Valley. The *Salt River Herald (1878a:1)* reported on April 13, 1878 that the three main flouring mills in the Valley had produced over 3 million pounds of flour in the previous year from locally grown wheat; at least 160,000 pounds had been shipped to Yuma for California markets. However, as the new decade passed, the mill was no longer a viable competitor in the Valley. By June 1880, Nathaniel Ross was the new proprietor (*Phoenix Herald* 1880b:1), but it closed down shortly therafter, according to Willson (1958). The only operating flour mill listed in the 1888 Phoenix Business Directory was the Phoenix Flouring Mill owned by J.Y.T. Smith (Meyer 1888). The former Hellings mill and property were acquired by John J. Gardiner, who used the mill and outbuildings as storage for hay and other grains until a fire destroyed much of the property in 1891(Veil 2004; Willson 1958). Farish (1918b) noted in 1918 that only crumbling adobe walls marked the location of the former merchant mill.

Phoenix Flouring Mill: 1876–1960s

John Y.T. (Yours Truly) Smith, one of the Valley's most colorful and beloved pioneer characters, was instrumental in the founding and settlement of Phoenix and the Salt River Valley. Serving with the infantry of the California Volunteers during the Civil War, John Smith was stationed in Yuma before resigning from military service. However, as a civilian supplier to the military, he followed the infantry to the newly established Camp McDowell and was soon gathering wild hay from the Salt River. As Phoenix developed, Smith opened a merchant store and invested in a number of early canal companies. His service to the growing community included the city council, school board, and eventually election to three terms in the Territorial legislature, as well as an appointment to Territorial treasurer and the Board of Equalization (McFarland & Poole 1896:442–443; Reiner 2002).

In 1876, John Smith, C.W. Stearns and King S. Woolsey opened a steam-powered flour mill on the corner of Montezuma (1st Street) and Jefferson (*Arizona Republic* 1981:PC15). The adobe mill structure, or portions of the mill had apparently been completed several years before in 1872 as a merchandise store for Goldwater and Brother, and was later used by Smith and Stearns for their store before conversion to the steam flour mill in 1876 (Elliott 1964:276). Phoenix Flouring Mills (Figure 8.36), as it came to be known, was the third flour mill constructed in Phoenix and the Salt River Valley. Interestingly, the *Historical and Biographical Record of the Territory of Arizona* (McFarland & Poole 1896:442) claimed that the mill had been started in 1879 as a single-burr mill; it was only after Smith had taken full control of the business in 1881 that the flour mill was expanded to a four-burr mill. However, an article in the September 22, 1876 issue of the *Weekly Arizona Miner* wrote that John Smith, C.H. Veil and Charles Hayden had met in Prescott, causing some concern that they would corner the flour market (*Weekly Arizona Miner* 1876d:2). Regardless, it is certain that Smith continued to make improvements on the mill through the 1880s. In 1883, a stone granary was constructed adjacent to the adobe mill and Smith reported that he would soon replace the adobe walls along Montezuma Street with stone as well. It is currently uncertain if Smith followed through on his proposal. Through the rest of the decade, the Phoenix Flouring Mill would compete with the Hayden Flour Mill for a stake in the Valley's flour business.

In 1887, Smith purchased property along 9th Street and Jackson near the Phoenix freight station along the M&P Railroad and soon began construction of a three-story brick flour mill (Myrick 1980:504); this new mill was also steam powered and would be equipped with all new machinery, including roller mills. Completed sometime between 1889 and 1890, the new roller mill, called the Phoenix Steam Flouring Mill, had an estimated daily capacity of 100 barrels, though the mill ran for only 12 hours a day for a total of 40 barrels (McFarland & Poole 1896:442). Smith incorporated his new enterprise in 1890 as the Phoenix Milling and Trading Company (Bensel Directory Company 1892). The original adobe mill on 1st Street and Jefferson was abandoned, or sold, though it is currently unclear what happened to the property. City directories in the 1890s do not list the old Phoenix Flouring Mill, only the newly constructed Phoenix Steam Flouring Mill.

Logan Simpson Design recently completed data recovery investigations on a parcel bordering 1st Street and Jefferson as part of the extensive Cityscape Development Project. A number of brick, and adobe foundations were identified in the course of the project, including portions of J.Y.T. Smith's original Phoenix Flouring Mill and granary (Mark Hackbarth personal communication, September 28, 2007).

The large steam mill was sold to C.E. DeMund before the turn of the century in 1899 (Phoenix Directory Company 1899–1900) and over the next two decades, would change ownership several times and be listed variously in City and Valley directories as Phoenix Flour Mill, or Phoenix Flour Mills. H.M. Kennedy, former manager of the Capitol Mills, was owner of the Phoenix Flour Mills by 1911 (Bell 1911); in 1917, he sold the Phoenix Flour Mills to the Valley Flour Mills, which was owned by the Viault Brothers (Hayden Flour Mills 1947). Of the Valley Flour Mills, nothing is known, but that it was listed in the 1915 Phoenix City directory (Arizona Directory Company 1915); the enterprise

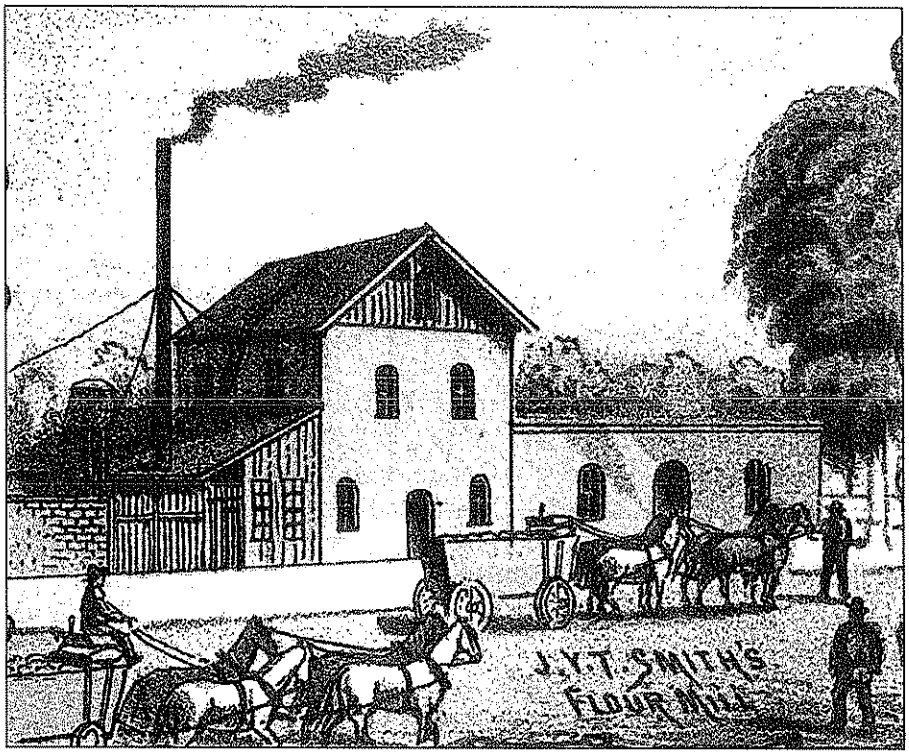


Figure 8.36. Illustration of J.Y.T. Smith's Phoenix Flouring Mill in 1885 (Dyer 1885).

may have been a jobbing company specializing in the distribution of flour, feed, and perhaps grain. The 1915 *Sanborn-Perris Fire Insurance Map* indicates that Valley Flour Mills had a grain warehouse facility in Tempe along the Southern Pacific tracks between Transvaal and Krueger (currently near University and Rural). The grain warehouse included a small storage outbuilding for flour, as well as a boiler for steaming barley; after acquisition of the Phoenix Flour Mills in 1917, the Tempe facility changed its name to reflect the purchase. Valley Flour Mills was no longer listed in city directories after this time.

The Phoenix Flour Mill would continue to be listed in directories until after 1935 when it experienced another managerial, or company, transformation; the 1936–1938 city directory lists the mill as Arizona Flour Mills (including the Tempe distribution facility)(McNeil Company 1935–1936). The corporate history of Arizona Flour Mills is currently unknown, given its presence in Phoenix and Mesa through the 1930s and 1940s, as well as their acquisition of the flour mill and business of Safford's Gila Valley Milling Company in 1936 (Gazetteer Publishing Company 1936).

The Phoenix-based Arizona Flour Mills on 9th Street and Jackson would appear in directories through 1961, indicating it was closed shortly thereafter (McNeil Company 1961); as the summary below will reveal, the Arizona Flour Mills in Mesa would cease operations sometime after 1963. Currently, it is unclear when Arizona Flour Mills ceased operations in Safford.

Grand Canal Flour Mill: ca. 1880–1884

Located along the Grand Canal and southeast of the current alignment of 48th Street (possibly within the boundary of Pueblo Grande Museum), the Grand Canal Mill was constructed by George W. Sirrine for Charles Crismon in late 1880. A fall in the canal provided water for a 40-in. (1.02-m) turbine that in turn provided motive power to two sets of millstones. Newspaper advertisements in 1882 advertised the sell of flour, bran, and mill feed, as well as cracked and whole barley; custom grinding was also available (Merrill 1977:266). Zarbin (1997:80) reported that the mill ground 1.5 million pounds of wheat in 1882, which would amount to approximately 5,300 barrels of flour (based on an average extraction rate of 70 percent).

As part of his contract in using water on the Grand Canal, Crismon was obligated to help finance repairs to the canal and heading in the event of flooding. After several floods in 1883 and 1884, Crismon sold the mill to his brother, but neglected to pay his share of repairs to the canal; the Grand Canal Company sued and won a judgment against Crismon, but on October 12, 1884, the flour mill burned to the ground (Zarbin 1997:80). The turbine shaft was saved and kept on the Crismon homestead in Mesa before being transferred to the Albert Crismon Ranch. Three of the millstones were also preserved and displayed at the Buckhorn Mineral Wells and Museum in Mesa through at least the 1970s (Merrill 1977:268).

Tempe Milling Co. Flouring Mill: Not constructed

This mill was conceived in the development era of the TLIC. The *Phoenix Herald* (1888e:1), in describing the growth of Tempe, stated that a new grist mill would be constructed immediately. The 1888 Map of Tempe, illustrated by C.J. Dyer includes a Tempe Milling Co. steam mill along the M&P Railroad tracks between 6th and 7th streets (Figure 8.37). The steam mill in the figure was a substantial brick structure comprising three stories, with a single-story, gable-roof outbuilding immediately to the north, and an attached single-story boiler room and chimney on its south face. However, for reasons yet unknown, the mill was apparently never constructed; supplemental archival information from primary and secondary sources have not been identified to confirm its completion and operation. Neither the Tempe Milling Co., nor the steam mill itself appears in contemporary city directories (Bensel Directory Company 1892; Meyer 1888). However, a careful analysis of *Sanborn-Perris* maps between 1893 and 1915 reveal interesting parallels between the structure and the Hayden Flour Mill.

Unfortunately, only Sheet 1 of the 1890 *Sanborn-Perris Fire Insurance Map* was located, which displayed structures in Tempe in a limited area between Maple and Myrtle avenues (west to east), and 1st to 5th streets (north to south). The 1893 *Sanborn-Perris Fire Insurance Map*, however, presented a much wider area of Tempe, including developed parcels along the M&P Railroad. On the 1893 *Sanborn-Perris Fire Insurance Map*, a long structure paralleled the M&P rail line between 6th and 7th streets and was labeled "J.S. Armstrong's Grain Warehouse." The three-story mill and attached boiler room as depicted on the Dyer panoramic map were not evident; only the single-story gable-roof structure had been completed, with a 4-ft (1.22-m) platform along the rail side and rear. The area that would have comprised the mill and boiler room was illustrated as an exterior surface, though it is unclear if it was prepared, or simply dirt or gravel. A small room adjacent to the exterior surface and south of the grain warehouse was labeled as "Lime."

John S. Armstrong had once worked for Hayden as a clerk and business manager, before entering politics as a legislator in the Thirteenth Assembly of the Territorial Legislature. He returned to Tempe as a successful businessman and land investor—eventually attaining one quarter interest in the TLIC. Armstrong and his family left Arizona and moved to North Carolina in 1894 (Kwiatkowski 1997a:8–10). Perhaps it is not surprising then that the Blinn Lumber Co. gained ownership of the warehouse (L.W. Blinn was a prominent founder of the TLIC). Between 1898 and 1911, the Grain Warehouse was listed under the ownership of the Blinn Lumber Co., with A.J. Peters as lessee (Figure 8.38). The 1911 and 1915 *Sanborn-Perris Fire Insurance maps* list A.J. Peters as principal owner, with electrical power available for cleaning, as well as a coal bin and other small rooms, or outbuildings.

A.J. Peters also leased and operated the Hayden Flour Mill between 1901 and 1914; operation and control of the Hayden Flour Mill was under the recently formed Tempe Milling Company (see Chapter 9 for detailed information). As lessee of the Hayden Flour Mill and the Grain Warehouse, one can surmise that the warehouse was used as grain storage by the Hayden Flour Mill, perhaps for storage of grain coming in by rail, or perhaps for transport of Tempe grain, flour, and feed to various markets. The presence of a coal bin may indicate limited use of a boiler, or engine, for rolling feed. The 1927 and 1948 *Sanborn-Perris Fire Insurance maps* do not include the immediate area surrounding the rail line between 6th and 7th streets on their maps, suggesting that perhaps the Grain Warehouse had been dismantled, or abandoned before 1927. Perhaps not coincidentally, the Grain Warehouse immediately adjacent to the Hayden Flour Mill was constructed between 1915 and 1916 as part of expansions of the mill by the Tempe Milling Company.

It would certainly appear, given the absence of archival materials referencing a prominent three-story brick structure along the M&P Railroad, that C.J. Dyer's illustration on the Tempe panoramic map was only a simulation of the proposed Tempe Milling Co. Flouring Mill—not an existing operational mill. The Grain Warehouse appears to have been the only structure completed on the property, though it is unclear exactly when it was completed, or by whom. That A.J. Peters—for many years, a close associate with the Hayden family and Hayden Flour Mill—would become a lessee and eventual owner of the property once proposed as a powerful competitor to Hayden Flour Mill is perhaps most interesting. The fact that Dyer presented a simulation on his map would suggest the mill's proposed construction was heavily influenced by the TLIC (the TLIC had funded production and distribution of the map). Interestingly, the name of the company that would run the proposed mill was later adopted by Carl Hayden and other principal investors in 1915.

Gardiner's Mills/Capitol Mills: 1894–ca. 1900s

John J. Gardiner was trained as a millwright and machinist in England before migrating to America in 1862, at which time he engaged in the freighting business. After arriving in Phoenix in 1870, Gardiner continued his freighting enterprise, investing in a number of properties in the developing town. He built and operated a number of businesses in Phoenix, including a blacksmith shop, the Phoenix Hotel, a waterworks plant, Phoenix Electric Light Company, a planning mill, and finally, a large flour mill in 1894 (Farish 1918b:189–191). The mill was apparently a steam-powered mill, boasting a daily capacity of 120 barrels.

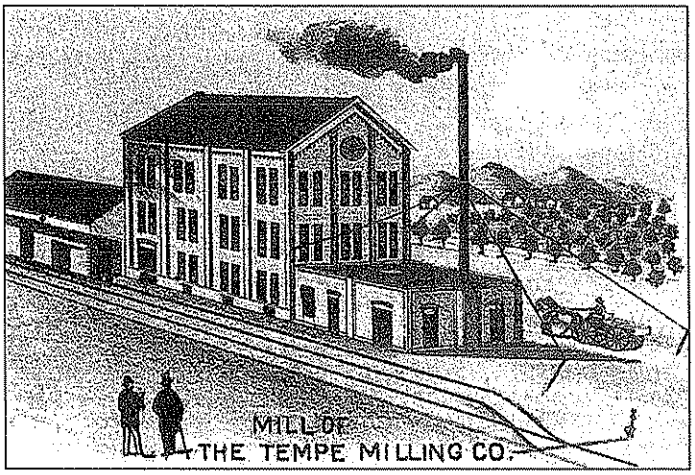


Figure 8.37. Portion of the 1888 Map of Tempe, Maricopa Co., Arizona showing the proposed Tempe Milling Co. Steam Flouring Mill (Dyer 1888).

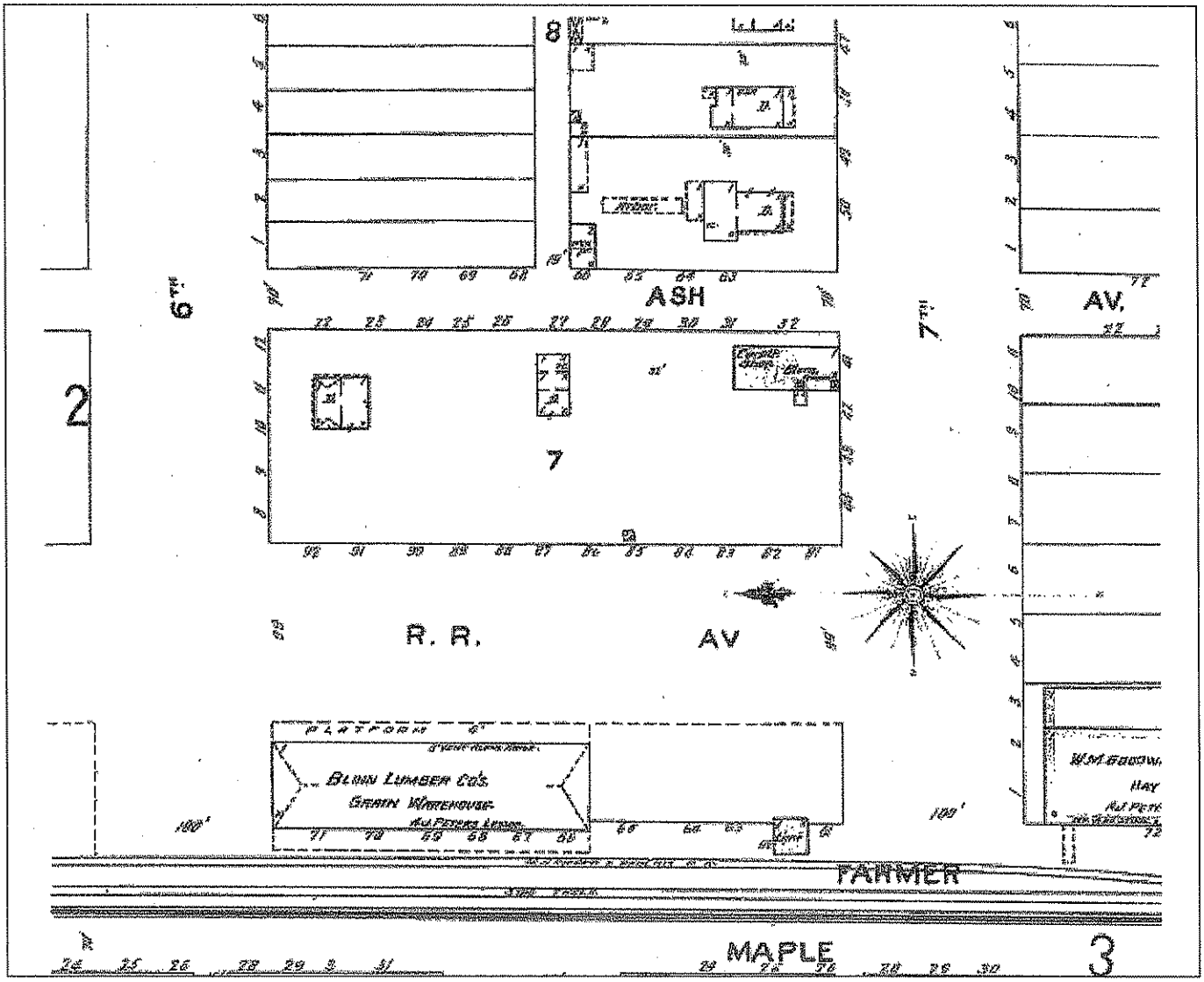


Figure 8.38. Portion of the 1901 *Sanborn-Perris Fire Insurance Map* showing the Blinn Lumber Co. Grain Warehouse along the M&P Railroad tracks between 6th and 7th streets.

Farish (1918b) notes the mill was run by Gardiner for six years before being leased. However, the 1898 City Directory describes the Capitol Mills along 2nd Street and Adams, with Kessler–Boyle Grocery, lessees, and H.M. Kennedy, manager; the 1899–1900 City Directory also lists the Capitol Mills, but under management of M.H. Hoar (Cox & Fleming 1898; Phoenix Directory Company 1899–1900). Unfortunately, finding city directories dating from the first decade of the twentieth century has been very difficult. The absence of Capitol Mills in the 1911 City Directory indicates the mill ceased operations in the 10 years prior; interestingly, however, H.M. Kennedy was listed as manager of Phoenix Flour Mills, Inc. (Bell 1911).

Mesa Flour Mill/Arizona Mill: 1895–ca. late 1950s–1960s

Mesa's first flour mill was a project sponsored by the Zenos Co-Operative Mercantile and Manufacturing Institution. First proposed as early as 1887, the steam mill would not be completed until 1895. The mill was apparently constructed and run for several years under the supervision of George W. Sirrine, who had built a number of flour mills, including the Grand Canal Flour Mill for Charles Crismon. The 1895 flour mill was a two-story brick structure with a boiler room and chimney in the rear; initially the mill produced flour and corn meal, but would later expand to include oats, barley, and milo (Merrill 1975:224–225).

The organization operating the mill would later be called the Mesa Co-Operative Milling Company and still later, the Mesa Milling Co. According to East Valley city directories, the Mesa Flour Mill would become known as Arizona Flour Mills sometime between 1946 and 1950. Interestingly, the Mesa Tribune referred to the abandoned building as the Arizona Mill, owned by the Arizona Milling Co. The chronology of the various business organizations and their relation to one another is currently unknown; the mill last appeared in the 1963 City Directory. Whether the mill closed permanently or not is uncertain; what is certain, however, is that the abandoned mill was demolished in late 1968 (Merrill 1970:195–198; 1975:224–225; *Mesa Tribune* 1968:8).

Western Grain Elevator Co.: 1948–1980s

The Western Grain Elevator Co. was not a flour mill; however, a brief summary is warranted here, considering the company stored grain in a concrete grain elevator with at least 14 storage silos. Located along the Southern Pacific rail line (near Macdonald Street and Broadway Road), the grain elevator and silos were constructed and operating by 1948 under the ownership of F.P. Nielson (his sons would later join the business). The business specialized in the storage and distribution of local grain, hay, and seed to regional and national markets—including Pillsbury Flour Mills Co., Kellogg Co., and General Mills. Western Grain Elevator Co. was sold in 1964 to Chuck Kolhase and John Hogle, who continued to operate the business through at least the 1980s (Zipf 1984:C1–2). It is unclear when the business ceased operation.

Glendale Milling Company: ca. 1919–unknown

Very little is known about the Glendale Milling Company, but it apparently specialized in the production and distribution of animal feed. The company appeared in various Phoenix city directories between 1919 and 1932, though not as a flour-milling establishment (McNeil Company 1919, 1932). After 1934, only Phoenix-area businesses were listed in directories, so it is unclear how long the Glendale Milling Co. continued to operate.

Southwest Flour and Feed Company: 1919–unknown (also Mesa Feed and Seed and Red Star Feed and Seed)

The company was established in 1919 as a jobbing company, distributing wholesale and bulk flour products across the Valley; an office was opened in Glendale that year, with additional branches established throughout the Valley in Phoenix, Tempe, and Mesa. In 1920, the company was consolidated with the Tempe Milling Company that operated the Hayden Flour Mill in Tempe; when the company was reorganized as Hayden Flour Mills in 1930, its interests included the Southwest Flour and Feed Company, Mesa Feed and Seed Company, and Red Star Feed and Seed Co. (in Tempe) (Hayden Flour Mills 1947). No information was discovered during ACS' research regarding the relationship between the smaller feed companies and Bay State Milling after 1981.

Arizona in the Twentieth Century: 1900–1960

Before 1900 most of the Arizona Territory's farm produce was consumed within the territory. This was a concern of Congress when appropriations for the Salt River Project were being considered. Arizona farmers needed to dramatically increase production of cash crops to integrate the region into the national economy (Figure 8.39). The USDA had begun scientific improvement of wheat strains as early as 1870, and increased crop yields had promoted rapid expansion of wheat production across the country. By 1900, the national acreage planted in wheat had doubled to more than 40 million acres. In 1900 the department's Arizona Agricultural Experiment Station in Tucson began investigating types of wheat that would be particularly well adapted to the desert environment. White Australian wheat had been grown in California since 1852, and it was considered the ideal strain for commercial production in the arid West. After years of selective breeding of White Australian, government botanists developed a new drought-resistant winter wheat called Baart. Station Chief G. W. Freeman began distributing seeds to local farmers in 1910.

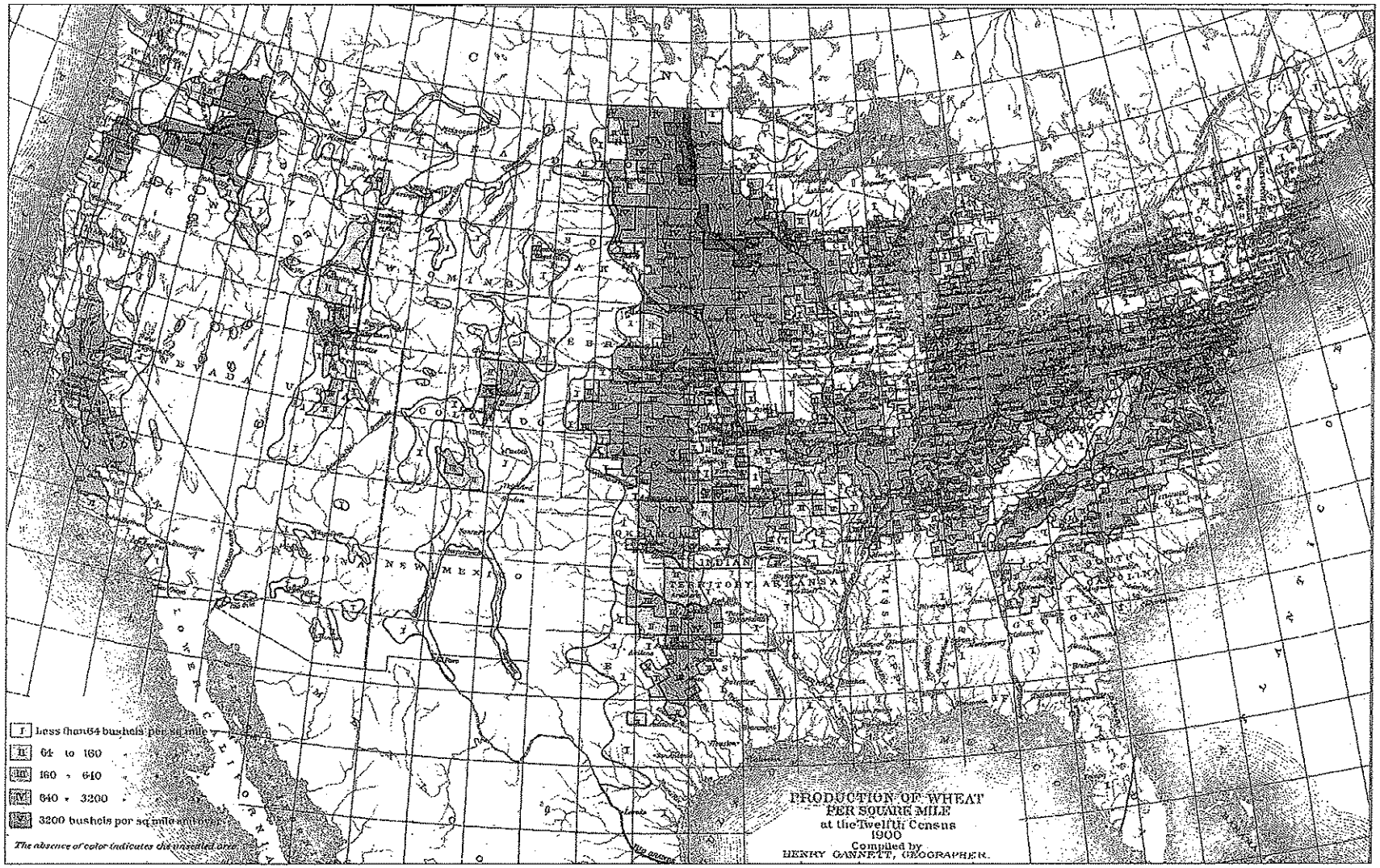


Figure 8.39. ***Production of Wheat per Square Mile*** **agricultural map of 1900, showing principal areas of wheat agriculture in the United States.**
The light-colored areas in Arizona denote an output of less than 64 bushels of wheat per acre. (United States Census Office 1902b:Plate No. 5).

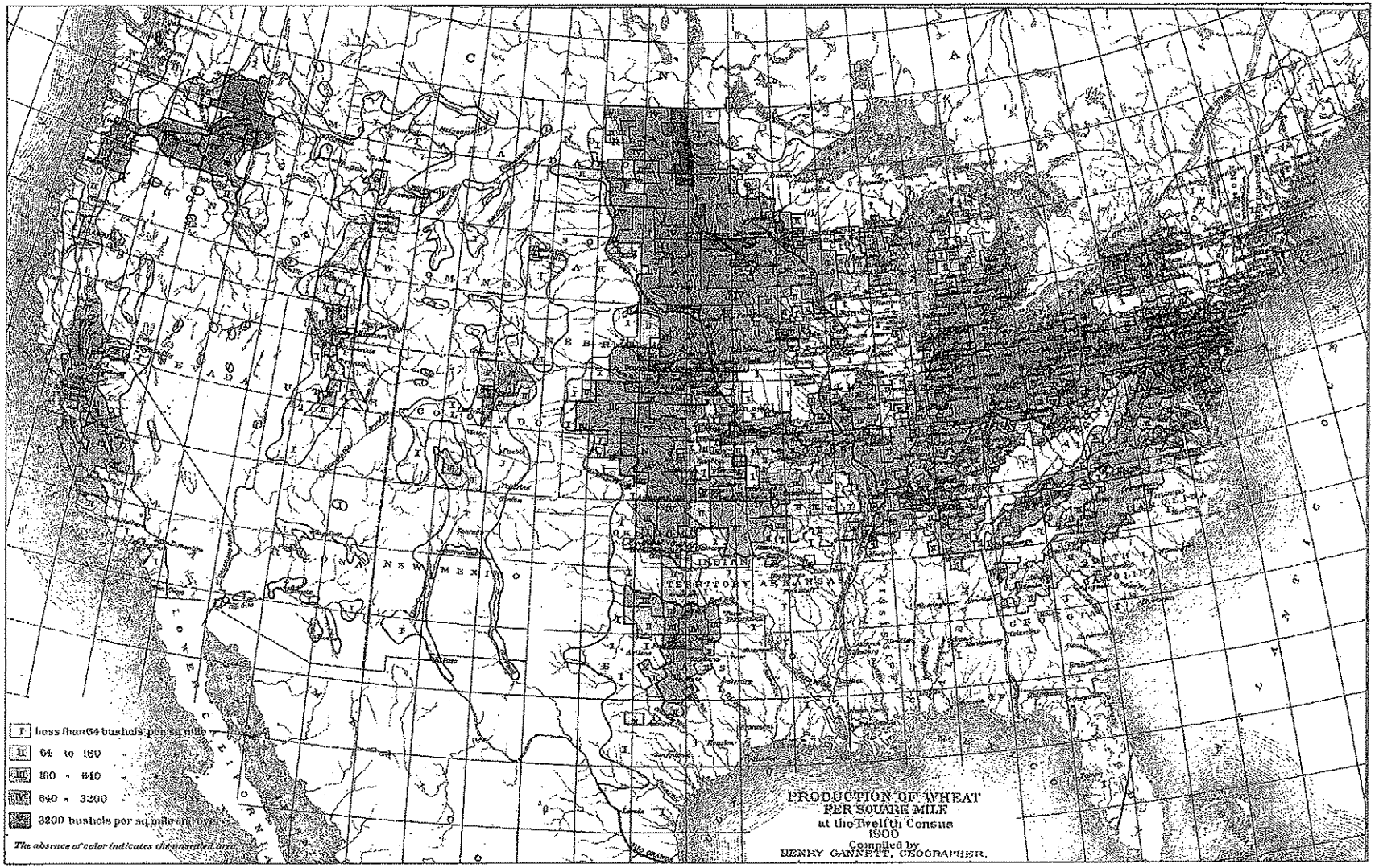


Figure 8.39. ***Production of Wheat per Square Mile*** **agricultural map of 1900, showing principal areas of wheat agriculture in the United States.**
The light-colored areas in Arizona denote an output of less than 64 bushels of wheat per acre. (United States Census Office 1902b:Plate No. 5).

Arthur H. Wilde at the University of Arizona Agriculture College and R. H. Forbes at the Arizona Agricultural Experimental Station continued improving the strain, which immediately became popular with Arizona farmers. In 1912, more than 23,000 acres were planted, yielding 707,000 bushels with a value of $778,000; in the following year, 29,000 acres produced 928,000 bushels worth $1,021,000. With yields of more than 30 bushels per acre, Arizona fields were producing more than double the national average per acre. Baart wheat was well established in the state by 1914, but because of the high costs of marketing and transporting the crop outside of Arizona, it was only sold for consumption within the state (Shannon 1945:175–176; United States Department of Agriculture 1914:365, 367, 379–380; 1937:210–211, 218, 271, 277) (Table 8.3).

National grain production increased considerably during the First World War as there was a great demand for wheat to supply not only domestic needs and American soldiers overseas, but also to ship food to allies whose farm production had been disrupted. Millions of acres of new lands were opened for wheat growing, but this was limited almost exclusively to the Great Plains and the Pacific Coast states, two regions which were soon producing the majority of America's wheat. Arizona farmers had started turning to a much more lucrative crop:Egyptian-American long-staple cotton. The completion of Roosevelt Dam in 1911 ensured a dependable supply of water, and central Arizona quickly became one of the leading cotton-producing centers in the nation. While Arizona's irrigated lands nearly doubled, all new fields were planted in cotton, and wheat production remained fairly steady (Fairchild 1944:207; McGowen 1961:35–36; White 1991:203, 244, 271).

Farmers across the country were hit by a severe postwar agricultural depression in 1920. Prices for all commodities collapsed. In Arizona, the cotton crash of 1920 had a devastating impact on the young state's economy as crops were plowed under because they would cost more to harvest than they were worth. Recovery was slow, and there were no significant changes in the state's agricultural production for many years. In 1922, W. E. Bryan, chief of the Arizona Agricultural Experimental Station in Tucson, began distributing Hard Baart, a new hybrid with a harder texture and greater yield. Despite such ongoing improvements, Arizona's 1925 crop of winter wheat was planted on only 32,000 acres, just slightly more than the acreage that had been planted a decade earlier. Production was sporadic through the 1920s and began to decline in the 1930s as growers turned to more profitable crops such as upland cotton and lettuce (Table 8.3). Most of Arizona's wheat was still grown in Maricopa County, but more likely on marginal lands and areas outside of the Salt River Project boundaries where water supply was more restricted.

Table 8.3. Statistics on Arizona Wheat Crops, 1909–1988.

Year	Acres	Bushels	Value	Bushels/acre	Dollars/bushel
1909	20,000	363,000		18.1	
1912	23,000	707,000	$778,000	30.7	$1.10
1913	29,000	928,000	$1,021,000	32.0	$1.10
1920	37,000	835,500	$1,921,500	22.6	$2.30
1923		1,092,000			
1925	32,000	490,000	$735,000	15.3	$1.50
1930	15,500	349,000	$449,000	22.5	$1.29
1935	40,500	872,500	$733,500	21.5	$0.84
1940	24,500	610,000	$471,000	24.9	$0.77
1945	18,000	411,000	$661,000	22.8	$1.61
1950	27,000	707,500	$1,329,000	26.2	$1.88
1954	11,000	260,000	$561,000	23.6	$2.16
1959	73,000	3,066,500	$5,060,000	42.0	$1.65
1964	28,000	1,321,000	$2,076,500	47.2	$1.57
1969	59,000	3,590,000	$5,227,500	60.8	$1.46
1970			$14,600,000		
1982		372,000 tons	$44,700,000		
1988	85,000	232,000 tons	$30,100,000		

(De Gennaro 1990:314, 318–323, 327; United States Bureau of the Census 1941:9, 19–20; 1961:11; 1972a:5; United States Department of Agriculture 1914:379–380; 1926:744–747, 757, 770)

The declining production levels and growing population of the state meant that Arizona farmers could no longer provide most of the wheat that was needed for consumption within the state. After 1920, Arizona produced less than 25 percent of the wheat needed for local markets, and much more had to be shipped in from California and other states (Nash 1999:18; Sheridan 1995:257–258; United States Department of Agriculture 1926:744–747, 757; 1937:210–211, 218, 267, 271, 277).

Arizona's wheat production continued to gradually decline; in 1954, only 11,000 acres were planted. However, there was a very steep and sudden increase in the late 1950s as new large-scale wheat farms started spreading across Pinal and Yuma counties. This sudden rise in wheat production was due largely to broad changes that were transforming Arizona agriculture, which was now dominated by agribusinesses—highly capitalized corporate farming operations that relied on mechanized production. These dramatic changes in farming methods related directly to the new ways in which grain was marketed. Wheat, like all key commodities, was now sold in larger units, and was increasingly tied to foreign trade and national foreign policy. Arizona's wheat production continued to increase greatly after 1960, though never to a level that the state could be considered a major wheat-producing state (Cross et al. 1960:258–261; De Gennaro 1990:314, 318–323, 327; Nash 1999:106; United States Bureau of the Census 1961:11; 1972:5) (Table 8.3).

The Decline of Arizona's Flour Mills

As Table 8.4 indicates, the number of merchant mills had significantly decreased at the turn of the twentieth century, reflecting the overall national industrial pattern influenced by the efficiency of gradual reduction. Many of the early mills operating after the Civil War were likely custom mills established on ranches, or in small communities to provide flour for local farmers and settlers. It appears that many of these simple mills operated for a short period of time until mercantile businesses had been established in settlements to provide affordable flour from larger Territorial merchant mills. A number of mills established by founding Mormon communities operated as cooperative enterprises, several of which survived into the early decades of the twentieth century. Other Territorial flour mills that operated into the twentieth century were merchant mills (small-scale and large enterprises). As Table 8.4 indicates, in order for mills to economically survive in the twentieth century, they had to convert to the roller process and gradual reduction.

Between 1914 and 1920, the amount of flour produced statewide more than doubled to 150,000 barrels, which was undoubtedly associated with a nationwide increase in flour production during World War I as part of America's campaign to feed war-torn Europe and the Soviet Union. The largest of Arizona's merchant mills through the first two decades of the twentieth century included three Valley mills (Hayden Flour Mill, Phoenix Flour Mill, and Mesa Flour Mill), as well as the Eagle Flour Mills in Tucson, and possibly several mills in the vicinity of Safford and Solomonville (see Table 8.2). As Chapter 9 details, the Hayden Flour Mill survived these two decades despite tremendous economic hardships, not to mention the complete destruction by fire of the original adobe mill in 1917.

Just as wheat crops were significantly impacted in the decades following World War I, so too were Arizona's merchant mills that witnessed a decline to only four by 1940 (a reduction of more than 67 percent). It is not currently possible, given the fragmentary nature of census records, to place a more exact timeframe for this decline; however, analysis of national trends through the census records indicate that between 1927 and 1933, the number of merchant mills nationally decreased by more than 50 percent (United States Bureau of the Census 1936). Predictably, the largest and most productive merchant mills survived, including those in the Salt River Valley. Smaller mills across the state may have continued to operate, such as the Shumway Flour Mill, although their absence in census inventory records of 1940 suggests they had been relegated to custom mills, or small-scale merchant mills to serve the local communities.

Other mills, such as the Mesa Flour Mill, Phoenix Flour Mill, and the Gila Valley Milling Co. Mill in Safford appear to have been consolidated under the Arizona Flour Mills. By the early 1960s, however, only the Hayden Flour Mill remained as a principal merchant mill, with an extensive network of agents promoting and selling flour statewide. Currently, the only Arizona merchant mill in operation is the Bay State Milling Company facility in Tolleson, which was constructed in the early-to-mid 1980s.

Conclusions

The Hayden Flour Mill was the third merchant mill to be constructed in the Salt River Valley. Representing one of the largest merchant mills in the Arizona Territory, the structure and associated property was instrumental in the economic development of Tempe. With its favorable location along the Salt River and room for expansion, Charles Hayden was able to upgrade and modernize the mill at a time when technological innovation had revolutionized the milling industry. As a result, the Hayden Flour Mill was able to survive harsh economic challenges through the first decades of the twentieth century.

After the devastating fire in 1917, the Hayden Flour Mill was again positioned to become a prominent merchant mill under the leadership of the Tempe Milling Company. The Hayden Flour Mill continued to expand through the

Table 8.4. Statistics on Arizona's Merchant Flour Mills, 1900–1939[1].

Year	Number of Mills	Rolls (pair) / Stones (run)	Daily Capacity (barrels)	Wheat Flour (Barrels)[2]
1900	11	67 / 7		65,617
1905	9	92 / 0		72,898
1909	10		1154	79,526
1914	8			79,414
1920	12			150,254
1921			925	132,000
1923			825	152,000
1939	4			

[1] United States Bureau of the Census 1908; 1913; 1919; 1924; 1942; United States Census Office 1902a; United States Department of Agriculture 1926

[2] White, Graham, and Semolina flour

1940s and 1950s, becoming the tenth mill in the United States to install a pneumatic conveyance system by the early 1960s (Laetz and Starr 1984). By this time, the property included a number of associated outbuildings for storing surplus grain and flour, and a sizable Grain Elevator and Silos with a storage capacity of approximately 18 million pounds (300,000 bushels) of wheat. The daily capacity of the Hayden Flour Mill expanded significantly from an estimated maximum of 100 barrels in 1918 to 1,000 cwt (510 barrels) by the 1970s. Other merchant mills in Arizona could not compete with such an aggressive expansion; before the end of the 1960s, the Hayden Flour Mill was the only merchant mill in the state, distributing its well-known brands of flour throughout Arizona.

CHAPTER 9: THE BUSINESS HISTORY OF THE HAYDEN FLOUR MILL PROPERTY

Ilya Berelov

Charles T. Hayden's business acumen was developed from an early age and brought to bear on a variety of business ventures that he pursued throughout his life. In his mid-twenties, he acquired his cousin's freighting business and store in Missouri (Fireman 1969:196; Hayden 1972:2). This event marked the beginning of his freighting and mercantile endeavors that would continue up until his death in 1900. The central focus of his business life, however, between 1874 and his death in 1900, was the Hayden Flour Mill. After his death, others picked up that mantle and continued with an ever-changing roster of managers of and investors in the mill business. Additionally, a variety of other smaller business ventures were associated with the mill property and the Hayden family. This chapter summarizes the history of the Hayden Flour Mill and its operations, as well as brief overviews of the other, related businesses.

The Hayden Flour Mill was constructed as a merchant mill in an era that witnessed significant advances in both milling methods and technology. Competition between Salt River Valley flour mills and mills throughout the territory ensured the mill was routinely upgraded with contemporary machinery. Consequently, the mill continued to operate through the early decades of the twentieth century, even as additional merchant mills across the territory and Southwest were supplanted by the regional merchant roller mill. For 124 years, the flour mill at the base of Tempe Butte represented a major source of fine flour for the Salt River Valley and numerous communities throughout Arizona. The flour mill remained central to Tempe's growing economy and community needs well into the twentieth century.

The Hayden Flour Mill and Associated Businesses: 1871–1903

After expanding the Kirkland-McKinney Ditch along the south edge of Tempe Butte and securing a cash entry patent in Section 15 (November 6, 1871), Hayden began construction of a small store and a flour mill:

> From this place up to Hayden's Ferry, formerly named Butte City, is located on the western side of a large butte, which stands sentinel on the south bank of the Salt River. The town contains a store and a saloon. A number of houses are in the course of erection, one of these by G.H. Freeman, is said to be intended for a hotel. Judge Hayden has here commenced the erection of a flouring mill which will be driven by water from Tempe ditch, with a fall, it is said, of twenty-four feet [*Arizona Miner* 1872b:1].

Hayden hired John J. Hill to oversee the new development, including building "the first house in the place of willow poles which was used as a warehouse" (Hayden 1972:38). He would also need an experienced and trustworthy miller to oversee the installation of milling equipment and daily operations. To that end, Hayden hired a German miller, John Sievers, who proved to be a loyal employee and stayed on with Hayden for over 20 years (*Arizona Citizen* 1872b; Hayden 1972:40). Construction of the mill was slow, given the difficulty in obtaining supplies and materials, as well as personal demands due to Hayden's freighting enterprise throughout the Arizona Territory. By August 1873, the foundation of the mill had not yet been completed, and lumber was being acquired from as far north as Prescott:

> ...During my visit to this place, the work of quarrying, hauling, cutting and laying of stone in the walls of "the pit" for the water-wheel, was progressing finely... [*Arizona Sentinel* 1873b:6].
>
> Judge Chas. T Hayden's freight train arrived here from Salt River Valley with a load of barley, which the Judge sold at four and five cents a pound. The train takes back lumber to be used in the erection of a flour mill which the Judge is having erected at Hayden's Ferry on Salt River [*Weekly Arizona Miner* 1873a:3].

Hayden also had to purchase millstones, a turbine, a bolter, and screens from markets in the eastern United States. Because there was as yet no effective transport to the East Coast, merchandise had to be shipped around Cape Horn by boat to San Francisco, thence to Guaymas, Mexico for wagon transport to the Salt River Valley (*Arizona Citizen* 1872b). By mid-1874, the flour mill was complete and in operation.

From the outset, the mill was producing a range of products such as graham flour and cracked wheat, and other products, such as cracked barley, would later be produced at the mill (*Arizona Citizen* 1874b; *Weekly Arizona Miner* 1876a). Figure 9.1 presents an early advertisement of the Hayden Flour Mill from the *Weekly Arizona Miner* (1875a:3)

As the advertisement indicates, Hayden was in the process of constructing a blacksmith and wagon shop on the premises. Blacksmith shops as outbuildings to a flour mill were not altogether uncommon in American flour mills of this period. They provided routine maintenance on horses and wagons and performed important services to the millers and millwrights, including manufacture and maintenance of dressing and miscellaneous tools, as well as small hardware. Before metal parts became widely available for millers and millwrights in the nineteenth century, blacksmiths also did much of the repair on wood shaft and gear systems (Hazen 2000).

Charles T. Hayden
Hayden Ferry, Maricopa County, A.T.
Dealer in
EVERY VARIETY OF MERCHANDISE
and
Proprietor of Hayden Mills
Flour of the very best quality from these Water Mills always on hand,
and grain at lowest market rates for cash.

Shall soon make a large amount of BACON AND LARD FOR SALE
Freighters will find it for their interest to give me a call, as I am
distributing flour and grain to all parts of the Territory and
can frequently furnish back freights to their advantage,
as well as supplies; and will have a blacksmith's shop
and wagonmaker's shop supplied for convenient repairs.

Charles T. Hayden, Hayden Ferry, September 12, 1874.

Figure 9.1. Transcribed early advertisement for the Hayden Flour Mill and Associated Businesses (*Weekly Arizona Miner* 1875a:3).

Daniel W. Jones, a Mormon pioneer, stated that when he stayed at Hayden's house in late 1875, he had already "built a grist mill, started ranches, opened a store, blacksmith shop, wagon shops, etc." (Jones 1960, quoted in Hayden 1972:44). The blacksmith and wagon shops described by Jones in 1875 were likely the smaller structures immediately east of the flour mill, later designated the Blacksmith and Carpenter shops on Sanborn-Perris maps. Although an exact date of construction of the Hayden Blacksmith and Wagon Shop, located north of the Hayden Flour Mill has not been firmly established, a conservative estimate between 1876 and 1878 has been proposed (Kwiatkowski et al. 1999:174). Indeed, the June 12, 1878 issue of the *The Enterprise* (1878b:4) declared, "[b]etween the mill and the edge of the river bank, Mr. H. is just finishing a blacksmith shop, with three forges, and wagon shop adjoining, to do his own work and accommodate the public." Chapter 15 provides the construction history of the Hayden Flour Mill property, including a series of maps showing the relative locations and estimated dates of construction for various associated buildings and structures.

In order to compete with local flour mills, Hayden upgraded his flour mill in the spring of 1877 to accommodate three runs of stone (*Weekly Arizona Miner* 1877b). That year, it was reported that the three Valley mills produced 3,400,000 pounds of flour from wheat grown on local lands (*Salt River Herald* 1878c). In 1880, newspapers reported that demand for flour was so high that capacity would be doubled at the Hayden Flour Mill (*Arizona Citizen* 1880). Initially, Hayden purchased a new turbine and additional bolting cloth. However, must have become clear that the structure itself would require major renovation to accommodate increased capacity. Between 1881 and 1882, the mill was significantly altered:

> ...A year since we entered into a minute description of the immense business carried on by Mr. Hayden, but for the present occasion the extent of our peregrination forbids. His flouring mill, the largest in the territory, has been improved somewhat, and we note among the additions to the machinery, a set of porcelain rollers, that are now supplanting the mill stone to a great extent. Work of painting and whitewashing the inside of the large store rooms in front, which are three stories in height and surmounted with a fine iron roof, is now progressing, as also other improvements [*Arizona Gazette* 1882d:1].

With the exception of John Y.T. Smith's flour mill in Phoenix, the Hayden Flour Mill was larger in size and capacity than any other Valley mill (*Arizona Gazette* 1882g).

In the first months of 1891, the mill was closed and renovated with three new sets of Cornelius rollers (*Arizona Republican* 1891a) to supplement the four Wegmann rollers that were used for the reduction of middlings and cleaning bran (*Arizona Enterprise* 1891a). With the addition of the Cornelius rollers, the daily capacity of the mill was expected to increase substantially; with each Cornelius roller having a potential daily capacity of 55 barrels, this would indeed have been the case.

However, one year after the installation of the new rollers, the *Arizona Daily Citizen* (1892) reported the mill capacity at 100 barrels per day. Hayden must have been dissatisfied with the Cornelius rollers; Phil Robertson, a former miller and restorer of milling equipment, said of the Cornelius roller, "Despite all the hype, the Cornelius roller was a flop; only God could make it work" (personal communication, September 2007). The 1893 *Sanborn-*

Perris Fire Insurance Map listed four patent rollers within the Hayden Flour Mill, which were likely Gray's Patented Noiseless Roller Mills manufactured by the E.P. Allis & Co. Hayden had cleared the mill of the three Cornelius rollers and obsolete Wegmann rollers. Although the capacity of the mill had not increased substantially since 1882, operation must have been significantly more efficient.

Daily Capacity of the Hayden Flour Mill

It is difficult from the available newspaper resources to accurately define the average daily capacity of the flour mill prior to 1918. In some cases, no distinction is made between wheat capacity and flour capacity; in other cases, numbers are errantly printed, or exaggerated. New process flour mills with purifiers and efficient bolters were capable of extracting an average of 70–72 pounds of flour per 100 pounds of grain (70–72 percent extraction) (Hazenb 2001). In documenting the reported capacities of the Hayden Flour Mill in primary newspaper accounts, an attempt has been made to provide an inventory of daily flour capacity at the Hayden Flour Mill between 1878 and 1918 (Table 9.1).

Daily capacity estimates of the Hayden Flour Mill in 1878 were between 7,000 and 11,200 pounds (36–57 barrels) (Enterprise 1878b). After extensive rehabilitation of the mill in 1881–1882, the mill contained four sets of stone, as well as a porcelain roller, and boasted a daily capacity in excess of 30,000 pounds of grain (*Arizona Gazette* 1882g), or approximately 21,000 pounds of flour (107 barrels). The capacity had significantly diminished in the first years of the twentieth century, although by 1918 the capacity was again averaging 100 barrels.

C.T. Hayden's Thriving Freighting and Merchant Business: 1874–1883

At the time the mill opened, Hayden was supplying flour to a number of customers in Tucson, including Fish & Co., J.H. Archibald, and Zeckendorf Bros. (*Arizona Citizen* 1874g). The products were unloaded at the Lord and Williams' store and distributed to clients. He would also eventually supply Theo Welisch, the successor to Hayden's Tucson store, with his flour (*Arizona Citizen* 1878). This is telling, considering that Tucson by 1874 already had two flour mills in operation (the Silver Lake Mills and Eagle Flour Mills); furthermore, Solomon Warner would soon have his flour mill running under Sentinel Peak. It is possible that until Warner's Mill opened in 1875, existing Tucson mills functioned as custom mills that were incapable of producing flour quantities necessary for profitable distribution. Of course, it is more likely that Hayden—having resided in Tucson as a merchant and freighter for almost two decades—was still an influential business personality and was able to compete against Tucson mills for local business.

Hayden's freighting contacts extended across the entire territory. In 1875, Hayden opened a store with Judge Hezekiah Brooks in Prescott, where various milled products and general merchandise were sold (*Weekly Arizona Miner* 1875b). On June 9, 1876, the *Weekly Arizona Miner* (1876e) reported that 4,000 pounds of flour arrived at the store, and was sold out in 25 minutes; in July 21, 16,000 pounds were sold (*Weekly Arizona Miner* 1876c). By December, Judge Brooks reported an inventory of 20,000 pounds selling for $11 per hundred pounds (*Weekly Arizona Miner* 1876b). By autumn of 1877, however, Hayden closed the store, entrusting Judge Brooks to continue selling flour in Prescott as his agent. Other locations in the Arizona Territory where the flour was distributed included Florence, Wickenburg, Ehrenburg, mines and settlements in Mohave County, and military camps or forts in southern Arizona.

Clearly, Hayden was a passionate entrepreneur, constantly devising new ways to diversify his income. The difficulties of hauling lumber from Prescott encouraged Hayden to find a way to float logs to Hayden's Ferry via the White and Salt rivers; this river route had been previously navigated by Logan, a Scottish carpenter, who determined this was certainly possible. The *Arizona Sentinel* (1873a:6) reported: "Charles T. Hayden left his home at Hayden's Ferry on the 24th ult., in company with his cousin, three Americans and three Mexicans, for the purpose of prospecting along the Salt River for timber suitable to saw into lumber." It was determined, however, that the rivers were too shallow for floating logs reliably; furthermore, the meandering river courses through canyons would create log jams (Hayden 1972:42–43).

Hayden also raised hogs, using the bran and other remnants from the milling process as feed. He built a dry-laid rock wall as a pig enclosure at the base of the butte, northeast from the mill building, and had 1,500 hogs by 1874 (*Arizona Citizen* 1874c). Although he did not find a way to produce quality smoked hams, Hayden was still able to sell fresh pork, bacon, and lard to supplement his income (*Weekly Arizona Miner* 1875a; Hayden 1972:43). He sold the pork products locally, but also delivered them by wagon to other towns.

Sugar cane transplanted from Sonora was grown in limited quantities through the 1870s and possibly the 1880s by Mexican American farmers along the south side of the Salt River, west of the Hayden Flour Mill. The sugar cane was used to produce molasses and *panocha* (cakes of raw brown sugar). Apparently the cane crops were successful enough to entice Hayden to purchase a water-powered sugar mill and profit from the by-products; a sugar mill was delivered to Hayden in September 1878 and soon put into operation within the flour mill (*Arizona Sentinel* 1878).

Table 9.1.Chronological Summary of the Hayden Flour Mill Daily Capacity: 1874–1998.*

Date	Capacity of Processed Grain	Comments	Reference
1874–1878	Unclear; no information identified to date		
1878–1880	7,000–11,200 pounds/36–57 barrels of flour (at 70% extraction)	Wheat capacity was reported between 10,000 and 16,000 pounds	*Arizona Citizen* 1880; Enterprise 1878b
1881	24,000–25,000 pounds /122–128 barrels	Appears to be an exaggeration based on the capacity reported below in 1882	*Arizona Citizen* 1881; *Arizona Quarterly Illustrated* 1881
1882	21,000 pounds /107 barrels of flour (at 70% extraction)	Wheat capacity reported at 30,000 pounds	*Arizona Gazette* 1882g
1891	Potentially 32,340 pounds /165 barrels	After installation of the Cornelius rollers; this capacity was apparently not achieved, however, considering Hayden replaced the Cornelius rollers within a year.	*Arizona Enterprise* 1891:3
1892	19,600 pounds/100 barrels	After installation of four patent rollers	*Arizona Daily Citizen* 1892
1905	11,000 pounds /56 barrels		Hayden 1905a
1918–1920s	19,600–29,400 punds /100–150 barrels		Studer 1921
1971	150,000 pounds /765 barrels/1,500 cwt	The barrel was used as a standard weight measurement for flour until World War II when it was replaced with the hundredweight (cwt)	Jennings 1971
1975	1,000 cwt daily/510.2 barrels		Laetz and Starr 1984
1984	4,500 to 5,000 cwt daily/ 2,296–2,551 barrels		Laetz and Starr 1984

*1 barrel=196 pounds /1 hundredweight (cwt)=100 pounds

Amber sorghum apparently replaced the Sonoran sugar cane in the 1880s; Hayden himself had reserved 45 acres of amber sorghum by 1882 (*Arizona Gazette* 1882d). Archival records do not offer a specific timeline for the operation of the sugar mill at the Hayden Flour Mill; it can only be presumed that it was used through at least the 1880s to mill the amber sorghum. The 1890 *Sanborn-Perris* map included an inventory of equipment within the Hayden Flour Mill, but the sugar mill was not listed.

Hayden was beginning to make serious advances in his business expansion by 1877 as he extended flour distribution to mines and settlements in Pinal and Mohave counties (*Weekly Arizona Miner* 1877d). Over the next year, Hayden opened a store in the newly founded town of Gillette near the Tip Top Mine in Yavapai County (*Arizona Enterprise* 1878a; *Weekly Arizona Miner* 1878).

As the Hayden Family prospered, so too did their holdings; by 1880 Hayden occupied 640 acres, which were principally used as agricultural lands (wheat, alfalfa, and orchards). Lovingly referred to as "Hayden's on the Rhine," the Hayden property included La Casa Vieja, the flour mill, granaries and store rooms, a corral and stable, and a blacksmith and wagon shop (*Weekly Arizona Miner* 1879a). A butcher shop was on the property to produce soap, lard, bacon and ham from his hogs (*Arizona Quarterly Illustrated* 1881). Of the 50 or so men employed by Hayden, 11 were occupied in the wagon and machine shops, leaving 39 to work the store, fields, the hog yards, and of course the flour mill. It is instructive that at the time Hayden had over 1,000 hogs which were being slaughtered at around 30 per day. All available fat was being used in the soap factory, and the bacon and ham were being sold in Prescott (*Arizona Gazette* 1882a, 1883b). On all counts, Hayden was seen to have been a successful and wealthy man, who encountered few obstacles for at least the first decade as a resident of Tempe.

The Final Years of Charles Hayden: 1884–1900

In March of 1884, the mill was again forced to briefly close, this time due to flooding (*Arizona Gazette* 1884c).

Nevertheless, the *Phoenix Herald* (1884b:2) claimed that Hayden was doing extremely well, shipping "an immense mount of flour to the southern and eastern portion of the territory." Indeed, later that month, the *Phoenix Herald* (1884a) backed up this claim by reporting that Hayden had received a share in a 397,800-pound contract for furnishing flour to the military. John Y. T. Smith, the proprietor of the Phoenix Mill, was awarded the biggest order at 314,000 pounds, while Hayden received a 60,000-pound share, and Chas. Goldman of Valley Mills, a 23,800-pound share.

But, quite inexplicably, later in the summer the *Arizona Gazette* (1884f) also reported that Hayden was in terrible financial trouble due to heavy mortgages, and was in danger of losing his business. The *Arizona Gazette* (1884g:3) even claimed to have seen a "statement of the business transacted by Peterson, Wormser & Co., the firm which has succeeded to the business of C. T. Hayden of Tempe." This, despite reporting three weeks prior that Hayden had returned from the East accompanied by a gentleman with means who would assist Hayden (*Arizona Gazette* 1884a). It appears that Hayden finally managed to settle his concerns by selling a quantity of his property under execution the following spring (*Arizona Gazette* 1885d). This was the first of many financial hurdles that would encumber the Haydens' financial life in the future.

It is not clear how serious Hayden's financial concerns were, especially given how much money the mill was generating at the time. Only one month after the *Arizona Gazette* ran the story about Hayden liquidating certain assets, he proceeded to sell 20 acres of land worth $2,000 (not an inconsiderable sum in those days) to the Normal School for only $800 (*Clifton Clarion* 1885). And yet, things were serious enough that it took Hayden into the next year before he was able to fully extricate his business from threat. On March 30, 1886, the *Arizona Gazette* (1886d) reported that Hayden was purportedly about to sell 300 acres of his land, not connected to the mill, store, and land in the immediate vicinity. This sale was to be made to a syndicate that would later be named the Tempe Land and Improvement Company (TLIC). Two months later, announcements ran in the papers that Hayden had succeeded in taking back control of his business from Peterson, Wormser & Co., and would now operate as C. T. Hayden and Co., with Mr. A. C. Webster and Mr. A. J. Peters as business associates and shareholders (*Arizona Gazette* 1886d; *Phoenix Herald* 1886). The name change would begin a series of similar alterations in the company name over the next century (Table 9.2).

During this time, the mill business continued as before with the Akimel O'odham reportedly selling 200,000 pounds and J. D. Rittenhouse, the post trader at the Sacaton agency, 1,000,000 pounds of wheat to Hayden over the harvest season (*Arizona Gazette* 1886a; *Arizona Sentinel* 1886). Despite continuing improvements in the business, the land sale proved to be no chimera, and by the spring of 1887, the *Arizona Gazette* (1886b) announced that Hayden had sold as much as 305 acres of Tempe land to L. W. Blinn of Tombstone, with Hayden reserving the mill and his own home and store as previously reported. The actual deed on record, however, shows that C.A. Hooper purchased the property from Hayden and then sold it to the TLIC; Hooper, along with Blinn, was a major investor and stockholder in the TLIC. Hayden must have decided to concentrate primarily on the Hayden Milling Company, given its "rushing business with both their mill products and their commercial establishment" (*Phoenix Herald* 1887b:3).

Table 9.2. Company Names Under Which the Hayden Flour Mill Operated.

Date	Name Variant
1870–1874	Hayden Milling and Farming Company
1874–1886	Charles T. Hayden and Co./C.T. Hayden &Co.
1886	Peterson, Wormser & Co.
1886–1887	C. T. Hayden and Co.
1887–1888	The C.T. Hayden Milling Company
1889–1892	Tempe Milling and Mining Company
1893–1899	The Tempe Milling Company
1900	C. T. Hayden Company
1901–1914	C. T. Hayden Company/Arizona Mercantile Company
1915–1919	Tempe Milling Company
1920–1929	Tempe Milling Company/Southwest Flour and Feed Company
1930–1946	Hayden Flour Mills
1947–1996	Hayden Flour Mills/Southwest Flour and Feed Company/Mesa Feed and Seed Company/The Arizona Pest Control Company/Glendale Appliance Mart

In early 1888, the Hayden Milling Company removed the old warerooms adjoining their store and began erecting another warehouse (*Phoenix Herald* 1888a). At about this time, A. J. Peters was made the manager of the company (*Phoenix Herald* 1888c). It is not clear whether he took over from John Armstrong as the mill's manager, a post the latter occupied in 1885 (Kwiatkowski 1997a:8), or whether his duties pertained to the larger company. Not long after however, through a legal action against the Watkins brothers for the recovery of a pasturage bill of $600 published by the *Phoenix Herald* (1889), it emerged that the Tempe Milling Company had again changed its name, at least temporarily, to the Tempe Milling and Mining Company. It appears that Hayden's great interest in a north-south railroad through Arizona was at least partially linked to his burgeoning interest in mineral exploration, which was reflected in the company's new name (*Arizona Daily Star* 1889).

In July, 1890, the *Arizona Republican* (1890a) reported that Hayden was taking the Arizona Canal Company to court over water rights. Hayden was worried about the water supply to the mill and wanted to be "confirmed in his right to the use of the water claimed." The case, presided over by Judge Kibbey, was ruled in favor of Hayden, whose water power was estimated to be worth $45,000. The Tempe Canal was available for use by others, but Hayden was to be compensated by a sum of $2,000, and ensured that a steady flow of water to the mill would be maintained (*Phoenix Herald* 1890).

In 1891 the *Arizona Daily Star* (1891), estimated Hayden's net worth to be $150,000, largely on the basis of his water rights. In today's buying power, this figure translates to a staggering $3,428,571 (Officer and Williamson 2007), and quite possibly does not include the ongoing revenue derived from the mill. Hayden was 66 years old at the time, but did not appear to be slowing down; early in 1892, he appeared as one of the incorporators of a new sugar company (*Arizona Gazette* 1892a). This new enterprise did not appear to be linked to the original sugar crushing mill, which was phased out some time in the preceding five years.

Other aspects of Hayden's business continued as before, with his burro trains packing to Globe (*Phoenix Herald* 1893a). However, modern technologies inevitably began to alter the nature of the business. With the introduction of the railroad, Hayden was able to extend his business reach. From Hayden's stores, barley headed to Tombstone (*Arizona Gazette* 1893a), flour to Tucson (*Phoenix Herald* 1893b), bran to El Paso (*Phoenix Herald* 1894a), and hay bales weighing as much as 315 pounds to Los Angeles (*Arizona Gazette* 1894), all by train. These developments perhaps forced Hayden to begin delegating. Although he continued to sell wheat and flour himself (*Saturday Review* 1894), he entrusted another young apprentice, Will McNeil, to represent the Tempe Milling Company at this time (*Arizona Gazette* 1893b). Finally, in 1895, Hayden announced his retirement, with the entire business, including the mill, going under the management of Joseph A. Ford (*Saturday Review* 1895).

Financial problems continued to plague the family business through the 1890s; Hayden attempted to sell the mill in 1897 but was unsuccessful (Robinson 1897). Instead he managed to negotiate a mortgage on the mill (Hayden 1898), and the mill remained in the family. The mill stumbled on until the close of the century when Charles T. Hayden passed away.

The Hayden Flour Mill in the Twentieth Century

The early years of the twentieth century at the Hayden Flour Mill were marked by great change and reorganization. Charles Hayden's death, which followed on the heels of intermittent financial problems for the mill, necessitated a thorough reorganization of the family's assets. Prior to Hayden's passing, Joseph Ford attended to the family's business concerns, and A. J. Peters concentrated on the mill. Carl Hayden, Hayden's first born son, was uninterested in business life and was living at Stanford University in California. The death of his father, however, precipitated his reluctant return from California, and forced him to take control of his family's affairs; these were generally in poor shape due to a number of coinciding factors. First, Carl inherited a business that had continually overextended its credit and was mired in poor collection practices (Fireman 1976). Second, the 1890s were a generally depressed period for the entire country, which affected business. And third, this recent, severe economic depression was compounded by several serious droughts, which occasionally caused the cessation of water supply to the mill. In 1904, for instance, the mill was forced to close for a total of 47 days (Table 9.3).

When Carl became the president of the C.T. Hayden Company, he took swift action, deciding to liquidate the assets of the general store, and leasing the mill to A.J. Peters for $450 per month (*Arizona Republican* 1901b). Peters would run the mill for 13 years with frequent impediments (Celaya and Harter 1970:4). Soon after, during the summer of 1901, Carl merged the C. T. Hayden Company with the Arizona Mercantile Company, and assumed the role of president (*Arizona Republican* 1901b). This was a difficult period for the mill since its operation was frequently interrupted by the loss of water power (Woolf 1902). Carl Hayden nevertheless contributed to the running of the mill (Hayden 1902a; Peters 1901) and upgraded many of the mill's fixtures, installing electric lights and implementing needed repairs (*Tempe News* 1900).

The mill continued to be embroiled in disputes over water rights. In the summer of 1902, water supply was

Table 9.3. Dates between 1900 and 1905 in which the Flour Mill was Shut Down due to Shortage of Water in the Salt River.*

Year	Dates	No. Days	Miner's inches in Salt River
1900	June 25th to July 22nd	27	4,000
1900	August 1st to 3rd	3	4,000
1901	July 4th to 24th	20	3,500
1902	June 24th to July 23rd	29	3,200
1903	July 7th to 14th	7	4,300
1904	June 4th to July 21st	47	3,000
Average over the 5-year period		*26.6*	*3,600*

* information acquired from (Hayden 1905b).

sufficient and the mill was running full time (Hayden 1902a). But by 1904, water flow again became a concern and Carl began to search for better streams of revenue. In 1905 he advanced a plan to use the Hayden family's water shares, then standing at 11 shares in the Tempe Canal Company (at $7,200 per share) and 11 shares of the same value in the Kirkland-McKinney Ditch to create power from the mill. This power would serve to provide the surrounding area with electricity or to pump excess water from the increasingly waterlogged fields lying up to three miles away (Hayden 1905b). This plan was unsuccessful. By 1907, the mill was once again up for sale, and Carl received an undisclosed offer to buy the mill from a business in Minneapolis (Langan & Co. 1907). Negotiations must have fallen through, however, as the mill remained in the Hayden family's hands.

As much as A. J. Peters was valued during his time working under Charles Hayden, the mill struggled during his 13-year tenure. When Carl Hayden left for the Congress in 1912, the mill had been struggling financially for at least two years (Benton 1996:12). In 1914, at the age of 61, A. J. Peters finally closed the mill, possibly in favor of retirement. The following year it reopened under new management. The new miller, W. L. Leslie, had previously worked for the famous Pillsbury mills in Minneapolis, and the Globe Milling Company in Los Angeles, and oversaw the renovations of the mill by the Tempe Milling Company (*Tempe News* 1915a). The latter company, which was incorporated by Carl Hayden, F. A. Van Ritten, and C. G. Jones in 1915, instigated a complete overhaul of all the machinery (*Tempe News* 1915b). F. A. Van Ritten served as manager and J. H. Dobson as president. The mill, however, burned down just two years later (*Tempe News* 1917b). Substantial amounts of grain and alfalfa burned with it. Since the mill was covered by insurance, the owners, including Carl Hayden, who maintained a substantial share in the company, were able to rebuild it completely by the following year (Benton 1996: 13; Fireman 1976; *Tempe News* 1918a). The construction of the new mill building cost $128,000 (*Tempe News* 1918b).

Following the fire and the subsequent rebuilding of the mill, a new managerial structure appears to have emerged, in part through the instigation of several Valley farmers who were also instrumental in the initial organization of the Tempe Milling Company. This new structure would pave the way for the growth of the company in previously unimagined directions. Dobson and Van Rittten continued to work in their previous capacities in the midst of the restructuring (*Arizona Republic* 1918). W. T. Studer, L. W. Irving, and D. H. Bonsall represented the new arm of the restructured company. These men served as the executive officers, but were also at the time associated with H. M. Kennedy of the Phoenix Flour Mills. Kennedy sold his mill in Phoenix to the Viault Brothers in October 1917, prompting Studer and Irving to start a flour jobbing company called the Southwest Flour Company in 1918. They were soon also joined by Bonsall, their associate at the Tempe Milling Company, causing the company to disband and reincorporate under the new name of the Southwest Flour and Feed Company, which opened in Glendale in the spring of 1919 (Hayden Flour Mills 1947). Even before this took place, the mill had begun to diversify, selling seed corn, and grinding wheat, barley, and corn (*Arizona Republican* 1918). At the time, the mill was grinding 110 barrels of grain a day, 50 of which were of wheat and 25 of corn (*Arizona Republican* 1918). The following year, in 1920, this company consolidated with the Tempe Milling Company, for which it began distributing flour throughout Arizona (Hayden Flour Mills 1947).

The consolidation of the two companies proved to be a good move for the mill given what was to follow during the next decade. The distribution arm of the business helped to offset some of the losses the mill was about to sustain. At the conclusion of 1920, Mr. Henness, the manager of the Tempe Milling Company, suffered a nervous breakdown (Hayden 1921). It is not clear whether the cause of this breakdown was work related, however, the plight of the mill could not have helped matters. In his letter to Carl Hayden some six months later, Henness' replacement, Bill Studer (1921),

paints a grim picture of the mill's finances. Despite Studer's best efforts to keep production costs at a minimum, the mill was struggling due to the rapidly dropping price of flour, oran, and barley. A stock take in April of 1921 showed that the mill lost $45,000, a figure commensurate with the rates of loss in neighboring mills according to Studer. Shortly after this, Southwest Flour and Feed Co. Inc., now merged with the Tempe Milling Company, opened a store in Tempe (McNeil Company 1923).

In 1930, with changes to the firm's operation and practices, the Tempe Milling Company again changed its name to the Hayden Flour Mills (Hayden Flour Mills 1947). This period marked the beginning of significant changes to the mill. During the 1930s several additions were made to the original structure. In 1935 the Hayden Flour Mill's "River Warehouse" was constructed (Neeley and Kwiatkowski 1999:178). The price of flour and grain gradually rose again, and the mill began to recover financially. In a letter dated 1936, Studer, still the manager, reported to Carl Hayden, one of the principal shareholders, that the mill was doing very well, and operating at a nice profit (Studer 1936). Carl apparently controlled much of the stock despite the fact that investors in the mill changed repeatedly through the 1920s, 30s, and 40s (Benton 1996). With the decade drawing to a close, and business apparently faring better, the Hayden Flour Mills opened a further branch in Phoenix at 224 S. th Street. This office would remain until 1956 when a new office opened on Jackson Street, an area containing at least four other milling and flour distribution businesses (McNeil Company 1939:60, 1946–1947, 1956).

As Table 9.1 indicates, the capacity of the mill did not fluctuate significantly between 1882 and the 1920s, despite construction of the new mill, installation of new machinery, and the switch to electrical motive power. Although documentation of daily capacity is yet to be identified between 1921 and 1971, the construction history of the property (Chapter 15) suggests significant improvements and structural additions in the 1940s may have occurred to address increased capacity.

After World War II, Carl's nephew, Hayden C. Hayden began to gradually recoup the remaining shares in the company until he largely controlled and operated the mill (Hayden 1964). Financial gains and a more stable market enabled the mill to continue its gradual modernization. Its most impressive architectural feature, the towering 150-foot (45.72 m) grain elevator and its seven silos, each reaching 117 feet (35.66 m) into the sky, was built in 1951. By then, the company had grown to encompass several interconnected business ventures, including the Hayden Flour Mills, Southwest Flour and Feed Company, Mesa Feed and Seed ompany, and subsidiaries, as well as plants and retail stores in Glendale, Phoenix, Tempe, Mesa, and Tucson (Hayden Flour Mills 1947).

At the end of the 1940s, when Hayden C. Hayden started working at the mill, the Hayden Flour Mills and Southwest Flour and Feed Company produced Arizona Rose, Arizona Maid, and Arizona Tulip Flours; Red Star and Full Value Poultry and Dairy Feeds; team rolled barley; and oats, wheat, bran, and shorts; general mill feeds; molasses; dairy cattle and sheep rations; and hog feeds. These products were available from statewide distributors, the mill plants, and farm stores. The latter were located throughout the Valley. The Glendale plant and farm store was managed by Bonsall and his son D. H. Bonsall Jr. The primary function of the store was to act as representative and distributor for dairy and barn equipment. A large range of goods and services was provided, including power sprayers, dusters, feed, seed, hay, grain, salt, fuel, fertilizers, insecticides, dairy supplies, poultry supplies, ranch hardware, and home supplies. The Mesa Feed and Seed Store and the Red Star Feed Store in Tempe provided supplies for customers in the East Valley. The Hayden Flour Mills at Tempe, meanwhile, produced the flagship Arizona Rose Flour and served as the warehousing location for the grain growers of the southern Valley serving the Coolidge, Casa Grande, and Eloy districts. The Phoenix plant served as the distribution point for flour to stores and bakeries, and as the grain-warehousing location for farmers in the area. In addition, a Tucson store was operating to supply customers in southern Arizona (Hayden Flour Mills 1947).

Four other notable establishments made up the suite of companies associated with the Hayden Flour Mills. The Arizona Pest Control Company in Glendale manufactured insecticides for infestations and plant diseases and custom-produced chemical fertilizers, and distributed products for Chipman and DuPont. Glendale Appliance Mart sold a range of well-known brands, including Westinghouse, General Electric, and Norge. A host of home appliances and kitchen cabinets was also available. Southwest Flour and Feed Company also operated Southwest Commission Agency, which distributed Union Oil Products from Glendale. Finally, a grain elevator was built at the Glendale bulk grain plant to service north-side grain growers (Hayden Flour Mills 1947).

The consolidated group of companies that made up the Hayden Flour Mills was principally managed by the same people over a 30-year period, no doubt contributing to its stability during the difficult period between the two wars. With the exception of Hayden C. Hayden, who began working at the mill after World War II, and D. E. Frazier, the assistant manager of the Tempe plant, the other major shareholders and managers were largely the same until the early 1950s (*Arizona Magazine* 1971; Hayden Flour Mills 1947). The Hayden family remained financially involved with the mill throughout this period, as attested by Carl Hayden's receipt

of dividends from the mill in the 1930s and 1940s; he held onto his shares at least into the 1960s (Hayden 1964; O'Neill 1943; Valley Bank & Trust Co. 1936). But it was his nephew, Hayden C. Hayden, who demonstrated a serious interest in the operation of the mill, gradually taking over in the 1950s, and embarking on a series of important transformations to the plant. Hayden C. Hayden started as a salesman at the mill in 1948, became a manager in 1955, and soon after, the president (Laetz and Starr 1984). By this time the mill also had two offices in Phoenix (McNeil Company 1957–59).

Bill Mitchell, former Mill Supervisor, recalls that the mill produced a variety of flours made from hard winter wheat, many of which, particularly the Ramona and Cahame brands were used to make fine tortillas. While the mill was expanding further into local markets, Mitchell remembers that the mill still provided for customers who chose to buy directly from the mill. "We sold a lot of 25-pound bags and two, five, and 10-pound bags and stuff like that in a grocery store. So, anything a customer couldn't buy in a store, we'd sell to them directly; we didn't want to be in competition with our customers, the grocery stores, and distributors" (Bill Mitchell, personal communication 2006). One of the mill's main customers was Associated Grocers in Phoenix who would distribute the mill's products to various stores. The mill also had its own fleet of trucks used for transport and distribution to customers like Rosarita, which bought a large amount of flour and pinto beans.

Importantly, Hayden C. Hayden not only gained control of the mill from shareholders and modernized its operation, but he also diversified its activities and products. The Hayden Flour Mills expanded into food brokerage and distributorship in the 1970s because competition from other flour mills made it difficult for the mill to generate profits sufficient for its survival, despite steady sales. At the time, the mill was producing 1,000 cwt of flour a day, but this was not enough to ensure its future (Laetz and Starr 1984). Hayden incorporated a distributive component to the mill's operations, turning it into a center for many other grocery products. It was the state's largest packager of beans (13 different types according to former manager Bill Mitchell), and rice, both packaged under the Arizona Rose label (*Tempo* 1975). It distributed General Mills' bakery flours, Rustco bakery supplies, Karp's bakery supplies, Stokely-Van Camp's institutional canned food line, Family Kitchen candy, and the entire Dunkin Donut chain in Arizona. The Hayden Mills handled Campbell's Soup, nuts, coconut, and shortening. Family Kitchen Pie Crusts were manufactured on site for many years, and bran continued to be sold as animal feed for some time (Bill Mitchell, personal communication 2006). The mill business also brokered Brown Paper products.

At this time the milling component was being downscaled, although it was still processing 15,000 tons of wheat per year, which was enough to produce 20 million pounds of flour, equating to sales of approximately three million dollars (*Arizona Magazine* 1971). Hayden was producing a greater variety of flour products while simultaneously milling and continuing traditional practices like supplying the Navajo with material from flour-laden calico bags. By the early 1980s however, Hayden realized that he could no longer run the mill viably under its current structure. He needed an injection of capital and new ideas, and decided to scale down his involvement in the mill. In 1981, he sold the mill to Bay State Milling Company of Quincy, Massachusetts. The mill kept its name and Hayden stayed on, first as president and member of Bay State's board of directors, and later as public relations director (Laetz and Starr 1984).

In its first few years, Bay State Milling injected 10 million dollars in the Hayden Flour Mills, increasing its capacity to 4,500–5,000 cwt (Laetz and Starr 1984:7). Wheat had to be imported from other states to supplement the wheat bought in Arizona. Sensitive to local perceptions and mindful of the success behind the Hayden flour, which penetrated every type of store throughout Arizona, it hesitated in changing the established brand names of the Hayden Flour Mills. It added specialty brands such as rye, whole wheat, and other special flours, and introduced new staff and a new corporate structure. Later, names such as Arizona Rose and the Family Kitchen, were discarded (Bill Mitchell, personal communication 2006), and with them, went certain elements of the past. Bay State expanded the capacity of the mill and moved from bags to loading freight cars with massive quantities of bread flour directly through pneumatic blowers. The mass production targeted large consumers such as Wholesome Bakery, sidelining small operations in the process (Biddy Hayden, personal communication 2007). The mill continued to operate until 1996, when Bay State decided to place the property on the market. The City of Tempe purchased it and has been in the process of readying it for redevelopment since that time.

CHAPTER 24: AZ U:9:189(ASM)– THE HAYDEN DITCH SITE

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Introduction

The Hayden Ditch (AZ U:9:189[ASM])—also known as the Hayden Canal and the Tempe/Hayden Canal—is the historic water-delivery system that was constructed in 1871 to provide power for the original adobe mill building, and for a short time, the current Mill Building. It consists of a canal alignment that branched off of the Tempe Canal near the southeastern edge of Tempe Butte, where it then followed the southern and western edges of the butte towards the flour mill where it branched into two channels before rejoining north of the Mill Building (see Chapter 20 for site background). Based on ACS' archival research, the Hayden Ditch flowed along the exterior of the eastern side of the adobe mill building originally, but was incorporated into the building during an 1880s remodeling and expansion episode. It was again a semiexposed canal after the current concrete Mill Building was built, except where it dropped into the enclosed penstock (an attached Wooden Warehouse was built over the Hayden Ditch, but the ditch never flowed within the 1918 concrete Mill Building). It appears that the penstock and turbine were always enclosed structures at the terminus of the head race (the head race is the portion of the ditch that carried water directly to the penstock). The site also is comprised of a diversion ditch, which carried "diverted" or excess water around the head race and penstock, and a tail race (also known as the waste race), which marks the water's exit from the base of the penstock north into the San Francisco irrigation canal (AZ U:9:187[ASM]). The diversion ditch reentered the tail race north of the penstock. The various segments and features of the system crossed the entire north-south length of the project area, from an existing headgate near the CP/EV Light Rail construction area (south end of the current project area) to its current terminus at the recently constructed Rio Salado Parkway (north end of the current project area).

The initial alignment proposed for the Hayden Ditch by Charles T. Hayden was to originate at the Salt River in Section 15, east of Mill Avenue, extending southwesterly towards Sections 28 and 29 around Tempe Butte. However, work on the initial alignment was suspended, as was Hayden's land claim in Sections 28 and 29. These decisions may have been influenced by the completion of the competing Kirkland-McKinney Ditch and organization of the Hardy Irrigation Canal Company. However, construction of the ditch resumed ca. 1869/1870 in conjunction with the Kirkland-McKinney Ditch.

The Kirkland-McKinney Ditch, constructed between 1869 and 1870, headed upriver east of the butte and extended to Kirkland's homestead claim in Section 14, Township 1N, Range 4E. The Hardy Irrigation Canal Company, organized in 1870 by Jack W. Swilling, B.W. Hardy, J.O. Sherman, J.L. Mercer, J. Olvany, and J.E. Ingersoll, claimed 20,000 miner's inches, with a heading "... to be taken at a point five miles above the mouth of the Hayden Ditch" (Andersen 1989:4; Benton 1996:4; Maricopa County Canal Books n.d.:Book 1:43; Neeley and Kwiatkowski 1999:180) (a miner's inch, according to www.srpnet.com/water/irrigation/glossary.aspx [accessed September 26, 2007], is a flow rate equal to 11.22 gallons per minute.) In January 1871, Hardy, the elected president, bowed out and the name of the association was changed to the Tempe Canal Company. The new company consisted of Swilling, Winchester Miller, James T. Priest, Nathaniel Sharp, and other new settlers (Hayden 1972:33). Apparently, Swilling suggested an amalgamation of the three ditches into one extensive system (Zarbin 1997:27–29). At an April 1871 meeting of the new company, Swilling moved that "it be voted to allow the use of 2000 inches of water to any person who would build a grist mill" (Lewis 1963:23).

As the main lateral of the Tempe Canal, the Hayden Ditch subsumed the Kirkland-McKinney Ditch and was extended westward toward the Hayden Flour Mill and eastward to establish a head at the Tempe Canal. Completed between 1871 and 1874, the Hayden Ditch originated near the extreme northwest corner of Section 16, Township 1N, Range 5E, extending westerly toward Tempe Butte, closely paralleling the slope of the butte to the Hayden Flour Mill location on the northwest side of the butte in Section 15, Township 1N, Range 4E. Initially emptying into the river north of the mill, Hayden realigned the tail race sometime in the 1870s to connect with the San Francisco Canal that extended west from the north side of the Hayden Flour Mill property (Zarbin 1997). A separate channel (diversion ditch) was excavated to divert water around the mill for continuous flow.

The Hayden Ditch provided water for the original adobe mill until 1917 when the building burned to the ground. For almost six years after construction of the new Mill Building in 1918, the Hayden Ditch continued to provide motive power. In late 1923, the SRVWUA took control of the Tempe Canal System, and an agreement between the SRVWUA and the Tempe Milling Company, which operated the Hayden Flour Mill between 1915 and 1930, transferred proprietary water rights in exchange for hydroelectric power provided by the SRVWUA from Roosevelt Dam (Salt River Valley Water Users' Association 1923). The Hayden Ditch thus became Lateral 5 of the Tempe Canal (Canal 6). Although the mill no longer required water for motive power, water continued to flow behind the mill (east side) in the diversion channel to convey water to the San Francisco Canal and farmers west of Tempe. By 1956 however, the northern portion of the Hayden Ditch extending from 5th Street through the mill property had essentially become a waste ditch for carrying surplus

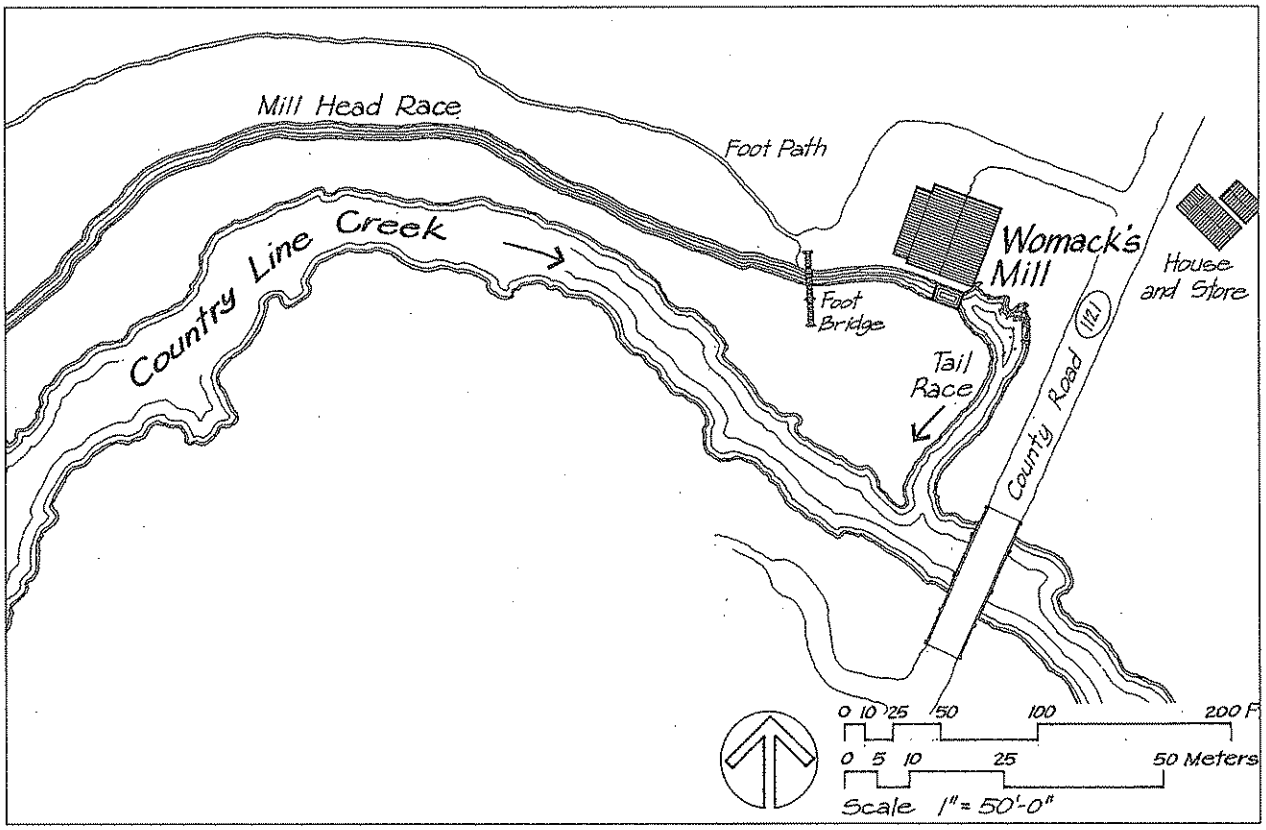

Figure 24.1. Illustration of the 1909 Womack Mill demonstrating typical components of a waterway (Johnson 1979: sheet 1 of 7).

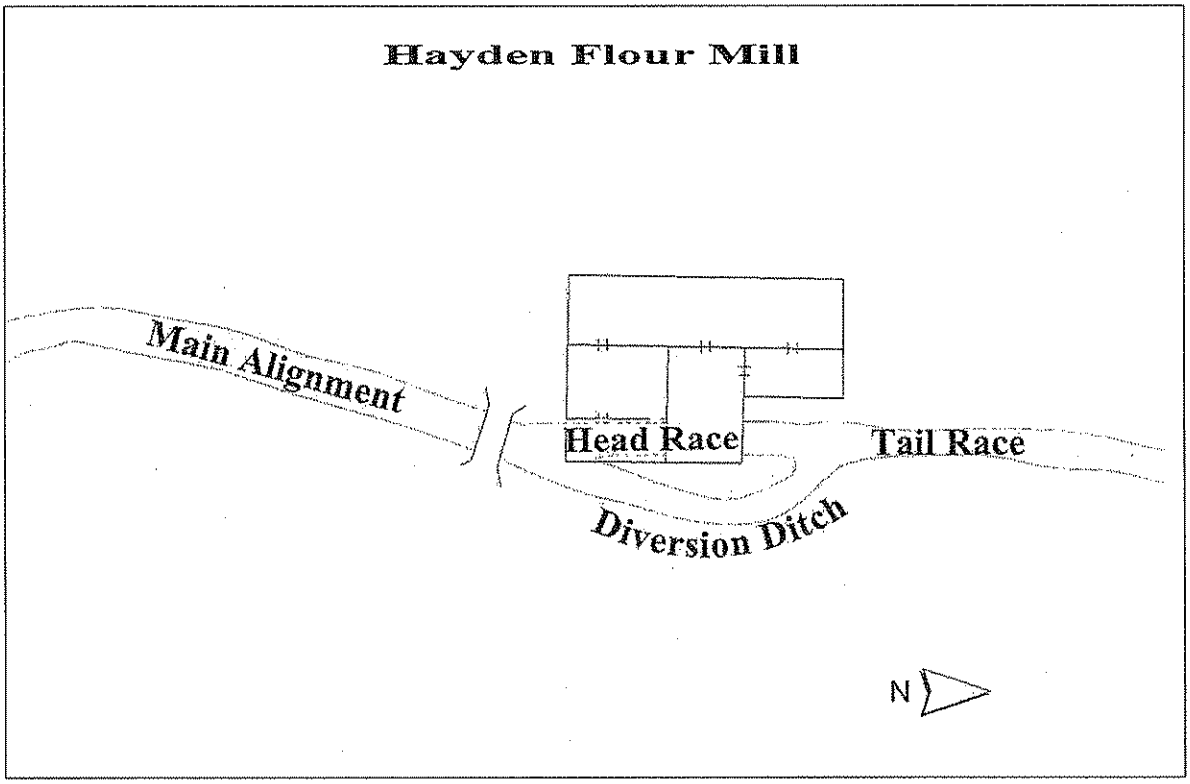

Figure 24.2. Simplified reproduction of the 1901 *Sanborn-Perris Fire Insurance Map* showing components of the Hayden Ditch, AZ U:9:189(ASM), identified within the project area.

Table 24.2. Feature Summary for the Hayden Ditch Site (AZ U:9:189[ASM]), Hayden Flour Mill Project.

Feature Number	Feature Type	Length/ Maximum Diameter (ft/m)	Width/ Minimum Diameter (ft/m)	Depth (ft/m)	Plan Shape	Section Shape	Age Range (A.D.)
1	Culvert, concrete	49.54/15.10	6.14/1.87	4.00/1.22	Rectangular	Linear/ curvilinear	ca. 1945–1956
1.01	Headwall	9.68/2.95	0.52/0.16	4.13/1.26	Linear/curvilinear	Linear/ curvilinear	ca. 1945–1956
3	Check/drop	9.51/2.90	2.36/0.72	1.35/0.41	Rectangular	Linear/ curvilinear	Post-1949
4	Berm	467.52/142.50	11.02/3.36	0.07/0.02	Linear/curvilinear	Linear/ curvilinear	1970s–1980s
5	Diversion ditch, concrete-lined	88.91/27.10	6.63/2.02	3.48/1.06	Rectangular	U-shaped	1945–1956
5.01	Concrete slab, sloped runoff	57.71/17.59	0.36/0.11	3.61/1.10	Linear/curvilinear	U-shaped	1945–1956
6	Head race, concrete-lined	49.64/15.13	9.45/2.88	3.77/1.15	Linear/curvilinear	U-shaped	1918–1924
6.01	Gate, turnout	7.64/2.33	1.44/0.44	4.89/1.49	Linear/curvilinear	Linear/ curvilinear	1918–1924
6.02	Concrete slab, sloped runoff	21.23/6.47	3.61/1.10	0.43/0.13	Rectangular	Linear/ curvilinear	1918–1924
7	Tail race, rock-lined	59.58/18.16	10.30/3.14	11.71/3.57	Rectangular	Indeterminate	1871–1956
7.01	Tail race, rock-lined, east wall fragment	7.87/2.40	n/a	7.25/2.21	Linear/curvilinear	Linear/ curvilinear	1871–1956
7.02	Gate, turnout	4.13/1.26	2.10/0.64	2.85/0.87	Rectangular	U-shaped	1918–1956
8	Retaining wall	8.37/2.55	4.59/1.40	8.53/2.60	Linear/curvilinear	Linear/ curvilinear	No firm dating
8.01	Drainage pipe, undefined	1.64/0.50	1.21/0.37	1.57/0.48	Circular	Linear/ curvilinear	No firm dating
9	Concrete apron	6.56/2.00	2.95/0.90	0.30/0.09	Rectangular	Linear/ curvilinear	1918–1956
10	Concrete slab, undefined	9.84/3.00	6.56/2.00	0.46/0.14	Rectangular	Linear/ curvilinear	1951–1998
11	Hayden Ditch, rock-lined	59.74/18.21	19.42/5.92	0.69/0.21	Linear/curvilinear	U-shaped	1871–1956
11.01	Gate, turnout	6.50/1.98	0.39/0.12	2.56/0.78	Rectangular	U-shaped	1871–1956
11.02	Diversion ditch, junction wall	15.16/4.62	2.33/0.71	2.20/0.67	Linear/curvilinear	Trapezoidal	1871–1956
11.03	Platform	25.52/7.78	9.25/2.82	0.89/0.27	Rectangular	Indeterminate	1871–1956
11.04	Posthole	0.59/0.18	0.56/0.17	4.04/1.23	Square	Indeterminate	1871–1956
12	Wall, undefined	23.79/7.25	1.31/0.40	4.40/1.34	Linear/curvilinear	Linear/ curvilinear	1918–1998
13	Hayden Ditch, earthen	327.72/99.89	21.39/6.52	1.90/0.58	Linear/curvilinear	Basin	1871–1956
14	Wall, support	12.14/3.70	1.31/0.40	3.44/1.05	Rectangular	Indeterminate	1871–1956

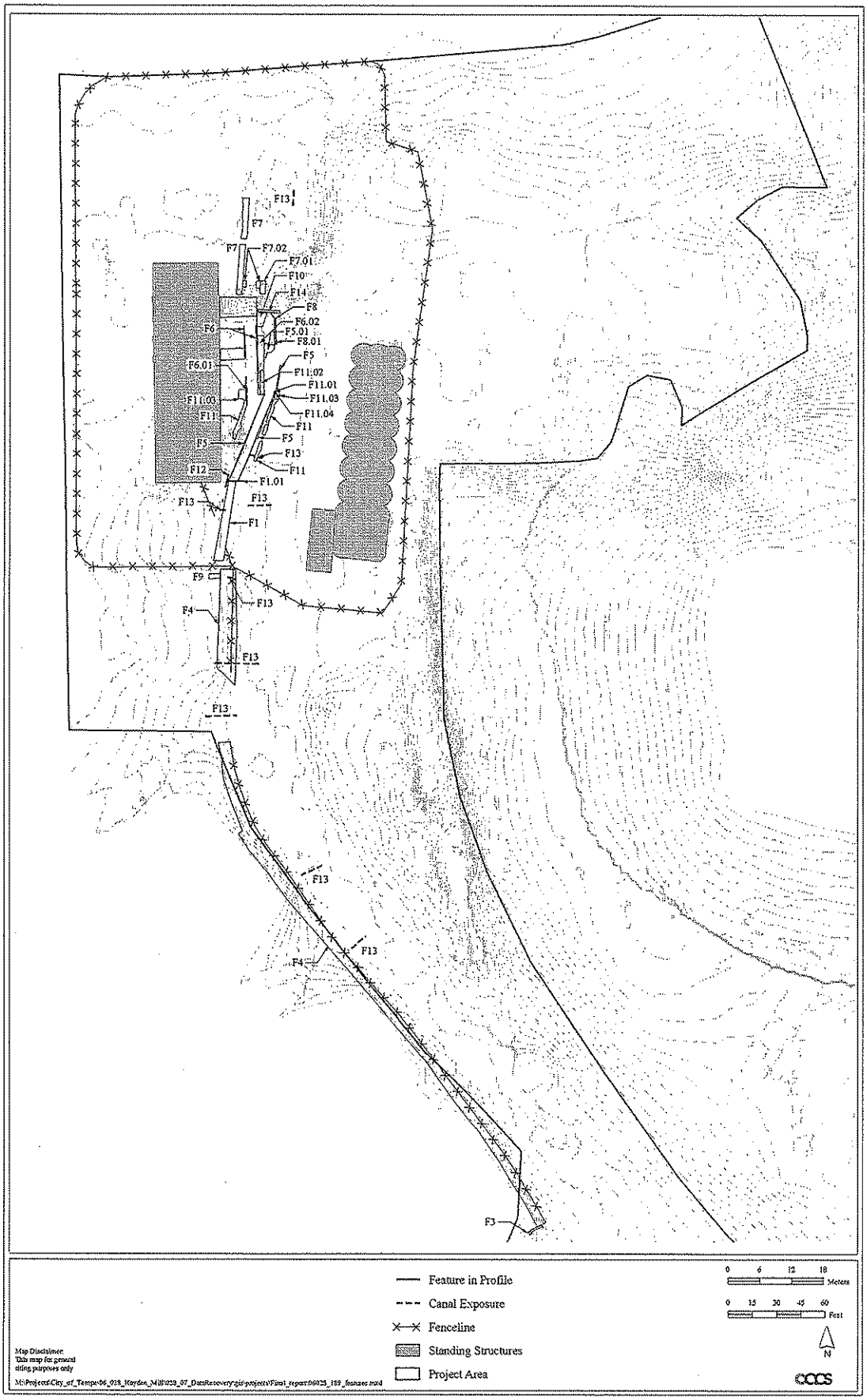

Figure 24.3. Locations of features associated with the Hayden Ditch site (AZ U:9:189[ASM]), Hayden Flour Mill Project.

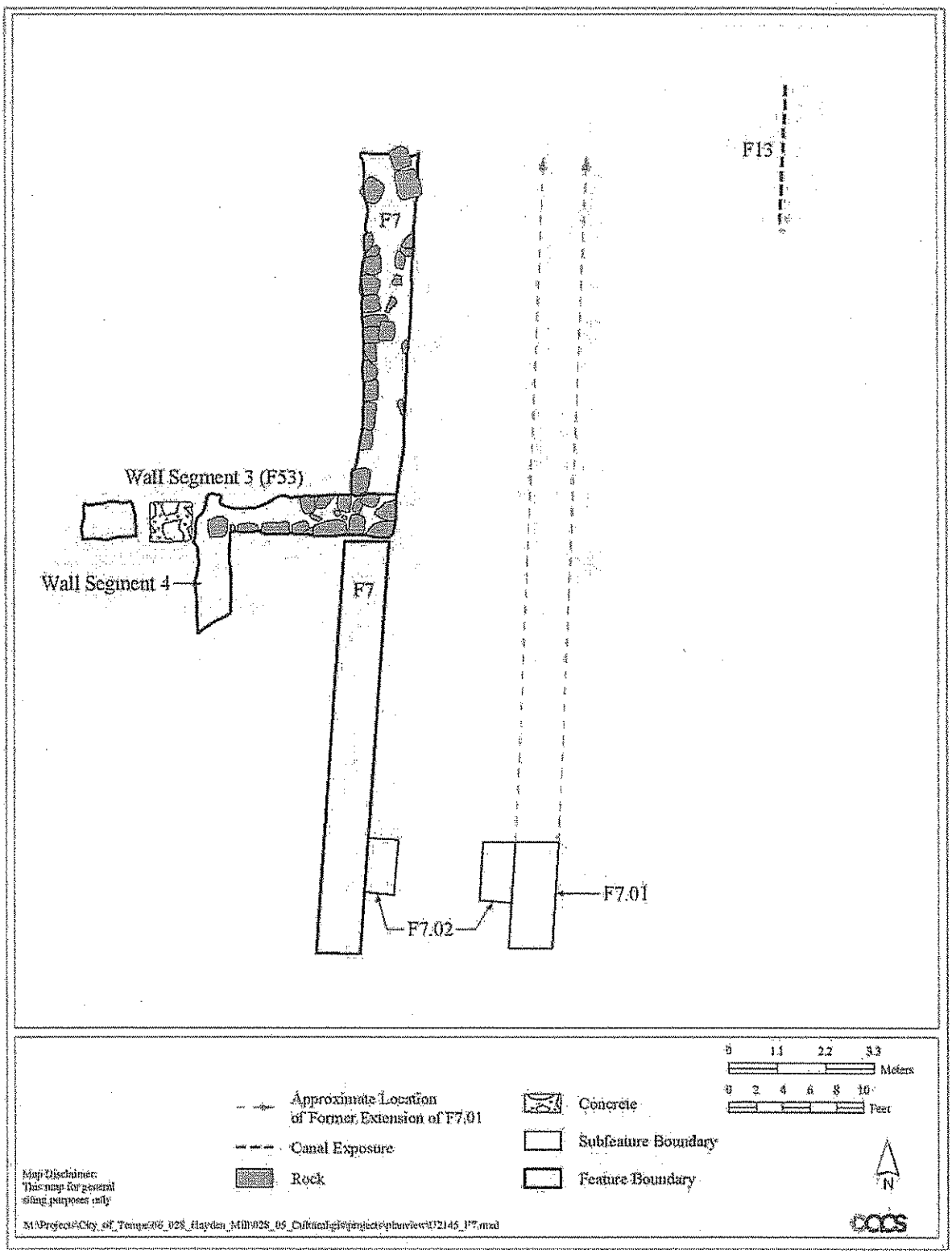

Figure 24.4. Plan view of rock-lined tail race Feature 7 and Subfeatures 7.01 (east wall) and 7.02 (turnout gate), Hayden Ditch site (AZ U:9:189[ASM]).

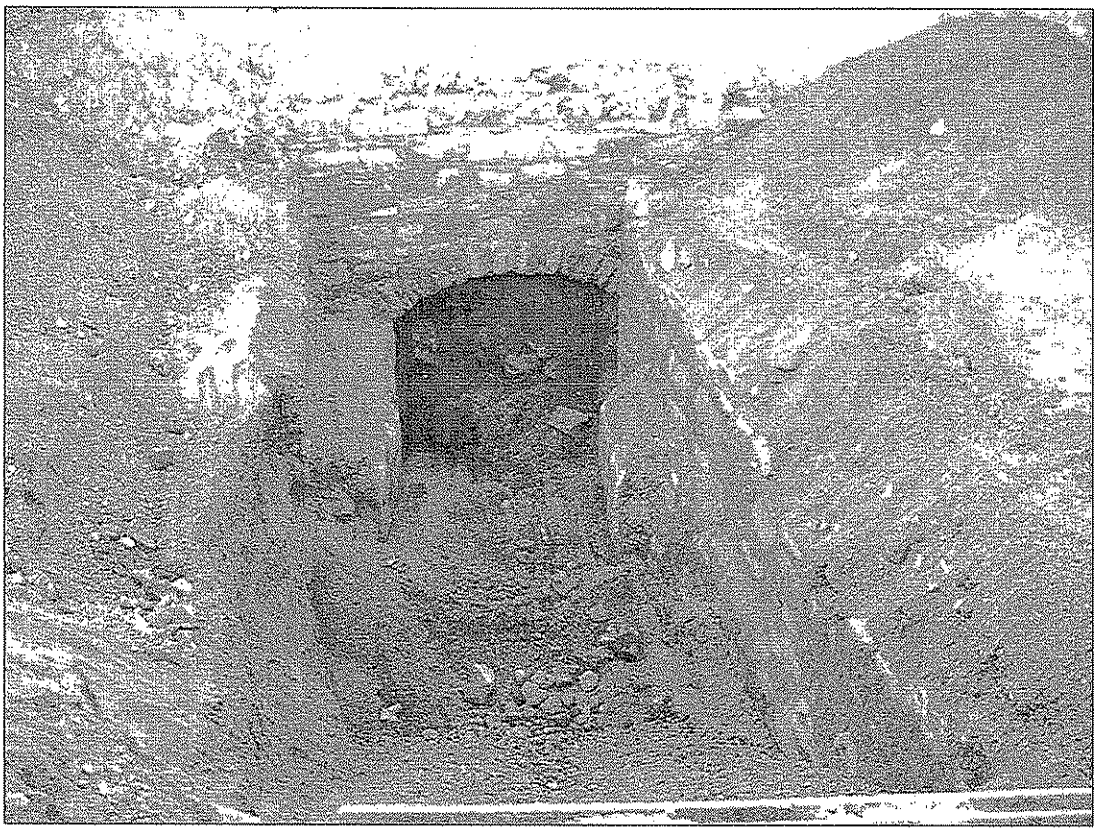

Figure 24.7. Photograph of intact rock-walled western retaining wall Feature 7 (tail race), Hayden Ditch site (AZ U:9:189[ASM]), exposed in Phase 2 backhoe trench U2139, facing south.
Note the turnout gate (Subfeature 7.02) remnants in front of the stone arch (Feature 67; AZ U:9:278[ASM]).

The construction style of the walls of the tail race is described as wet-laid, shaped sandstone and andesite rocks or boulders that utilized limestone mortar (Figure 24.8); the andesite probably came from Tempe Butte, but some of the cobbles could have been obtained from the Salt River bed. A later addition to the west wall connected the tail race and foundation walls of the adobe mill structure during a late 1800s expansion of the building (Figure 24.9). This addition increased the height of the northern half of the west wall by 4.50 ft (1.36 m), but does not seem to have affected the east wall. The southern portion of the west wall abutting the stone arch (Feature 67), for approximately 29.86 ft (9.10 m) north, historically had a layer of cobbles on top (Figure 24.10), of which some were noted to be in situ during excavations. Unfortunately, because we could not uncover the base of the tail race because of safety reasons, and archival photographs of the tail race do not show it empty, we do not know what the base was constructed of, for example, rock, concrete, or packed earth/adobe.

Fill Sediments of the Tail Race

Seven intact fill sediment levels of rock-lined tail race Feature 7 were recorded and detailed in the south wall of stripped area U2139, profile U2149, and in the east wall of stripped area U2139, profile U2141 (Figures 24.11 and 24.12; Table 24.3). The active tail race sediments were truncated and overlain by up to 2.95 ft (0.90 m) of historic-to-modern construction fill debris, suggesting that there may have been several additional sediment deposits prior to the construction fill activity. Active sediments ranged from finely laminated silts and sands, very gravelly silt loams containing copious amounts of historic debris, to dark brown heavy clay. The variety of these active sediment deposits reflect periods of flow diversity suggesting that not only was the tail race a receptacle for wastewater from the mill but may have also received water from the diversion channel that supplied a constant, controlled, and regulated source of water to the San Francisco Canal and beyond.

Artifacts and Other Materials

In total, 90 artifacts and samples were recovered from investigative units and profile exposures within Feature 7 (U2141, U2148, and U2149). All of the artifacts (n = 72) date to the Historic period; over half of the assemblage consisted of general Beverage items and Indeterminate items. Other contexts observed in lesser frequencies were Alcohol, followed by Food, Hardware, and Industrial items. If all Beverage items were combined, they would comprise over 40 percent of the assemblage.

Figure 24.9. Photograph of tail race Feature 7 ([a] western retaining wall extension), Hayden Ditch site (AZ U:9:189[ASM]), and a later east-west wall addition ([b] Feature 53, Wall Segment 3; AZ U:9:278[ASM]) that was part of the foundation of the original adobe mill, facing west.

Note that it abuts an earlier wall segment of the original mill ([c] Wall Segment 1) in the background.

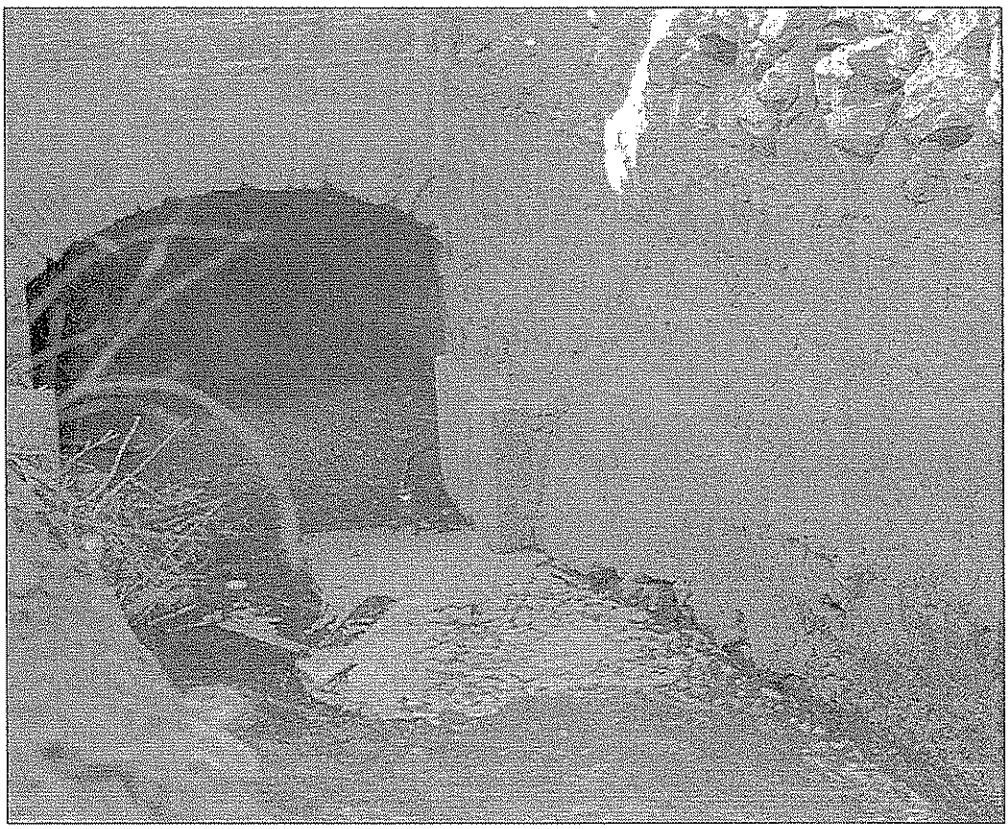

Figure 24.10. Historic photograph (ca. 1910s) of water flowing northward from the stone arch (Feature 67, AZ U:9:278[ASM]) within the rock-lined tail race (Feature 7), Hayden Ditch site (AZ U:9:189[ASM]), facing southwest.

Photograph courtesy of ASU Hayden Library, Arizona Collection (CP-CTH-122). Note turnout gate Subfeature 7.02 on the west wall; compare to Figure 24.7.

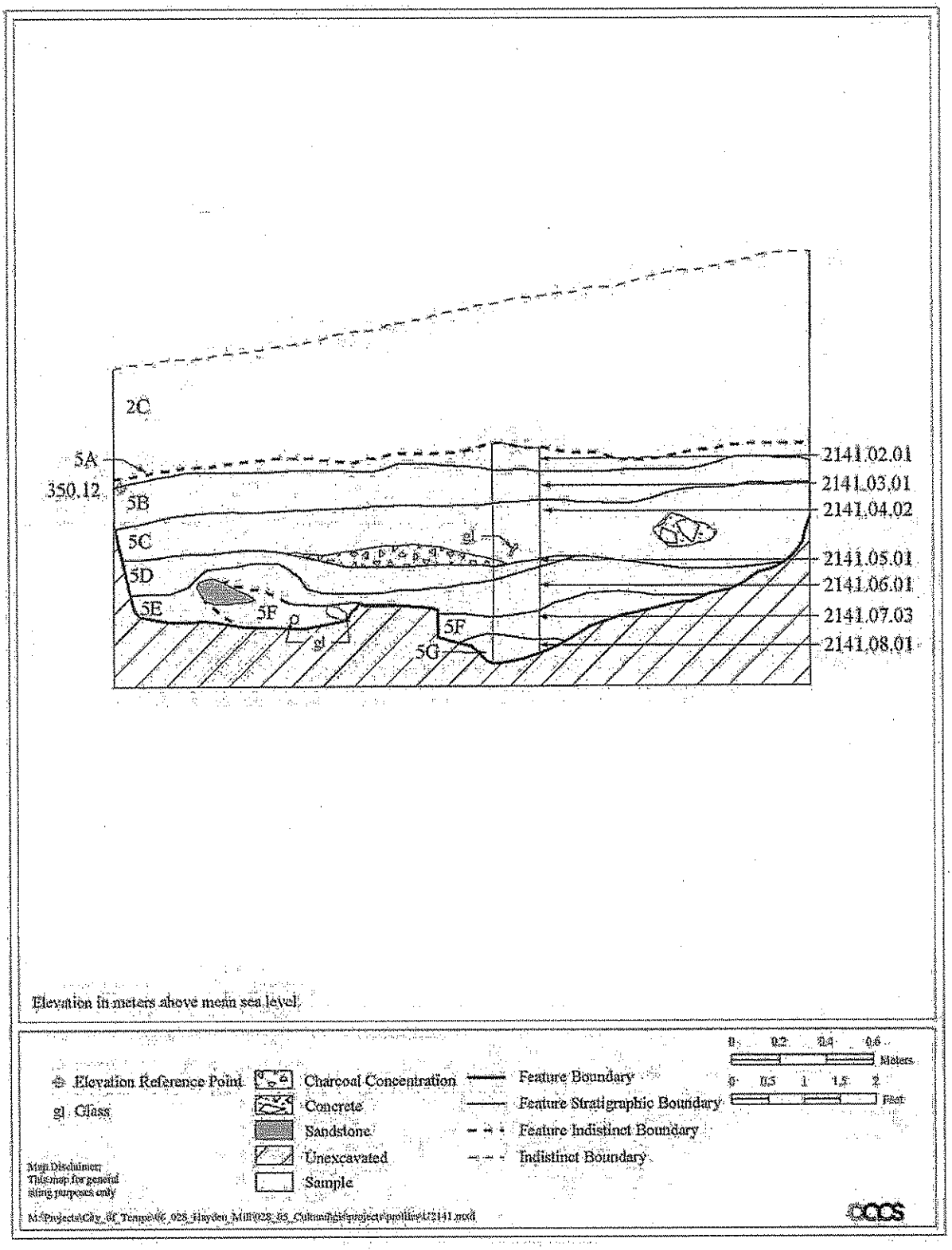

Figure 24.12. Profile U2141 of stripping area U2139 in tail race Feature 7, Hayden Ditch site (AZ U:9:189[ASM]), facing east.

This view shows a column of soil samples taken for analysis.

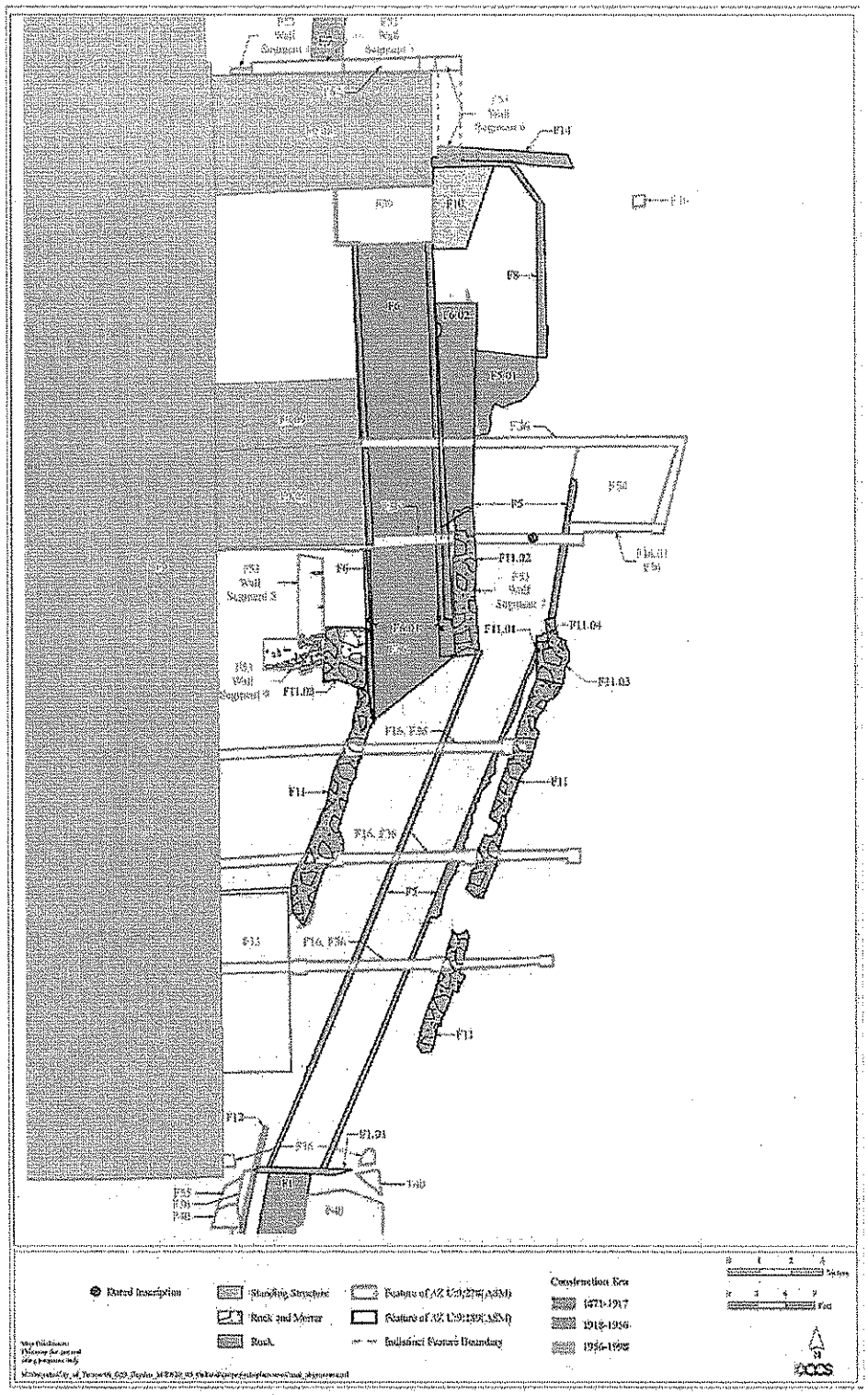

Figure 24.13. Plan view of rock-walled Hayden Ditch Feature 11, concrete-lined diversion ditch Feature 5, and concrete-lined head race Feature 6 (AZ U:9:189[ASM]) along the eastern side of the current Mill Building.

Figure 24.14. View of Feature 11 taken from the roof of the current Mill Building, facing northeast.
The southernmost walls of Feature 5 and Subfeature 5.01 (concrete-lined diversion ditch and wall) and Feature 6 (concrete-lined head race) are also shown.

The walls of the feature are characterized as wet-laid sandstone and andesite cobbles set in copious amounts of mortar, similar to the adobe mill building (Feature 53) and the Calaboose (Feature 27) foundations of the same time period (see Chapter 21). The alignment was slightly over 59.06 ft (18.00 m) in length, with an average width of 19.42 ft (5.92 m) (it became wider near the junction wall Subfeature 11.02). The walls had an average width of 2.56 ft (0.78 m), with some sections as wide as 3.61 ft (1.10 m) and as narrow as 1.77 ft (0.54 m) (Figures 24.16 and 24.17). It is currently unclear how high the original wall would have been because of obvious postabandonment damage and modifications; the remaining sections average 0.69 ft (0.21 m) in height. Investigation at various locations along the length of Feature 11 revealed that the walls were constructed on bedrock and were apparently not very high compared to tail race Feature 7 (Figure 24.18). The base of the ditch appeared to be earthen and bedrock. Although only junction wall Subfeature 11.02 and the northernmost terminus of the east wall remain to represent the original diversion ditch section, an interior width of 11.81 ft (3.60 m) could be estimated for the pre-1917 diversion channel based on the length of retaining wall Feature 14 from Feature 53, Wall Segment 6 (AZ U:9:278[ASM]) to its eastern end. Historic photographs indicate that the rock-lined diversion ditch had a much steeper drop in elevation alongside the building compared to head race Feature 6, which perhaps explains the presence of the three sloped concrete pads (Feature 10, Subfeatures 5.01 and 6.02) alongside the eastern portion of Feature 6 (see Figures 24.4 and 24.15).

Small excavation units placed between the concrete walls of diversion ditch Feature 5 and the rock walls of Feature 11 identified probable original channel deposits, described as brown, silty clay with light granular inclusions (Figure 24.18). However, as the profile indicates, much of the original material associated with Feature 11 would have been removed by construction of the stratigraphically deeper Feature 5.

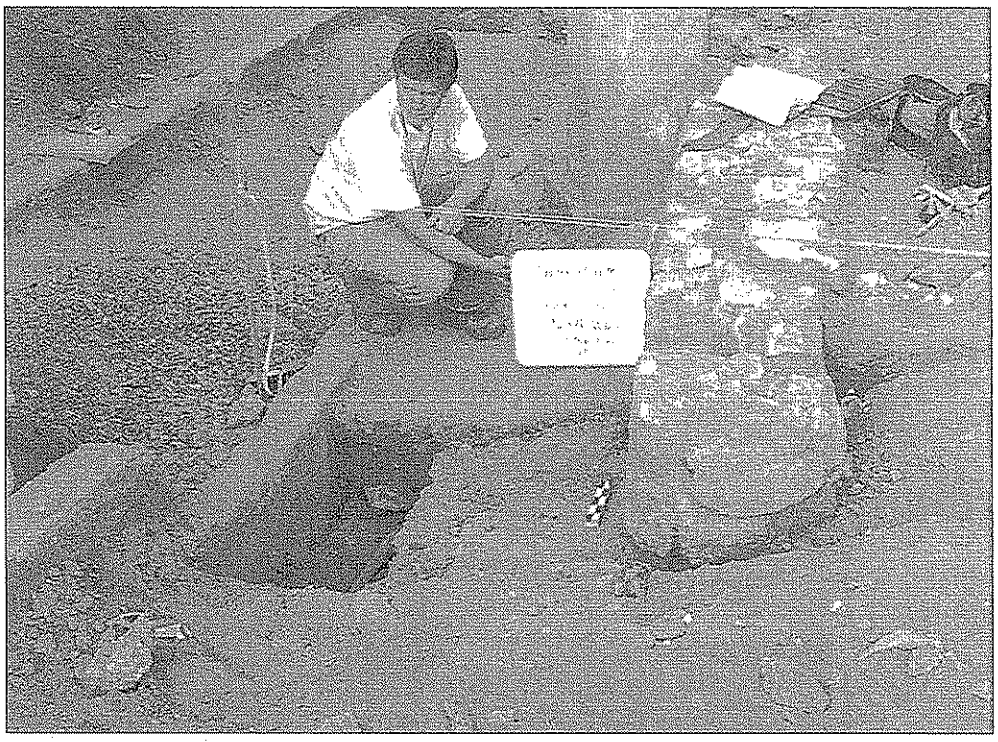

Figure 24.17. Photograph of profile U2130 and hand-excavated unit U2128 located between rock-lined main canal Feature 11 and concrete-lined diversion ditch Feature 5, Hayden Ditch site (AZ U:9:189[ASM]), facing south.
The shallow bedrock is evident in the photograph, as is a builder's trench excavated on the exterior wall of Feature 5. Eric Carlson is holding the mug board.

Associations

Four subfeatures were associated with Feature 11, all of which were located at the junction of the concrete-lined head race (Feature 6) and the concrete-lined diversion ditch (Feature 5) (Figure 24.19).

Subfeature 11.01 was the gate groove through which the gate or turnout was raised and lowered (Figure 24.20). The groove was located on the eastern wall of Subfeature 11.03, a post-1917 concrete addition (see below). The corresponding western gate groove would have been located on Subfeature 11.02, a rock-walled junction, but was not identified—later reconstruction of the canal system likely obliterated or covered it. Similar gate grooves were also identified in concrete-lined head race Feature 6 and tail race Feature 7.

Subfeature 11.02 was characterized as a junction dividing wall built of rock similar in construction to Feature 11, and was strategically located between the head race and the diversion ditch (see Figures 24.13 and 24.21). As Figure 24.21 shows, reconstruction of the head race between 1917 and 1918 also impacted this wall. The reinforced-concrete head-race wall was installed over the west face of Subfeature 11.02, as was a reinforced section on the south face. As noted previously, Subfeature 11.02 extended northward to wall support Feature 14. The width of the wall averaged 2.30 ft (0.70 m), corresponding to the average width of Feature 11's other walls; this measurement does not include the concrete covering addition for Feature 6. This junction wall also functioned as a foundation for an east room addition to the original mill structure that covered the head race (see Figure 24.15). As such, it would have needed to be of sufficient strength to support the building above it while diverting a near-constant flow of water around it; the overall thickness of the rock walls compared to the concrete walls of Features 5 and 6 would have sufficiently supported the adobe mill walls.

Subfeature 11.03 consisted of two rock platforms located on either side of the main alignment walls that may have functioned to support a small access bridge over the wide alignment (see Figure 24.13). The western platform was located adjacent to head race Feature 6. It is substantially larger than its eastern counterpart and has been raised with the application of a concrete slab (Subfeature 6.03). The eastern platform is much smaller and appears to have been incorporated into the canal wall of Feature 11. A concrete face was added to the east platform between 1917 and 1918, from which Subfeature 11.01 was installed. Historic photographs of the adobe building with this extension (e.g., Figure 24.15) show a doorway above the enclosed head race at the southeast corner of the building; therefore, a bridge or platform at this location would have been necessary.

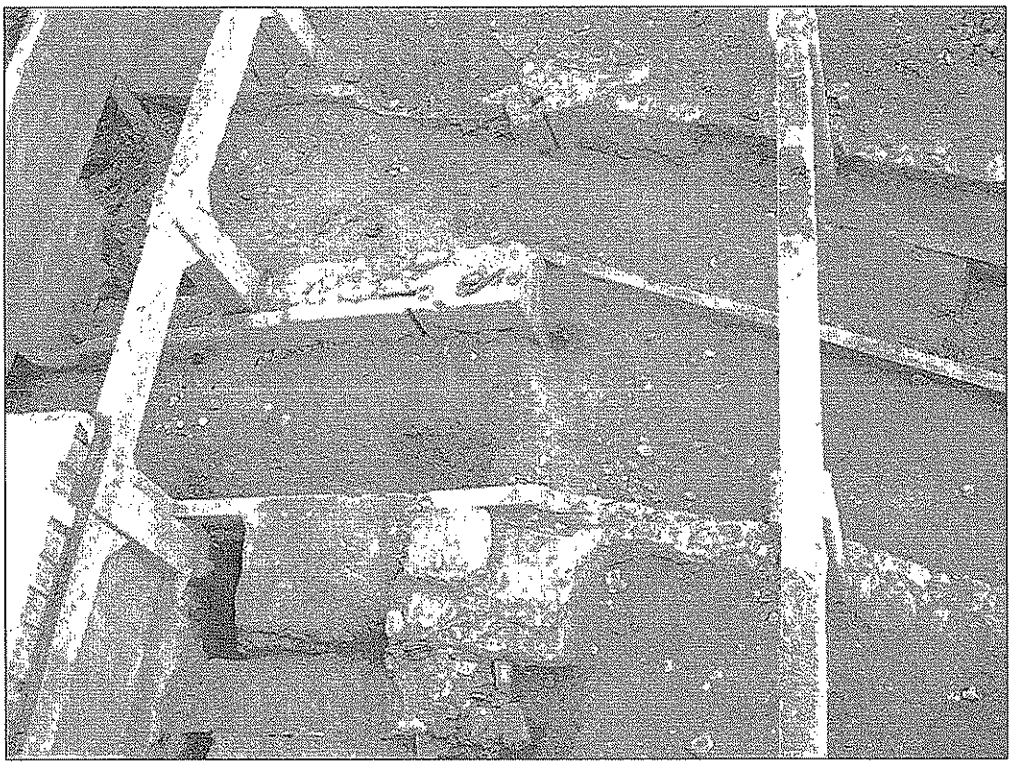

Figure 24.19. Photograph from the top of the current Mill Building of the head race (Feature 6) and diversion ditch (Feature 5) junction with Subfeatures 11.01–11.04 and rock-lined walls of Feature 11, Hayden Ditch site (AZ U:9:189[ASM]), facing east.

Subfeature 11.04 was a square-shaped posthole located in the eastern platform of Subfeature 11.03 (Figures 24.22 and 24.23). The small size of this posthole prevented complete excavation to identify its depth, but was at least 4.04 ft (1.23 m) deep. Though subjective, it may have supported a wooden post of the pre-1917 mill gate; we currently have no historical maps or photographs that show the gates or suggest a function of the posthole.

Artifacts and Other Materials

Three small artifacts were collected from within posthole Subfeature 11.04, including a very small, clear-colored bottle fragment and two fragments of a light bulb; none were temporally diagnostic. An additional 95 artifacts were collected from the excavation unit U2128 placed between concrete-lined diversion ditch Feature 5 and Feature 11. Items recovered include historic ceramic sherds (n = 2), glass shards (n = 38), metal (n = 50), historic other (n = 3), faunal bone (n = 1), shell (n = 1), and prehistoric sherds (n = 2). No samples were collected. Although most of these 95 artifacts were collected around the rock wall, given the general disturbance of the fill, they cannot be confidently associated with Feature 11's use.

Feature Interpretation

The rock-walled main alignment of Feature 11 originated just south of the current Mill Building and continued north as a component of the diversion ditch before terminating at wall support Feature 14. It functioned to channel water from the earthen portion of the ditch through the mill complex to power the machinery and to divert excess water for irrigation. The rock walls would have provided additional stability against water erosion while also supporting various structures over time above the canal; therefore, it is not surprising to find that this section of the ditch was prepared from an early date, perhaps as early as the original construction of the adobe mill or shortly thereafter. We do not have archival data to suggest why a portion of the rock-lined ditch was later covered by the building (head race Feature 6 and junction wall Subfeature 11.01), but this may have occurred simply as a way to expand the building and make use of valuable space. In fact, because the mill expansion would have needed good wall support around flowing water, the ditch may have been rock lined in its entirety at this point (ca. early 1880s). The walls of Feature 11 were well preserved, although broken into sections by later construction, and may have been used through at least the 1940s by the SRVWUA. At this point, the diversion ditch was significantly realigned and narrowed with construction of Feature 5, the concrete-lined diversion ditch.

Figure 24.21. Photograph of Subfeature 11.02, a rock-lined junction dividing wall, Hayden Ditch site (AZ U:9:189[ASM]), facing northwest.

Feature 13–Earthen Hayden Ditch

This feature represents the earthen main alignment of the Hayden Ditch that approached both the adobe and current Mill buildings before entering Feature 11, the rock-walled channel that diverted water into the head race and diversion ditch, and a small exposure at the north end of the project area where the later diversion ditch (Feature 5) rejoined the tail race (Feature 7) (see Figure 24.3). The feature is present in the southern portion of the project area, from the CP/EV Light Rail project area at check/drop Feature 3 to concrete culvert Feature 1 at the southeastern corner of the Mill Building. The single exposure to the north of the current Mill Building was in backhoe trench U1059. A number of trench and excavation units in the southern half of the project area contained remnants of the ditch (U1024, U1026, U1043, U1090, U1091, U1103, U1117, U1156, and U2128), but unfortunately, historic and modern disturbances obliterated all but the easternmost and upper levels of the bell-to-bowl-shaped ditch. The primary source of disturbance was a gunnite berm (Feature 4) built along the slope between the P&E Railroad tracks and a paved parking lot along Mill Avenue. This feature appears to have obliterated all traces of Feature 13, except where noted above (Figure 24.24). In fact, until the current project, common opinion held that the gunnite berm was actually the Hayden Ditch, but excavations for the current project revealed that what was left of the earthen Hayden Ditch was below the wall, and that the wall was built in the 1970s or later.

The upper levels of Feature 13 were severely truncated, making the stratum of origin indeterminate. The feature was excavated into Stratum 4A (bedrock). Most of the remaining sediments of the earthen alignment recorded across the project area were overbank and cleanout deposits associated with the upper portions of the eastern edge of the ditch; they also suggest that the canal periodically topped its banks with fine sediments after low-energy water events. The profile illustrated in Figure 24.25 was taken from backhoe trench U1026. Profile and stratigraphic delineations were drawn based on where the ditch appeared in the trench. The matrix in the lowest level of the feature consisted of a 1.31-ft- (0.40-m-) thick lens of dark brown, moderately compact clay to silty clay reflecting low-energy flow through the first stages of filling. Above this level was a gray-brown, moderately compact, silt loam reflecting a slight increase in flow. A fencepost was excavated through this deposit and modern gravels were mixed within the canal sediments. The uppermost deposit consisted of brown, moderately compact, silty loam. Overall, this upper portion of Feature 13 reflected slow flow or regulated conditions. Soil samples were taken from all sediment levels.

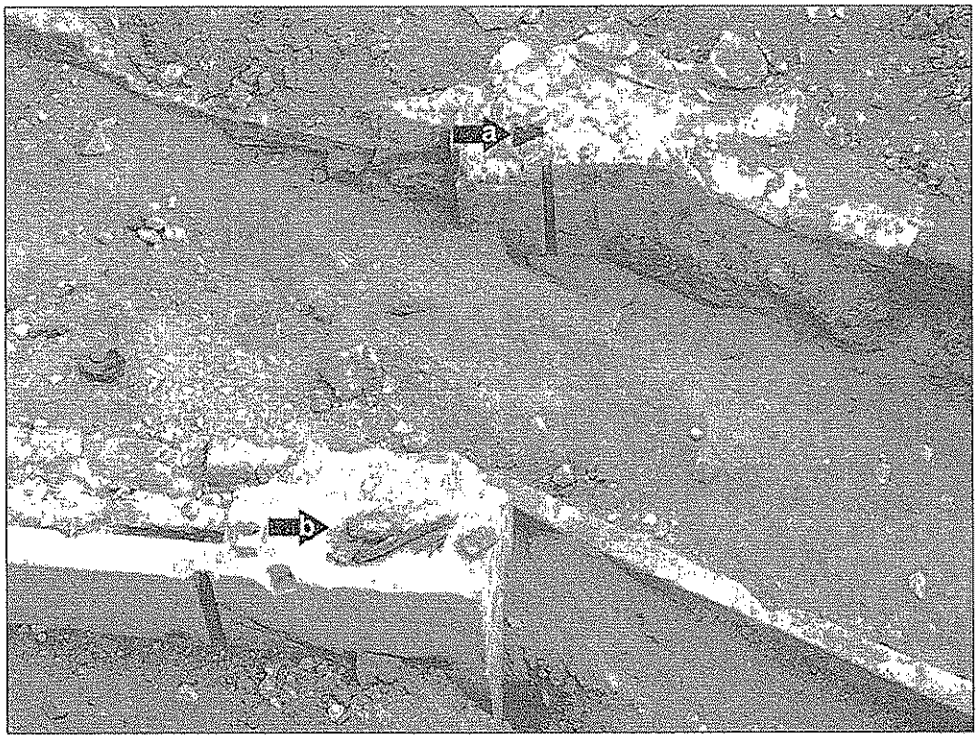

Figure 24.23. Photograph of posthole Subfeature 11.04 ([a] upper center) east of diversion ditch junction wall Subfeature 11.02 (b), Hayden Ditch site (AZ U:9:189[ASM]), facing east.

In the northern part of the project area, the single exposure of an earthen portion of the Hayden Ditch was identified in the east wall profile of north-south-oriented backhoe trench U1059. Its location clearly indicates that it marks the point where the water flowing from concrete-lined diversion ditch Feature 5 became an earthen alignment prior to rejoining tail race Feature 7. The slumping of canal sediments within dump/midden deposits (Feature 23) laid within the abandoned tail race here and to the south toward the current Mill Building demonstrates the continuance of water and sediments reentering the main channel after the tail race was abandoned.

Feature 23, the large historic dump/midden was located north of the current Mill Building. This loose and unconsolidated fill material was probably brought in to fill portions of the abandoned tail race (Feature 7) up to the grade for the construction of the concrete pads built in the 1940s. As the earthen portion of the Hayden Ditch continued to dump heavy and wet laminated silt and clay sediments into the tail race, portions of the laminated stratigraphy slumped down into the loose fill of Feature 23.

Artifacts and Other Materials

In total, 541 artifacts and samples were collected from four units and one profile exposure of Feature 13. In total, 316 artifacts, representing 91 items, were collected from four hand-excavated units in the southern portion of the project area (U1043, U1090, U1117, and U1156). Indeterminate items, including unidentified bottle, jar, and metal fragments, comprised almost half of the assemblage; Hardware items, consisting primarily of nails and a rivet were also well represented. Other contexts represented in the assemblage in lesser frequencies included Beverage, as well as Clothing and Kitchen. In addition, 139 pieces of faunal bone were collected from a profile exposure (U1079) of the ditch and from the four hand-excavated units, along with three prehistoric sherds, three pieces of chipped stone, one piece of marine shell, and 76 pieces of natural (non-marine) shell. Three samples were collected from U1079: one flotation sample, one pollen sample, and one split sample.

Very few items were collected that contained significant diagnostic information. A single aqua-colored bottle fragment was the only artifact that could be confirmed as manufactured prior to the 1920s. At least two bottle fragments were characterized as Coca-Cola bottles with a wide range postdating 1915. Several soda bottle fragments with applied color labels and manufacturer marks, however, indicate a date from the 1940s and 1950s. As the artifacts suggest, the earthen ditch collected a variety of historic artifacts throughout its use life, in addition to the prehistoric artifacts which were either introduced via sheetwash erosion from upslope on Tempe Butte or from erosion of its dirt walls that may have contained random artifacts.

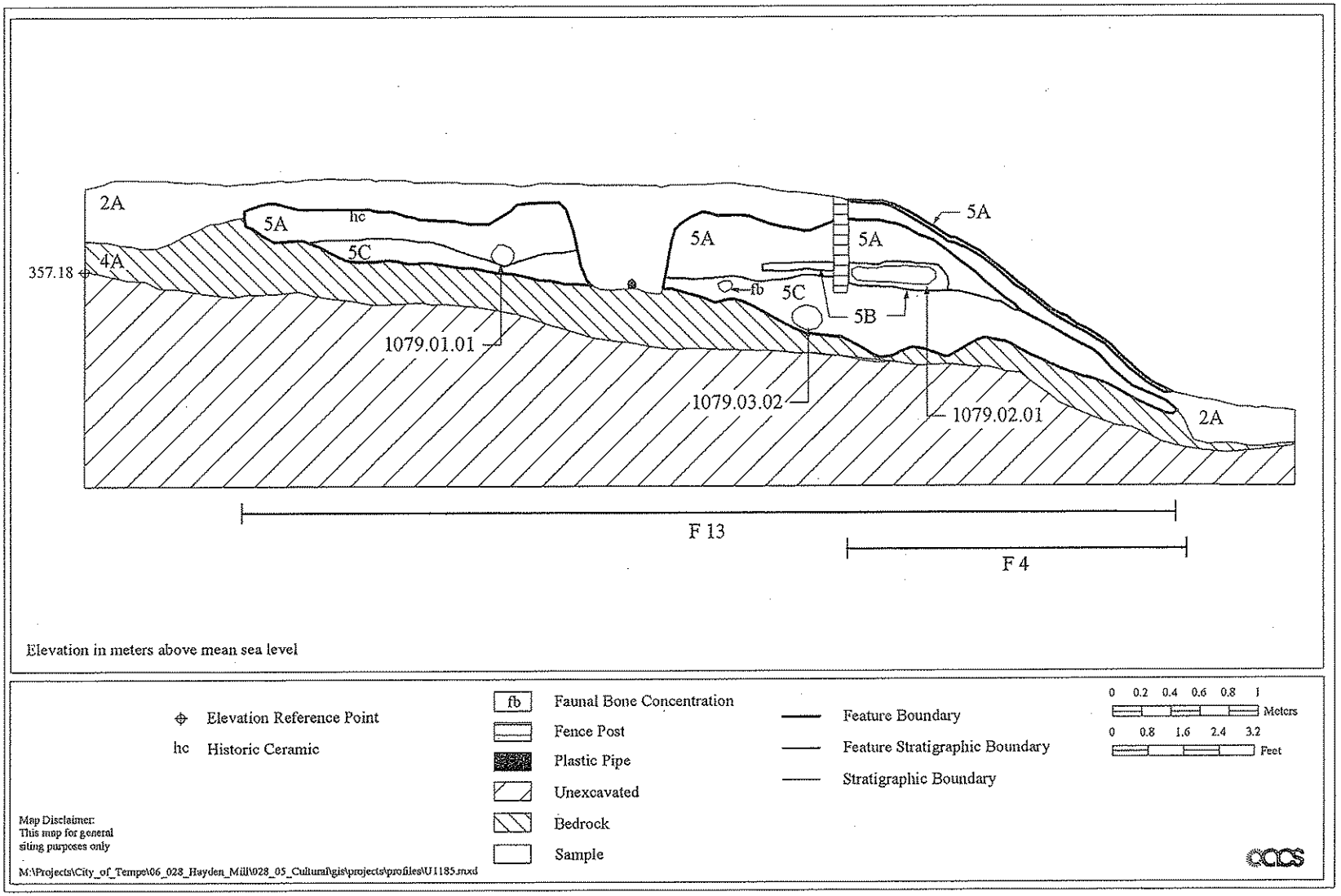

Figure 24.25. Profile U1185 of Feature 13, the earthen portion of the Hayden Ditch, and berm Feature 4, in backhoe trench U1026, Hayden Ditch site (AZ U:9:189[ASM]), facing south.

Feature Interpretation

The earthen portions of the Hayden Ditch represent its entrance and exit points along the water-control system. Because there was no reason to upgrade the ditch as it rounded the southern edge of Tempe Butte, an earthen alignment appears to have been sufficient to carry water to the mill. However, once the ditch neared the mill, it needed to be better controlled, which resulted in rock-lined Hayden Ditch Feature 11. However, once past the working elements of the mill, the diverted and wastewater merged into an earthen alignment once again before turning west and merging into the earthen San Francisco Canal. The southern end shows periodic overbank flooding and cleanout maintenance, which we suspect likely damaged the canal walls, which required additional maintenance; however, because so little of the southern alignment remained, little more could be gained from the archaeological remains. The single northern exposure does indicate, however, that water was still being funneled through the diversion ditch as it rejoined the tail race (Feature 7); the ditch water clearly interfingered with the loose historic fill of the largely abandoned tail race, causing slumping of the stratigraphy.

Feature 14–Rock Support Wall

Feature 14 was a rock support wall extending perpendicular to the concrete-lined diversion ditch (Feature 5) at its presumed "waterfall" location (Figure 24.27), and is situated on the east side of the current Mill Building adjacent to the penstock (Feature 39) and the northern Cribbed Wood Structure (Subfeature 9.08) of the Hayden Flour Mill Complex Site. The support wall feature was encountered beneath a later concrete retaining wall (Feature 8, AZ U:9:278[ASM]) while stripping away modern fill (U2013) on the east side of the Mill Building (Figure 24.28). Because the deep modern fill was unstable, the easternmost length of Feature 14's wall could not be fully exposed; however, the fragmentary nature of what could be seen of this section indicates that it was removed or significantly damaged sometime after 1956. The western half beneath Feature 8 was in good condition.

The wall construction was similar to that of Features 7 and 11 (tail race and main ditch alignment)—wet-laid sandstone and andesite-rock construction using limestone mortar. The edge of this feature adjacent to the current Mill Building had a clean, straight alignment (Figure 24.29), indicating this may have represented a junction with the north-south-trending original mill foundation (Feature 53, Wall Segment 6, AZ U:9:278[ASM]). Comparison with the earlier adobe flour mill foundations (Feature 53) north and south of this feature suggests they are related; therefore, Feature 14 was likely the diversion ditch waterfall area in operation prior to 1917. Though speculative, it would appear that the eastern extension would have aligned with the rock wall of Feature 11.

Artifacts and Other Materials

No artifacts or samples were collected from Feature 14.

Feature Interpretation

The orientation of this feature and its location adjacent to the original mill and at the edge of a sharp elevation drop suggests it may have functioned historically to add structural support to both the diversion ditch and original adobe mill building from highly turbulent water falling to the tail race below (see Figure 24.6). This feature could represent the original "waterfall" of the diversion ditch.

The upper portion of Feature 14 has been truncated by the construction of a concrete retaining wall (Feature 8). This retaining wall, which was "wrapped" around Feature 14, was subsequently filled in and leveled with fill. This presumably occurred sometime after 1956 when the Hayden Ditch was abandoned. The stratigraphically higher Feature 8 and the copious amount of fill in the area add credence to the idea that the original diversion ditch sloped down toward the waterfall at a steeper angle than the head race (Feature 6) as it headed toward the penstock (Feature 38).

Hayden Ditch Features: 1918–1956

As several of the archival and recent photographs presented thus far indicate, interpreting the construction and use of features within this time period has presented a challenge because some features are obstructed from view in the photographs, and later construction has partially hidden or altered earlier features. Initially, it was assumed that most, if not all, construction of Hayden Ditch features in this time period occurred between 1918 and ca. 1925, with abandonment of the ditch through the mill property occurring in late 1956. However, analysis of photographs taken between 1930 and the 1980s provided data that has altered our interpretation of the construction and use of the Hayden Ditch after 1918. These data are presented below.

Feature 1–Concrete Culvert

This concrete culvert feature was first identified in Phase 1 testing in backhoe trench U1091 in the driveway that passes along the southern edge of the current Mill Building. Its length was later fully exposed in Phase 2 data recovery in stripping area U2013, which was situated solely to fully expose Feature 1 from the current Mill Building south to the permanent fence. The culvert had an exterior width of 6.14 ft (1.87 m), with a total length of 49.54 ft (15.10 m); the overall height was 4.00 ft (1.22 m) while the interior opening was 2.10 ft (0.64 m). The culvert was placed within the former main channel of the Hayden Ditch to allow vehicle access over it between the east and west sides of the property along the south side of the building (see Figures 24.3 and 24.30).

Figure 24.28. Photograph of rock support wall Feature 14, Hayden Ditch site (AZ U:9:189[ASM]), facing southwest.

Note that Feature 8 (concrete retaining wall) is superimposed over the rock wall.

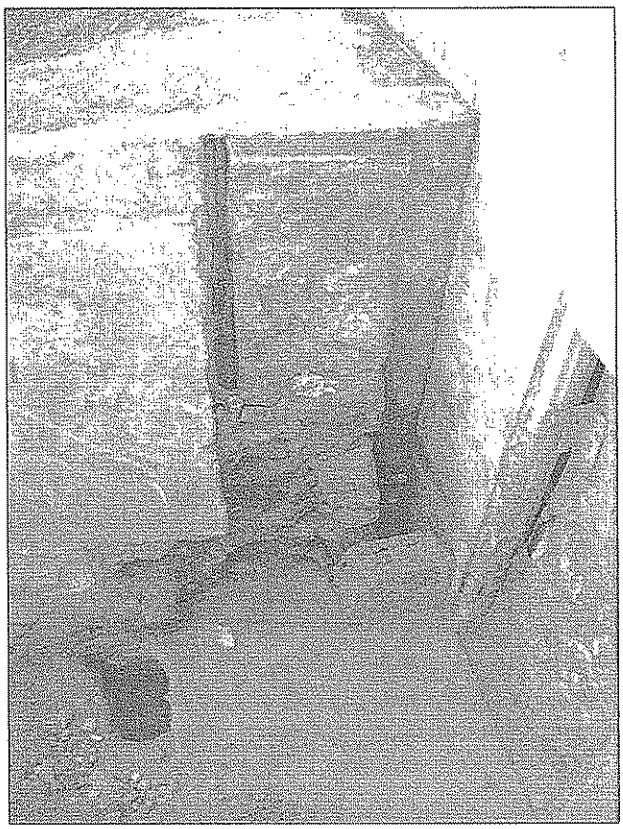

Figure 24.29. Photograph of rock support wall Feature 14 showing what may be a junction with the original adobe flour mill Feature 53 (Wall Segment 6, AZ U:9:278[ASM]), facing south.

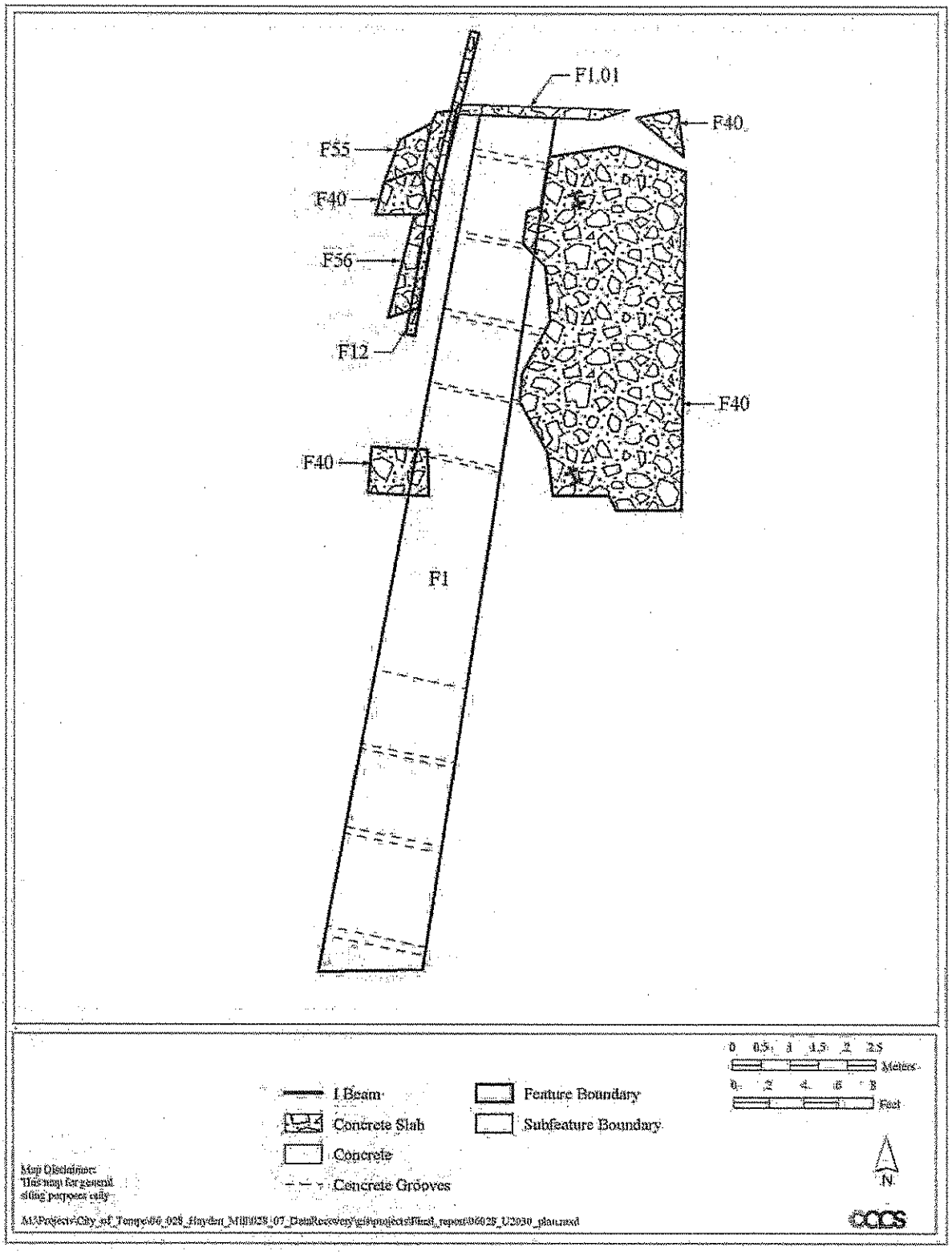

Figure 24.30. Plan view of concrete culvert Feature 1 and headwall Feature 1.01, Hayden Ditch Site (AZ U:9:189[ASM]).

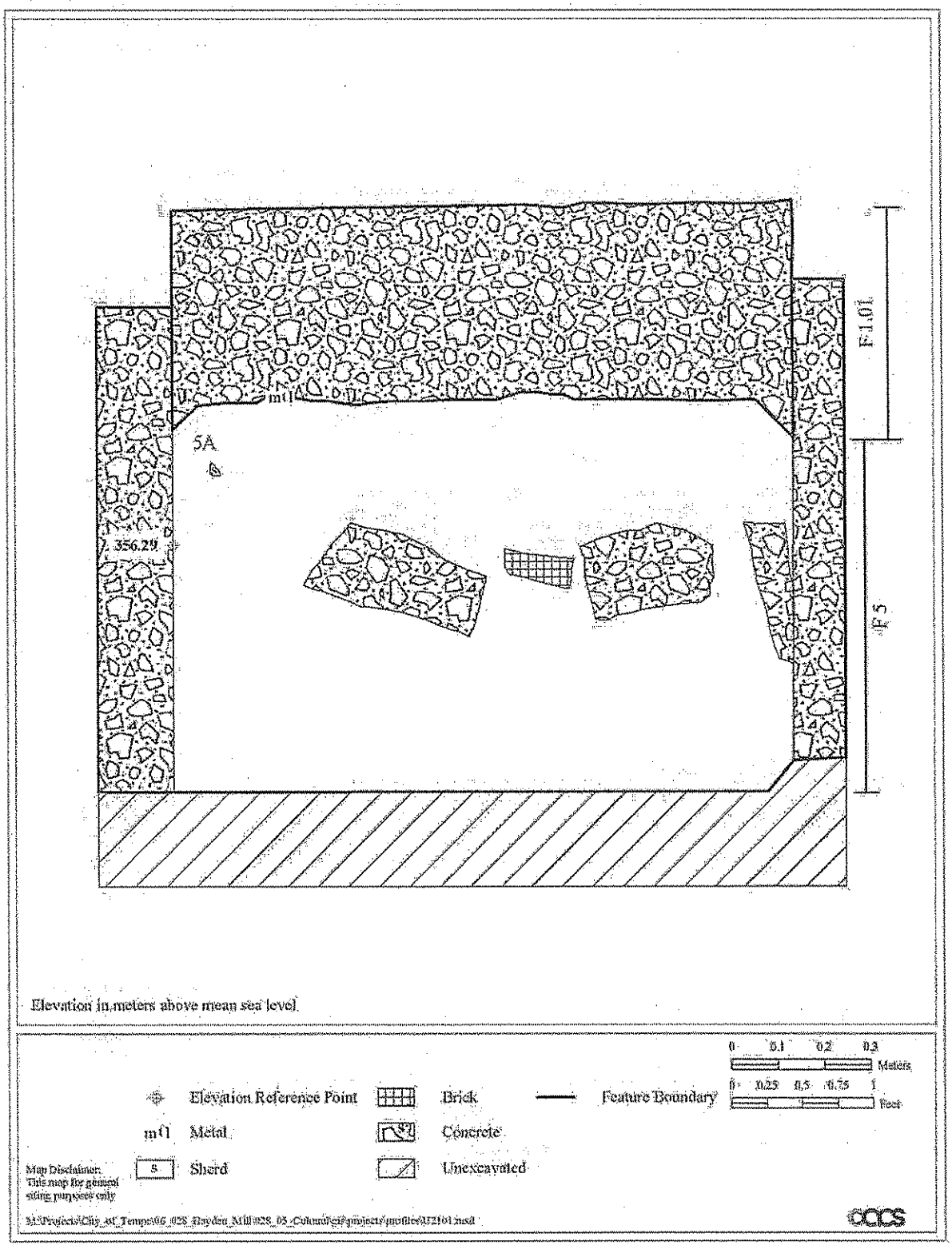

Figure 24.32. South wall profile (U2101) in hand-excavation unit U2085 of concrete-lined diversion ditch Feature 5 at the headwall (Subfeature 1.01) of the concrete culvert (Feature 1), Hayden Ditch site (AZ U:9:189[ASM]), facing south.

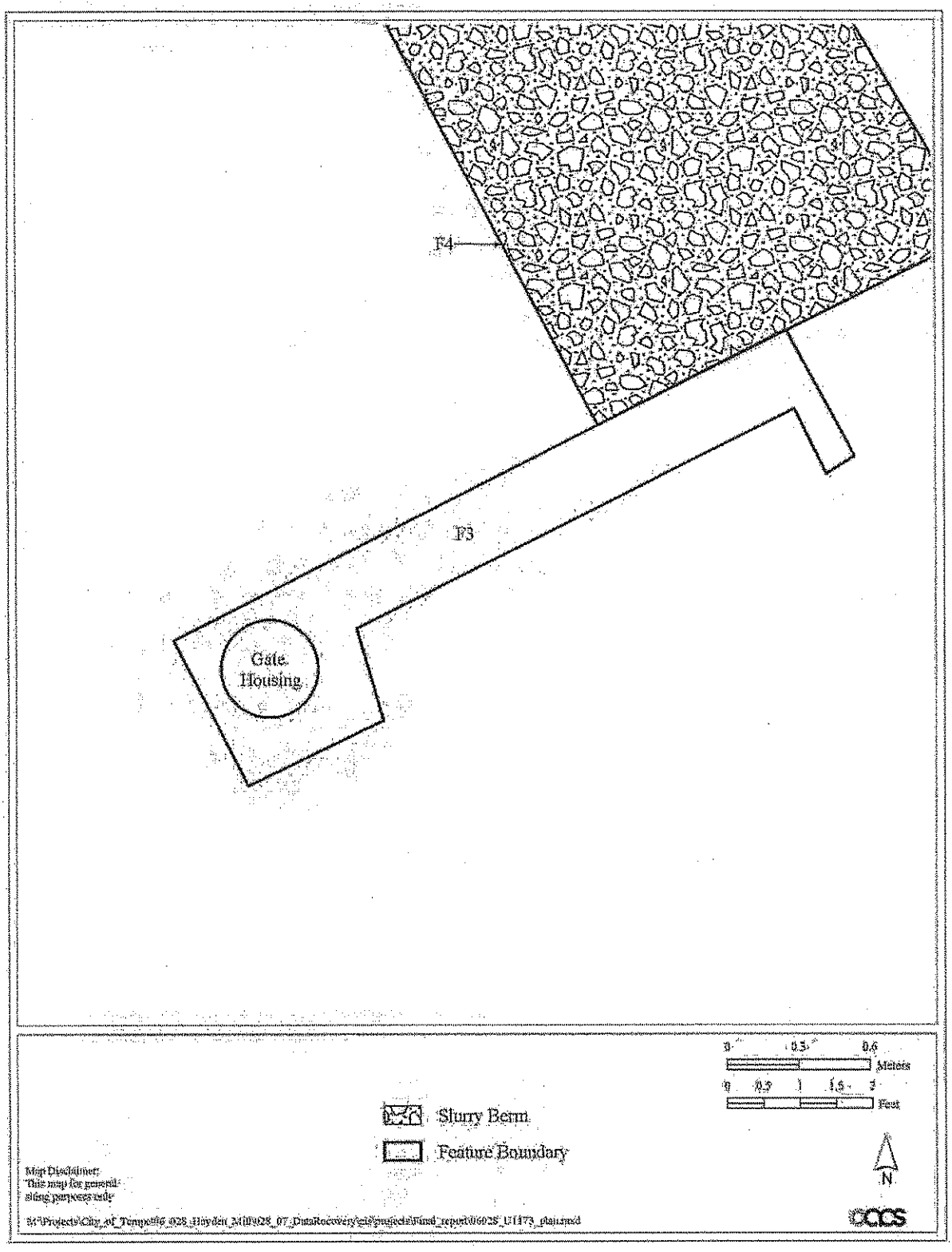

Figure 24.35. Plan view of concrete check/drop structure Feature 3, Hayden Ditch site (AZ U:9:189[ASM]).

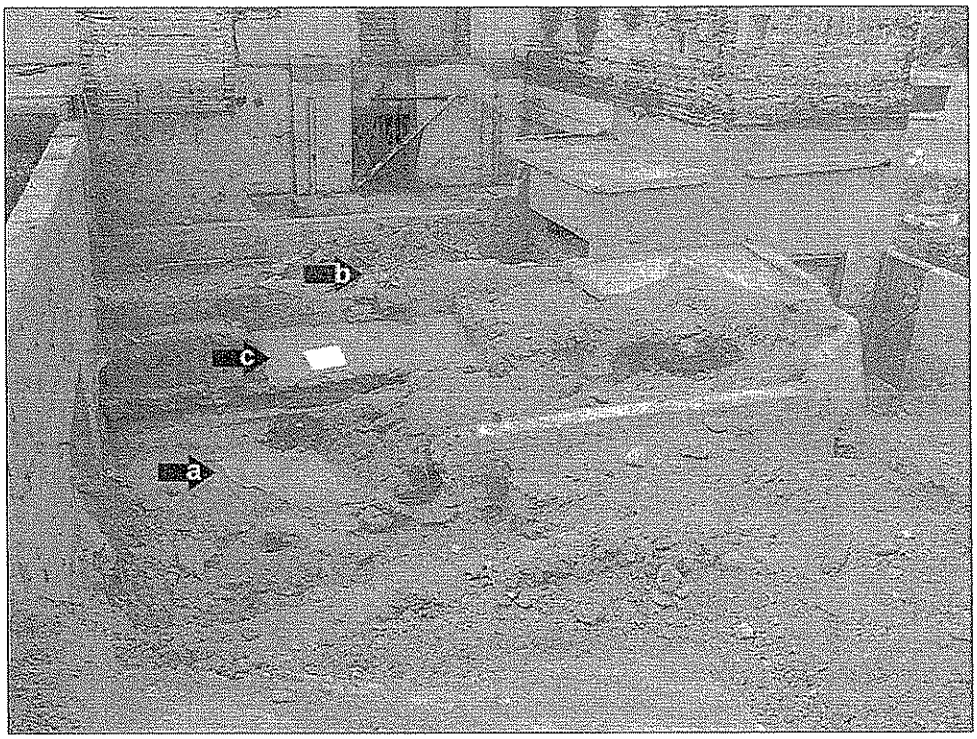

Figure 24.38. Photograph of a sloped concrete surface (Subfeature 5.01 [a]) below the concrete-lined head race (Feature 6 [b]) and its attached sloped concrete slab (Subfeature 6.02 [c]) in the background Hayden Ditch site (AZ U:9:189[ASM]), facing northwest.

Artifacts and Other Materials

In total, 1,245 artifacts and samples were collected from two excavation units within the fill (U2076 and U2085). Half of the collection was from the Historic and Modern periods, including 678 artifacts, representing 196 items. Three contexts dominated the assemblage—Hardware, Indeterminate, and Commercial Food. Hardware items consisted of a variety of nails, screws, bolts, washers, and other miscellaneous hardware items. Food items included fragments of mason jars, fragments of snack bags, and plastic *Arizona Rose* bags representing a variety of beans, popcorn, rice, and black-eyed peas that were packaged and distributed by Hayden Flour Mills from at least the late 1950s to the 1970s. Indeterminate items included bottle, jar, and window fragments, as well as unidentified metal, plastic, and rubber fragments. Diagnostic items in the assemblage suggests the bulk of the material was deposited at least after 1940—with many items dating after 1950.

Other materials collected included prehistoric sherds (n = 2); faunal bone (n = 229); natural shell (n = 1); and flotation (n = 1), pollen (n = 1), and split (n = 1) samples. The prehistoric sherds were likely carried into the channel from downslope wash from Tempe Butte or from the earthen Hayden Ditch south of the current Mill Building.

Feature Interpretation

Feature 5 represents the diversion ditch as it appeared in the late 1940s. The extensive expansion of the property (Wooden Addition) over the Hayden Ditch in the 1940s may have required action on the part of the SRVWUA to ensure that maintenance would not be a problem for the alignment east of the current Mill Building. It is also clear through archival records that the ditch by this time was functioning mainly as a waste ditch; the water flow was likely much lower than it had been historically when it was powering the mill. It would appear that the concrete-lined diversion ditch changed very little after 1945, except perhaps for the pouring of a thin concrete-sloped floor on the northern end of Feature 5 to Feature 14, the rock retaining wall that may represent the waterfall area. A permanent gate on the head race may have been sufficient to divert all water to the rock-walled diversion ditch (Feature 11) through the early 1940s until the concrete culvert and narrower channel (Features 1 and 5) were built in the 1940s. During this time, the diversion ditch flowed beneath the raised floor of the Wooden Addition, which was a multistory addition to the east side of the current Mill Building. Water flow was discontinued in 1956 when the Hayden Ditch in the project area was permanently disconnected from the Tempe Canal by the SRVWUA.

Feature 6–Concrete-lined Head Race

Feature 6 was the reinforced-concrete-lined head race that diverted water into the penstock for motive power at the current flour mill (see Figure 24.13). It was initially encountered during the testing phase while stripping away the overburden along the east side of the current Mill Building (stripping areas U1023 and U1154) and was fully exposed during Phase 2 data recovery (stripping area U2013). A portion of the west wall at the entrance (turnout gate area) had been removed, presumably a result of demolition of the Wooden Addition in 2002 (Figure 24.40). Constructed between 1917 and 1918, Feature 6 replaced the original rock-walled alignment that was likely impacted by the fire in 1917. Historically, the head race diverged just as the Hayden Ditch alignment passed the southeast side of the original adobe mill structure, but later, the diversion ditch junction wall Subfeature 11.02 supported a room addition corner of the original mill that effectively covered the original head race from the headgate to the penstock. Feature 6 was constructed along the same alignment of the original head race—no trace of which was found—and was used for a brief period between 1918 and 1924. The concrete-reinforced head race terminated at the reconstructed penstock (Feature 39, AZ U:9:278[ASM]) (Figures 24.41 and 24.42).

The concrete walls and base of the channel measured 9.45 ft (2.88 m) wide with a depth of 3.77 ft (1.15 m); the total length from Subfeature 11.02 to the penstock was 49.64 ft (15.13 m). Because the new head race was constructed within the alignment of the original head race, the original width was either the same or only slightly wider. The concrete walls and base of Feature 6 were board formed and likely poured in place. As Figure 24.43 shows, the head race was reinforced with twisted rebar, which was used in early concrete structures between ca. 1885 and the 1920s; twisted rebar has also been identified in exposed walls and pier footings of the current Mill Building, a further indication that Feature 6 was rebuilt at the same time as the current Mill Building.

Profiles of Feature 6 reveal four distinct stratigraphic levels of fill recorded within the feature (Figures 24.44 and 24.45). These likely do not represent deposition from water flow, except the bottommost level, Stratum 5E, which contains clay. After abandonment in 1924, several episodes of fill likely occurred, perhaps during construction of the Wooden Addition or the Cribbed Wood Structures attached to the side of the current Mill Building.

Associations

Two subfeatures are associated with Feature 6, including gate grooves representing a turnout gate (Subfeature 6.01) and one sloped concrete slab (Subfeature 6.02) (see Figure 24.13). Subfeature 6.01 was located on both walls at the south end of the head race channel and consisted of metal-lined grooves set within the concrete (Figures 24.46 and 24.47). Similar to turnout gate Subfeature 11.01 on the rock-lined Hayden Ditch (Feature 11), the grooves formed a track for the gate to be raised and lowered. On both walls, a small slot resembling an offset square was located behind the groove; this offset may have held a post, or control bar, for the gate (Figure 24.47).

ACS was fortunate to obtain digital photographs taken on the mill property in 2002 by Michael Wilson Kelly-Architects, Ltd. prior to the City placing deep fill along the east side of the Mill Building. Among the numerous photographs taken are several of the visible components of the Hayden Ditch under the standing Wooden Addition. Figure 24.48 is a photograph of turnout gate Subfeature 6.01; notice the upper extension of the gate groove with the installation of a concrete slab on the east wall of Feature 6. This extension was not identified during our field investigation; it was probably removed in the course of demolition of the Wooden Addition in 2002. This extension of Feature 6.01 may have been added after 1924 as part of a permanent headgate to keep water from flowing into the penstock.

Subfeature 6.02 is a sloped runoff concrete slab identified on exterior portions of the east wall bordering concrete-lined diversion ditch Feature 5 (see Figures 24.13 and 24.38). The subfeature slopes slightly toward the diversion ditch and may have functioned to draw overflow into the diversion ditch prior to the abandonment of the head race. Alternatively, this may have been a simple access platform used in later years for workers having to cross over the abandoned features of the Hayden Ditch.

Artifacts and Other Materials

In total, 1,033 artifacts and samples were collected, including 1,027 historic artifacts representing 405 items collected from three investigative units within Features 6 (U2016 and U2088) and 6/6.01 (U2026). The assemblage was dominated by Hardware items, which included a variety of nails, bolts, screws, brackets, and other miscellaneous items (over 75 percent). Additional contexts represented in smaller frequencies include Indeterminate items characterized by unidentified plastic, rubber, metal, and bottle fragments; Structural/architectural items, including twisted reinforcement bar (rebar), dimension wood fragments, brick fragments, and window fragments associated with the current Flour Mill Building; Industrial items such as fuse plugs, bulb fragments, rotary chain belt fragments and utility wire; and Miscellaneous items such as wire fragments, landscape cloth, rivets, and tarp fragments. The combined assemblage of all Beverage containers totaled less than two percent.

Figure 24.42. Photograph of concrete-lined head race Feature 6 terminating at the penstock (Feature 39, AZ U:9:278[ASM]), facing northeast from alongside the current Hayden Flour Mill Building.

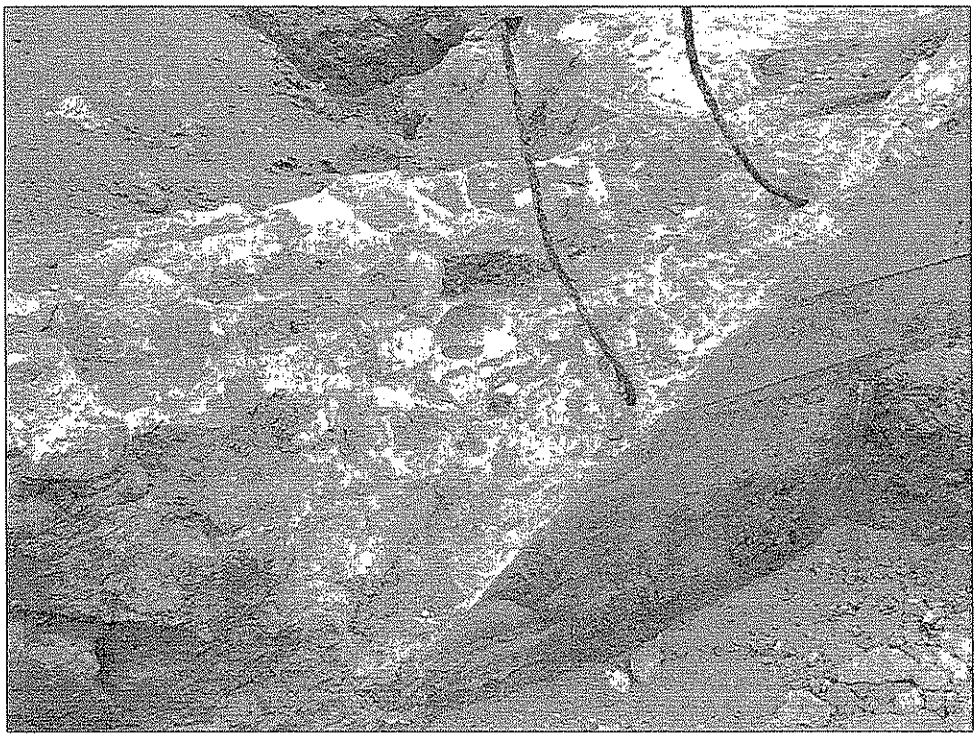

Figure 24.43. Detail of twisted-bar reinforcement used in construction of concrete-lined head race Feature 6, Hayden Ditch site (AZ U:9:189[ASM]).
Note the west wall of Feature 6 superimposing the wall remnants of rock-lined Hayden Ditch Feature 11.

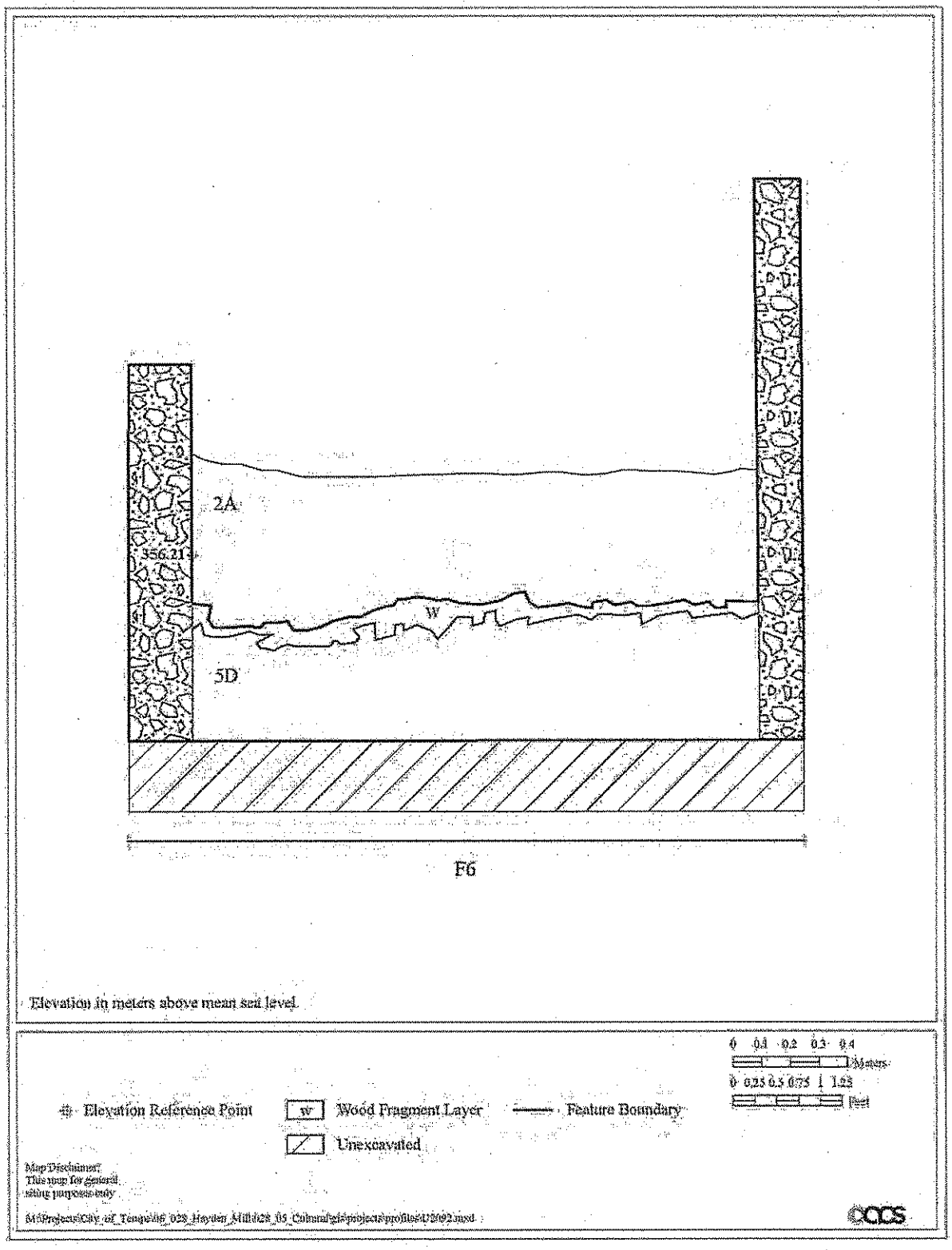

Figure 24.45. South wall profile (U2092) of hand-excavated unit 2088 in concrete-lined head race Feature 6, Hayden Ditch site (AZ U:9:189[ASM]).
The unit is located adjacent to the penstock (Feature 39).

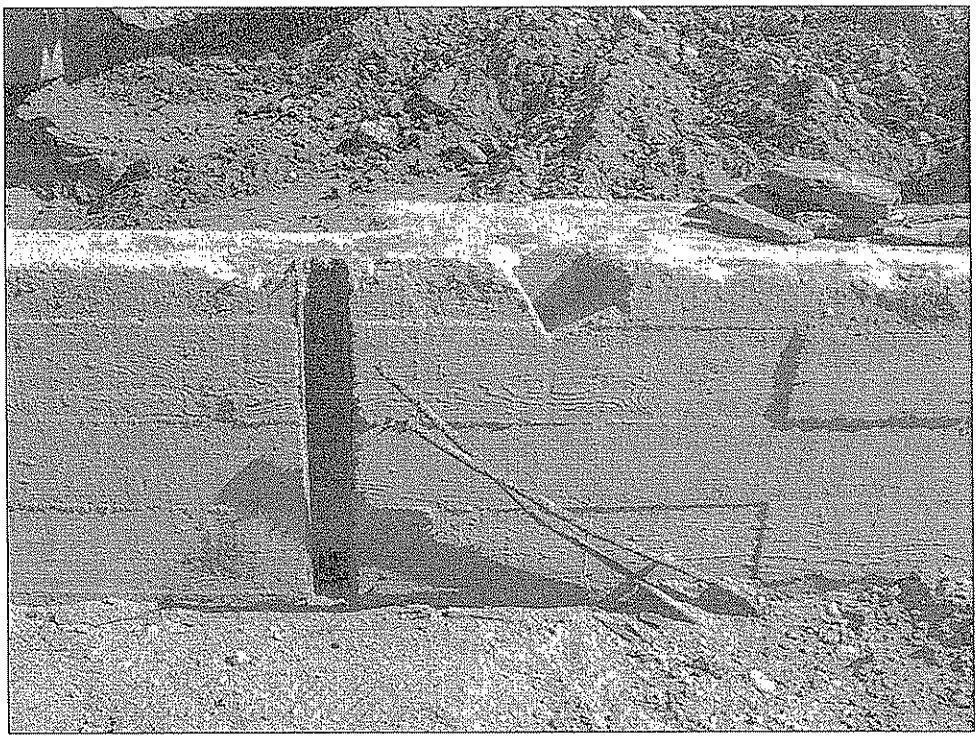

Figure 24.47. Photograph of Subfeature 6.01, the head race gate turnout groove and offset on the east wall of Feature 6, Hayden Ditch site (AZ U:9:189[ASM]), facing east.

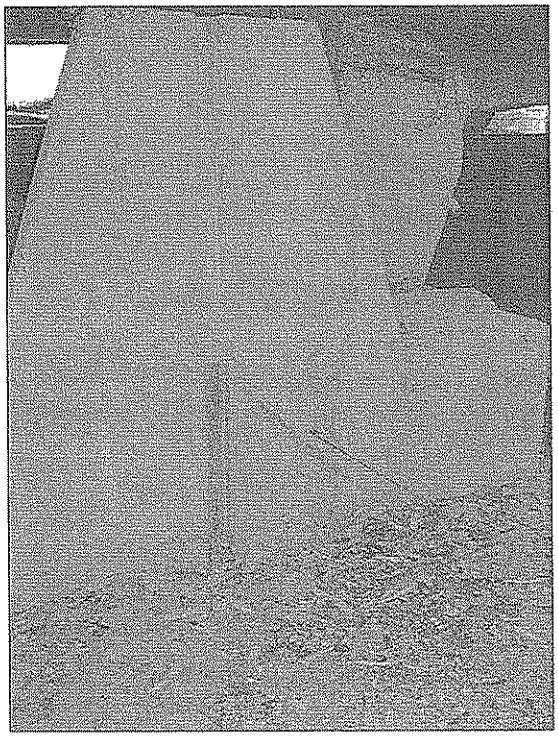

Figure 24.48. A 2002 photograph of concrete-lined head race Feature 6 and turnout gate Subfeature 6.01 groove on the east wall prior to its partial dismantling, Hayden Ditch site (AZ U:9:189[ASM]) (photograph courtesy of Michael Wilson Kelly - Architects, 2002).

The high extension of the concrete wall with the unlined groove is now gone.

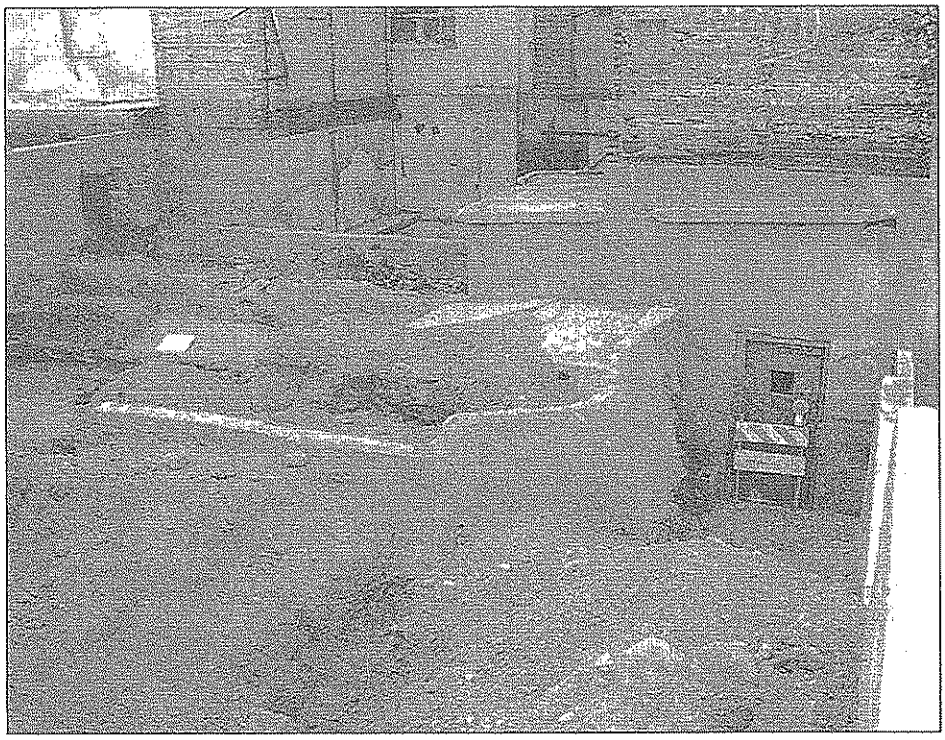

Figure 24.49. Photograph of concrete retaining wall Feature 8, Hayden Ditch site (AZ U:9:189[ASM]), facing southwest towards concrete-lined head race Feature 6 and penstock Feature 39 (AZ U:9:278[ASM]).

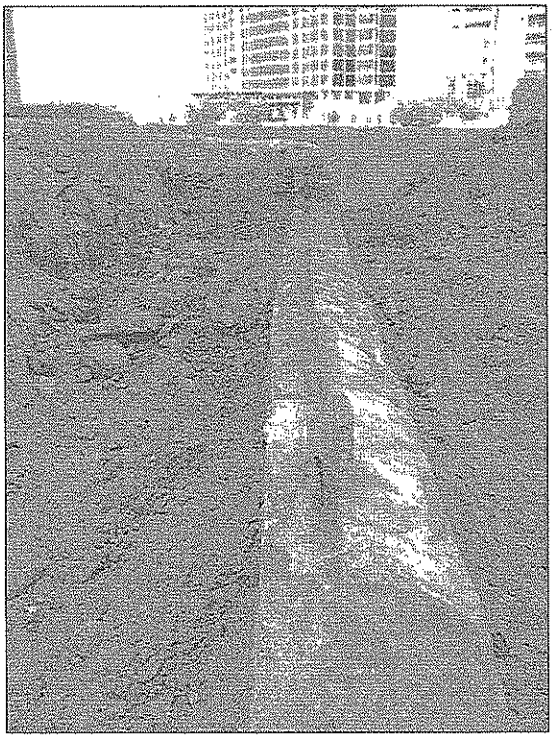

Figure 24.50. Detail of the concrete wall with sloped and grooved crown, retaining wall Feature 8, Hayden Ditch site (AZ U:9:189[ASM]), facing north.

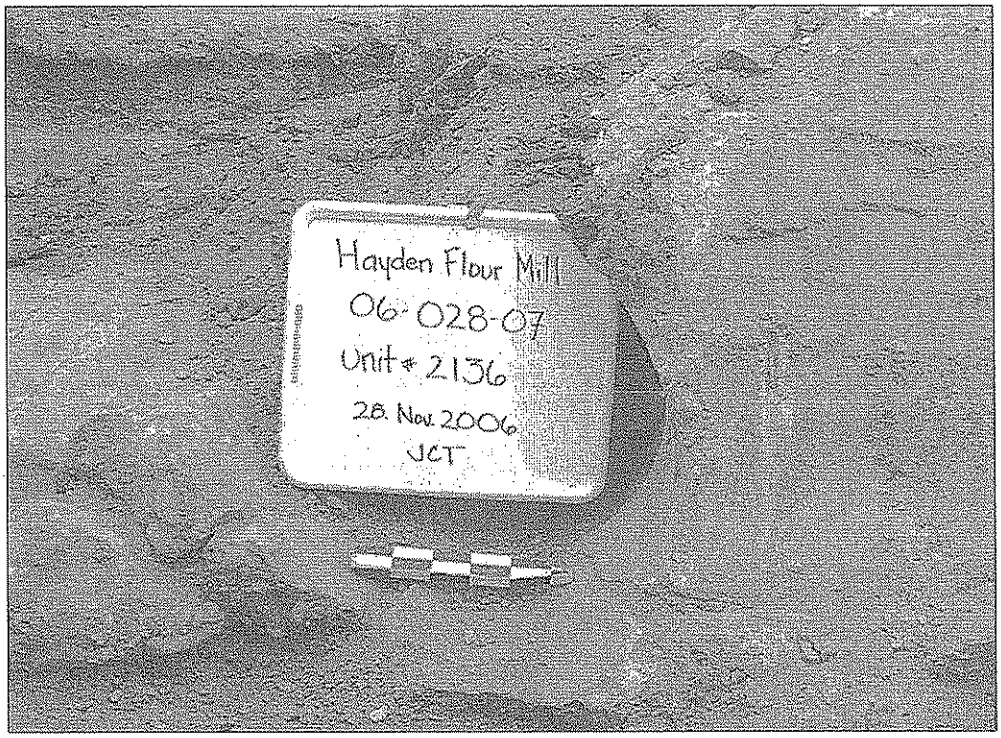

Figure 24.52. Photograph of undefined drainage pipe Subfeature 8.01, Hayden Ditch site (AZ U:9:189[ASM]), facing west.

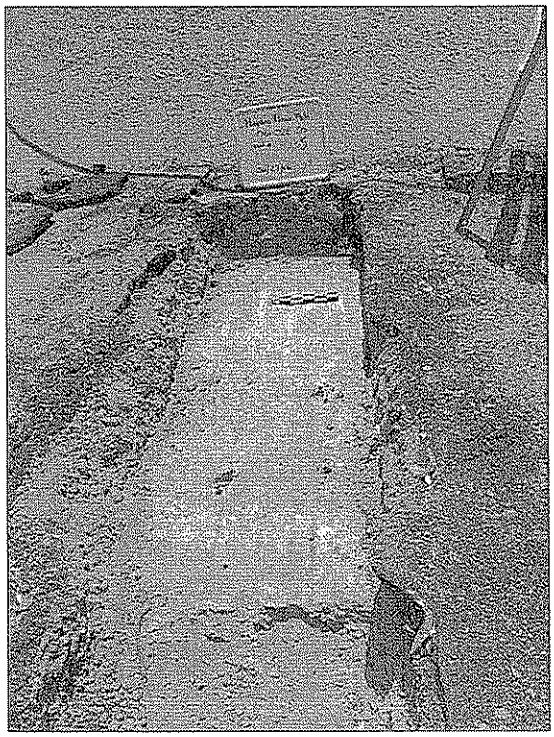

Figure 24.53. Photograph of concrete apron Feature 9, Hayden Ditch site (AZ U:9:189[ASM]), facing east.
Feature 4 (gunnite berm) is visible in the background.

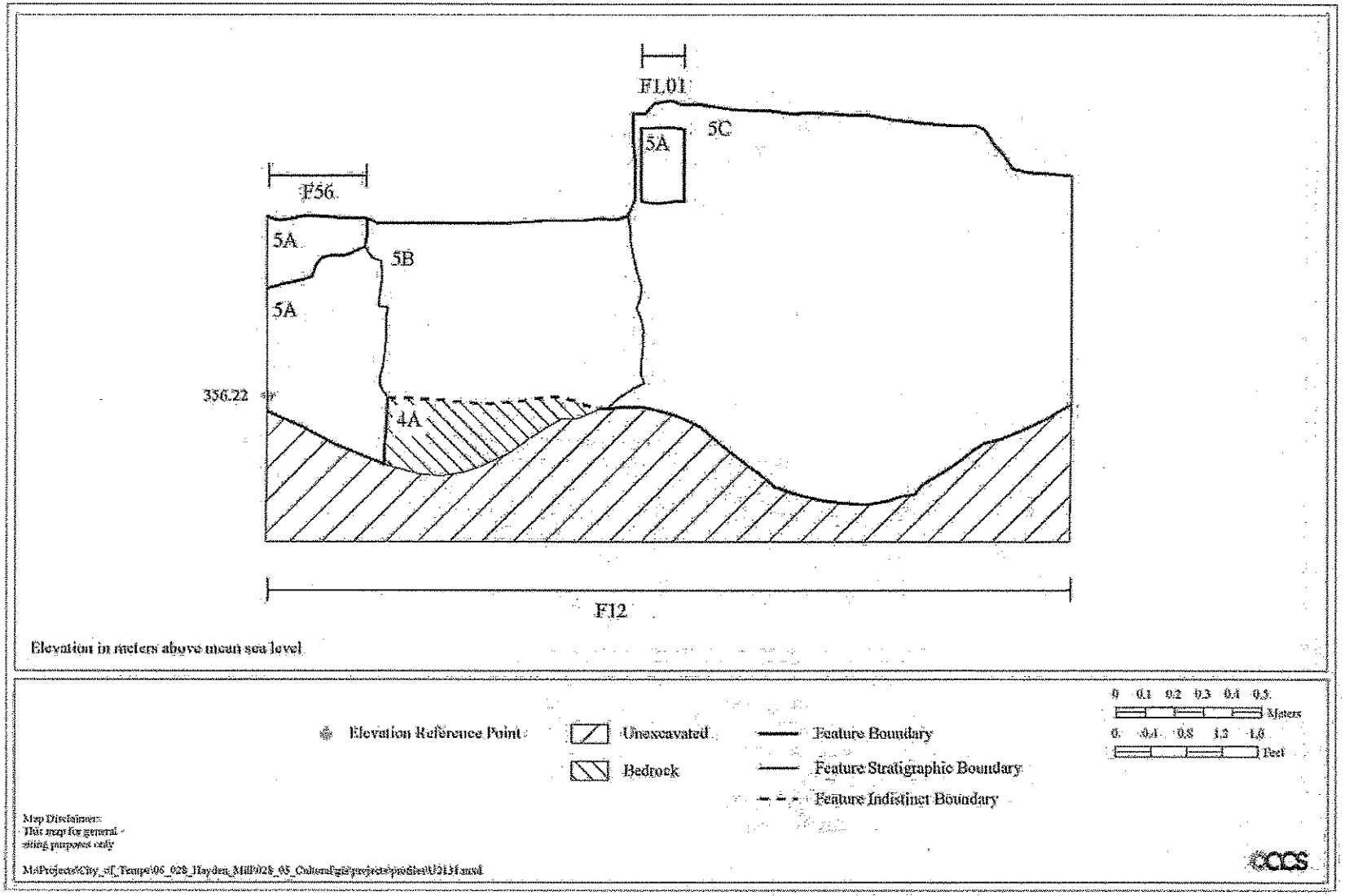

Figure 24.55. Profile of undefined wall Feature 12, Hayden Ditch site (AZ U:9:189[ASM]), facing west.
Note the presence of a later concrete cap (Feature 56) associated with the Hayden Flour Mill Complex site at the extreme left, and headwall Subfeature 1.01 intersecting the upper portion of Feature 12.

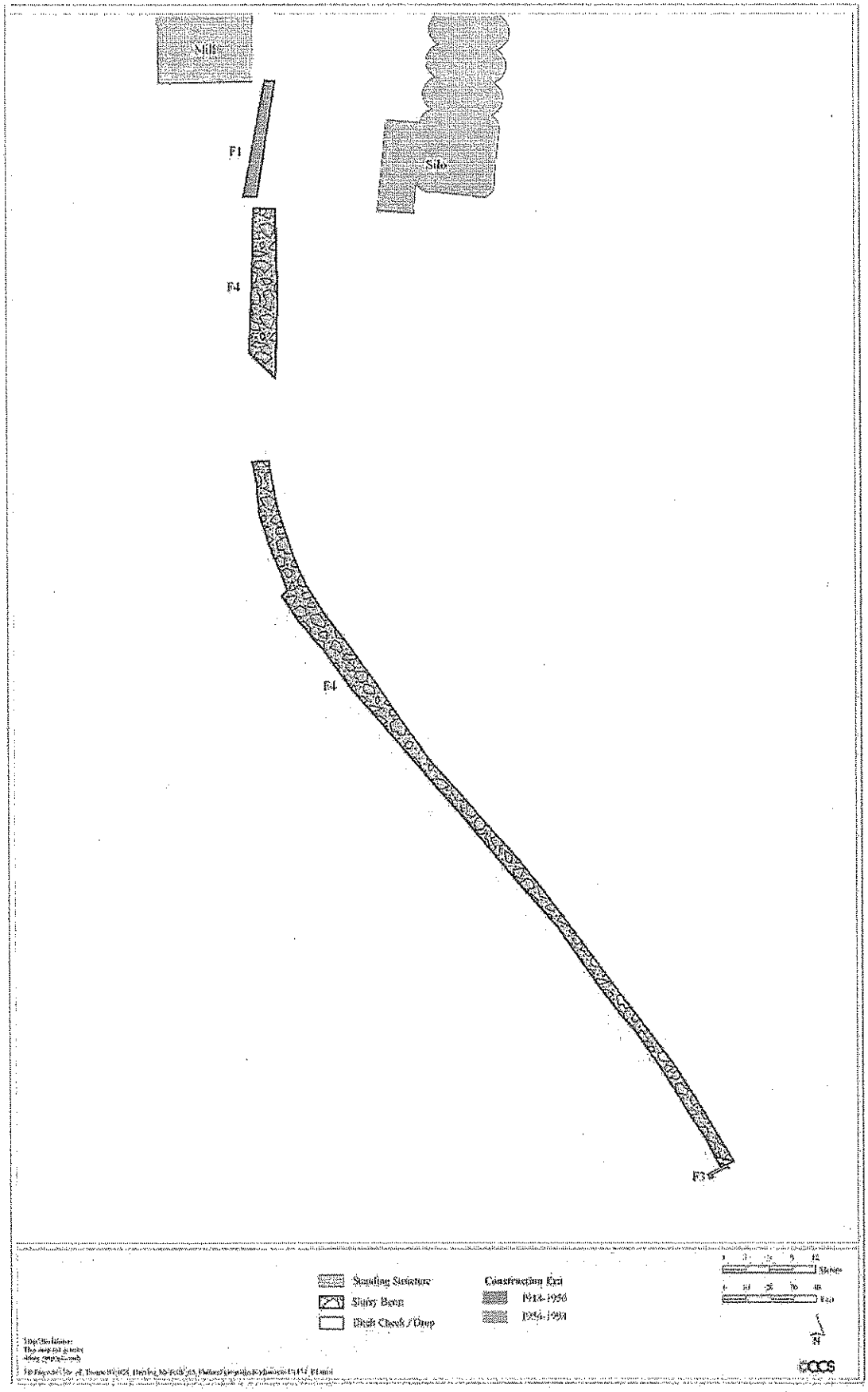

Figure 24.56. Plan view of gunnite berm Feature 4, Hayden Ditch site (AZ U:9:189[ASM]).

Figure 24.57. Photograph of gunnite berm Feature 4, Hayden Ditch site (AZ U:9:189[ASM]), facing north.

Figure 24.58. Photograph of the southern terminus of gunnite berm Feature 4 at check/drop Feature 3, Hayden Ditch site (AZ U:9:189[ASM]), facing southeast.

Table 24.4. Artifact Summary for the Hayden Ditch Site (AZ U:9:189[ASM]), Hayden Flour Mill Project.

Unit Number	Unit Type and Feature Number	Bone, Non-Human	Core	Debitage	Flotation Sample	Historic Ceramic	Historic Glass	Historic Other	Historic Wood	Macrobotanical Sample	Metal	Plastic	Pollen Sample	Shell	Shell, Natural	Prehistoric Sherds	Split Sample	Total Count
1043	Excavation unit, Feature 13	37	1	2		2	3	3			3			1	16	1		**69**
1079	Feature 13	12			1								1				1	**15**
1090	Hand trench, Feature 13	6				5	2				4							**17**
1117	Hand trench, Feature 13	40				1	80	5			163	2			8	1		**300**
1156	Hand trench, Feature 13	44					17	3			23				52	1		**140**
2014	Trench	1				1	84				79	9			7			**181**
2015	Excavation unit						105		1		5							**111**
2016	Feature 6						2				1	2						**5**
2026	Excavation unit, Subfeature 6.01	3				4	93	62	21	1	932	1				2		**1,119**
2076	Excavation unit, Feature 5	14			1		187	61	33		233	1	1		4		1	**536**
2085	Excavation unit, Feature 5	215				11	177	27	38		189	51				2		**710**
2088	Excavation unit, Feature 6						5	2										**7**
2102	Trench						19				22			1				**42**
2106	Excavation unit						2									1		**3**
2108	Subfeature 11.04						3											**3**
2128	Excavation unit	1				2	38	3			50					1		**95**
2141	Profile, Feature 7				6		12				3		6				6	**33**
2148	Trench, Feature 7					2	47											**49**
2149	Profile, Feature 7				0		8											**8**
Totals		**373**	**1**	**2**	**8**	**28**	**884**	**166**	**93**	**1**	**1,707**	**66**	**8**	**2**	**87**	**9**	**8**	**3,443**

Physa populations were particularly high, indicate still water no more than a few meters deep. *Pisidium* were collected in relatively large numbers from many of these contexts as well, the genera being especially well adapted to temporary water including that found in ditches and canals. However, the small amount of shell and the method of recovery from these contexts necessitate cautious interpretation of results.

Macrobotanical and Pollen

Macrobotanical

Nine flotation samples (several split samples were used for flotation) and seven historic wood assemblages were analyzed for this site. Fir or Douglas fir, mesquite, and pine as well as conifer, diffuse porous, and ring-porous charcoal were identified in the site flotation samples. Including nonidentifiable charcoal, an average of about 147 items/liter and concentration of about 0.4 g/liter was observed, indicating a fragmentary assemblage. All measured items appear to be of wood that was milled.

Wheat (*Triticum*) was the most commonly observed charred nonwood item, being observed in 78 percent of the samples at an average abundance of 2.6 items/liter of processed sediment. Another cereal taxon observed in the macrobotanical record was oats, though it was only observed in one sample (11 percent ubiquity) and has an average abundance of 0.1 items/liter. Other taxa observed include saltbush, cf. clover, and various weedy taxa.

The noncharred nonwood plant density for this site is much higher, averaging 109 items/liter, with a total of 18 different taxa observed, a taxa richness of 1.2 taxa/liter, and a productivity value of 100 percent. Chenopod-amaranth dominates the assemblage at 61 items/liter, followed by goosefoot at 32 items/liter and Mexican elder at 10 items/liter. Other common components include sedge, knotweed, or dock/sorrel, and groundcherry. This assemblage likely reflects vegetation growing along and in the vicinity of the Hayden Ditch as it winds past Tempe Butte and into the Hayden Flour Mill area.

In general, the Hayden Ditch macrobotanical assemblage reflects the processing of wheat at the mill, with substantially lesser amounts of oats; no barley, sorghum, or corn were observed in samples obtained from these water features. These results compare favorably with those of the palynological analysis which also indicated the processing of wheat and/or oats, but barley pollen was also observed. The abundant amounts of (uncharred) sedge, knotweed or dock/sorrel, and Mexican elder seeds suggest that seepage was sufficient to support an apparently thriving riparian community along the edges of the rock-lined tail race (Feature 7), or further upstream with the seeds transported downstream. These results too are consistent with those of the palynological analysis.

Pollen

Eight pollen samples were analyzed for this site. A total of 43 different pollen taxa or types were observed. Cheno-Am dominates the pollen assemblage, comprising 30 percent of the pollen record, followed by grass family at 22 percent and ragweed/bursage at 9 percent. Pollen of other taxa observed includes pine, oak, mesquite, cottonwood, willow, tamarisk, creosotebush, and sunflower family. Oat–wheat pollen was the most commonly observed domesticate (ubiquity = 88 percent; mean = 2.5 percent; average concentration = 357 grains/cc), though barley was also observed fairly often (ubiquity = 50 percent; mean = 0.3 percent; average concentration = 46 grains/cc), while corn was observed in one sample (ubiquity = 13 percent; mean = 0.05 percent; average concentration = 1 grain/cc). Yucca, agave family, and saguaro/hedgehog-type pollen were all observed, and likely reflect the presence of succulents and cacti growing on Tempe Butte.

The pollen record for the site reflects the continued growth of taxa characteristic of the Lower Colorado River Valley subdivision of the Sonoran Desertscrub biome—such as creosotebush, ragweed/bursage, hedgehog/saguaro, and cholla—on Tempe Butte. In general, however, the pollen record for the site more strongly reflects riparian vegetation, with cottonwood, alder, tamarisk, willow, cattail, and sedge, as well as mesquite, all recorded. These results are consistent with the macrobotanical results, which also indicated a thriving riparian community. Also in common with the macrobotanical record, the pollen results reflect the processing of wheat and/or oats at the Hayden Flour Mill—and the apparent cultivation of oats and/or wheat near the mill or upstream along the Hayden Ditch. In contrast with the macrobotanical record, however, the pollen record also suggests that barley was processed at the mill, and possibly corn. Other aspects of human behavior are also recorded in the pollen record, specifically the use of elm and ash as landscape trees, as well as the introduction—whether intentional or not—of tamarisk into the Salt River ecosystem.

Site Chronology and Discussion

Multiple phase investigations on the mill property identified 24 features and subfeatures of the Hayden Ditch site and associated structures, the bulk of which were concentrated on the east side of the current Mill Building. The complex arrangement of the various components and features presented an interpretive challenge regarding the use and development of the Hayden Ditch in the project area. After analysis of archival and archaeological documentation, three chronological periods of use and development were established for the project area, and the feature descriptions were organized in that format. Below are summary observations of the features and subfeatures (see Figure 24.3) based on that chronological ordering.

northwest to the original junction wall, where it merged into the existing walls of the earlier diversion ditch. Beyond this point, the channel appears to have been shifted to the east and a large wrap-around concrete retaining wall was built that partially sat on top of the original rock-walled waterfall. Because of extensive disturbance in this area and deep unstable fill, we could not determine how the rebuilt channel interconnected with the retaining wall, but because the northern east-west-oriented portion of the retaining wall does not have an exit point, the irrigation water must have flowed along the eastern side of the wall, over a new waterfall, and eventually back into the tail race. The southern portion of the retaining wall along its north-south-oriented section contained a circular concrete drainage pipe opening. Its slope suggests that it channeled water into the diversion ditch from areas to the west and north; the source of this water remains a mystery, as the head race was shut down.

The tail race continued to be used with few apparent changes through 1956 when the entire ditch alignment through the Hayden Mill property was abandoned. We suspect that the penstock and stone arch marking the exit of the water through the head race system were shut down and blocked off after 1924 (currently, the penstock and arch are completely enveloped with fill, from the drop at the head race to the arch). Examination of artifacts in the fill used to bury the rock-walled portion of the tail race seems to indicate that it was filled in the 1920s or 1930s, coinciding with the electrification of the building and abandonment of the head race. This would have forced the diversion ditch to empty into the tail race further to the north, beyond the end of the rock walls. We encountered evidence in the stratigraphy of this area of very turbulent water entering the earthen section of the tail race beyond the rock walls; the tail race had been leveled with fill containing copious amounts of trash, including 1920s–1950s glass bottles, and the slumped stratigraphy was intermixed with this fill. The source of the disturbance could only come from the diversion ditch entering the tail race in the 1950s in this area. Unfortunately, because of standing structures and fill hazards east of the tail race, we could not completely explore this area and therefore we do not fully understand the nature of the redesigned diversion ditch north of the waterfall.

At the southern end of the project area, a concrete check/drop structure was built within the earthen Hayden Ditch channel. We have little information about this feature due to unfortunate events that occurred between the time it was recorded during a survey in the late 1990s and the initiation of our project. It had been severely damaged by CP/EV Light Rail construction activities, which made it impossible to conduct archaeological investigations. However, based on circumstantial evidence, it appears the structure was built in the 1940s, perhaps at the same time as the concrete culvert. It may have functioned to regulate flow into the ditch heading towards the mill; it does not appear to have diverted water into an intersecting ditch or canal.

Hayden Ditch Features: 1956–1998

Only a few modifications occurred to the now-abandoned Hayden Ditch on the mill property. Adjacent to the penstock and the concrete retaining wall, a large, sloped concrete slab was added to cover the interior space of the retaining wall. It sloped down and towards the south, where another feature, an open concrete drainage pipe, would have funneled water into the now-shut-down diversion ditch. Perhaps the sloped concrete slab functioned to channel rainfall runoff away from the Mill Building and into an existing ditch. In the southern part of the project area, the western and central portions of the earthen Hayden Ditch were obliterated as the parking lot areas off of Mill Avenue were expanded and the slope to the east leveled. To buttress the earthen slope (formerly the Hayden Ditch), a gunnite berm was erected from the concrete culvert south to the concrete check/drop structure. This likely occurred during the 1970s and 1980s. Although once thought to actually be the Hayden Ditch, our investigations revealed that the berm actually capped what remained of the ditch.

Summary

Our Phase 1 and 2 excavations involving features associated with the Hayden Ditch site provided an extensive set of data useful for understanding how the ditch functioned and how it changed—sometimes significantly—over the many decades it was in use. These were the primary thematic research questions posed in the work plan for this project. The ditch was clearly not just a simple earthen channel that changed little over time; a great deal of engineering and thought went into its design, almost from the inception of the original adobe flour mill itself in the early 1870s. The design and the various structural elements associated with it were able to withstand floods, time, and the eventual destruction of the adobe flour mill. The Tempe Milling Company took the opportunity in 1917/1918 to reengineer elements of the system to complement the new concrete Mill Building, while retaining original characteristics in other areas of the ditch.

The abandonment of water power for the mill, but the need to continue the flow of water to the San Francisco Canal, must have presented a challenge to the mill operators who also needed this space along the eastern side of the building for new structures. They cleverly designed the Wooden Addition to completely cover the ditch while simultaneously not interfering with its flow, while the northern Cribbed Wood Structure was designed to use the abandoned penstock as its foundation. The complete abandonment of the ditch in 1956 allowed the mill to expand buildings and operations above the tail race on the north side of the property. Fortuitously for

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