

Water and Society in a Spanish American City: Santiago de Guatemala, 1555–1773

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THE importance of urban life to the Spanish experience in the New World is reflected in the many studies of colonial Spanish American communities which have appeared in recent decades.¹ Municipal works and services in general have, however, attracted little detailed scholarly attention, although they obviously had a role in determining the nature and quality of urban life—especially in those towns which, over time, grew into important cities. One service in particular, the establishment and maintenance of a public water supply, was vital.² It is certainly true that “without water no city can live.”³ But it is equally true that beyond this minimum prescription there are many possible levels of service. What one age, place, or social class accepts as adequate, another may not. Social, cultural, geographical,

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1. For recent assessments of the state of colonial urban studies, see Woodrow Borah, “Trends in Recent Studies in Colonial Latin American Cities,” *HAHR*, 64:3 (Aug. 1984), 535–554 and Fred Bronner, “Urban Society in Colonial Spanish America: Research Trends,” *Latin American Research Review*, 21:1 (1986), 7–72.

2. On the lack of municipal water studies for colonial Spanish America, see Borah, “Colonial Cities,” 552. In fact, studies of public water supply (even within the specialized realms of civil engineering and public health) are rare for any place or time before the present. Other than the classic work of Thomas Ashby, *The Aqueducts of Ancient Rome*, I. A. Richmond, ed. (Oxford, 1935), the most notable and useful exception is Cesare D’Onofrio, *Acque e fontane di Roma* (Rome, 1977), which treats the reconstruction of the Roman municipal system beginning in the sixteenth century. For the dramatic changes which came with the industrial age, see, esp., Nelson Manfred Blake, *Water for the Cities: A History of the Urban Water Supply Problem in the United States*, Maxwell School Series, no. 3 (Syracuse, 1956) and Jean-Pierre Goubert, *La conquête de l’eau: L’avènement de la santé à l’âge industriel* (Paris, 1986).

3. Emrys Jones, *Towns and Cities* (New York, 1966), 94.

institutional, and technological factors may determine how much water is available, how it is delivered, to whom and in what quantities, and for what it is used.

The availability of abundant municipal water records for an important Spanish American city, Santiago de Guatemala, permits an examination of this important, if neglected, aspect of urban life and governance.⁴ The petitions, titles, surveys, lawsuits, and other documents on which the following overview is based contain a wealth of information on colonial administrative practices, on the spatial dimension and material texture of urban life, and on the relationship between the city's core and its periphery as well as between its privileged residents and its marginal ones.

The Colonial City of Santiago de Guatemala

The city referred to here by its colonial name is better known today as Antigua Guatemala, or simply Antigua.⁵ Located some 40 kilometers west of modern Guatemala City, it is now a minor provincial capital and important tourist center. At its height, however, Santiago was the center of Spanish authority for the entire Spanish "kingdom" of Guatemala (a jurisdiction roughly equivalent to the isthmus of Central America, minus Panama but including the Mexican state of Chiapas). Founded in 1524 by the conquistador Pedro de Alvarado on the site of the native Cakchiquel capital of Iximché in the central Guatemalan highlands, Santiago had an eventful early history. When the Cakchiquel rebelled, the Spanish soldiers took flight and roamed widely through the highlands before finally stopping at a new site on the lower slope of the Agua volcano in 1527, where they built their first formal structures—a church, a town hall, and private residences. Little is known about this early town, because it was destroyed by a mudslide and abandoned by its inhabitants in 1541.⁶

4. Two previous, albeit limited, studies of the colonial Guatemalan urban water system are Ernesto Chinchilla Aguilar, "El ramo de aguas de la ciudad de Guatemala en la época colonial," *Antropología e Historia de Guatemala*, 5:2 (1953), 19–31, which reproduces two key documents with a brief and, in places, misleading introduction and Luis Luján Muñoz, *Fuentes de Antigua Guatemala* (Guatemala, 1977), which emphasizes the artistic aspects of public fountains.

5. The official name of the city in colonial times was Santiago de los Caballeros de Guatemala. Although it was common in the sixteenth century to abbreviate this to "Santiago," at least in official documentation, this gave way in later years to "Guatemala." I have adopted Santiago, however, for its lack of ambiguity. It cannot be confused with modern Guatemala City (officially Nueva Guatemala de la Asunción), or with the larger political reality (province or republic) called Guatemala, and it also avoids the anachronism of referring to the city as Antigua, a name it has possessed officially only since 1799. See Julio Galicia Díaz, *Destrucción y traslado de la ciudad de Santiago de Guatemala* (Guatemala, 1976), 45–50.

6. The basic facts of Santiago's early history appear in many traditional accounts. The most recent and reliable history of the city is Christopher H. Lutz, *Historia sociodemográfica de Santiago de Guatemala, 1541–1773* (Antigua Guatemala, 1982).

In search of safer ground, the survivors of the 1541 disaster moved their town to its present location in the nearby valley of Panchoy. The new settlement grew in size and importance, especially after the Audiencia of Los Confines (later called the Audiencia of Guatemala) moved there from Gracias a Dios in Honduras in 1549. The population grew steadily during the sixteenth and seventeenth centuries, peaking and leveling off in the 1680s at an estimated 37,500, of whom about 15 percent were reputed to be Spaniards.⁷ By this time, the city boasted not only a royal palace to house the audiencia and its president, the governor and captain general of the province, but also a cathedral (completed in 1680); a university (founded in 1676); three ecclesiastical parishes (a fourth would be created in 1750); and numerous convents, monasteries, hospitals, commercial establishments, and private residences, from the most humble to the most elegant.⁸

By the end of the seventeenth century, Santiago had grown to occupy much of its valley, in a pattern characteristic of colonial Spanish American cities. The wealthier households of the city's small-but-dominant Spanish minority occupied substantial tile-roofed dwellings in the center of town within the original rectilinear grid plan laid out in the 1540s (the area referred to below as the *traza* or city center). Poorer families, consisting mostly of Indians, mestizos, and mulattos, crowded into surrounding barrios, some of which were preexisting Indian villages. The newer poor neighborhoods had even begun to spread up the surrounding hillsides to the north and east.⁹

Although the city appears not to have grown much in population during the eighteenth century, there is every indication that it continued to prosper. New churches and public buildings were erected, including a new town hall in 1743, a new royal palace in 1769, and a new university building, also in the 1760s. Public and private building activity was accompanied by other physical improvements. The Plaza Mayor was paved

7. *Ibid.*, 11–13. Earlier sources offer higher numbers, in the range of 60,000, but Lutz's estimate appears to be the most accurate and is based on extensive research in manuscript parish registers and other appropriate sources.

8. On the physical development of the city at different times in the past, see José Joaquín Pardo, Pedro Zamora Castellanos, and Luján Muñoz, *Guía de Antigua Guatemala*, 3rd ed. (Guatemala, 1969), which is rich in historical details. There are also two excellent architectural histories: Sidney D. Markman, *Colonial Architecture of Antigua Guatemala* (Philadelphia, 1965) and Verle Lincoln Annis, *The Architecture of Antigua Guatemala, 1543–1773*, biling. ed. (Guatemala, 1968). No maps and almost no graphic representations exist from before the second half of the eighteenth century, but see Luján Muñoz, *La Plaza Mayor de Santiago de Guatemala hacia 1678* (Guatemala, 1969) for a reproduction and analysis of an important painting discovered in Mexico City in the 1960s.

9. Lutz, *Historia sociodemográfica*, 55–115; Markman, "The Gridiron Town Plan and the Caste System in Colonial Central America," in *Urbanization in the Americas from its Beginnings to the Present*, Richard P. Schaedel et al., eds. (The Hague, 1978), 471–489.

by 1704, and, although surrounding streets were slow to receive the same treatment, those in the city center were being cobblestoned in the late 1760s.¹⁰

Of course, an important reason for the constant construction activity in the city was the frequent earthquakes, which periodically damaged or destroyed many structures. The valley of Panchoy lies in a highly seismic region, and, although its inhabitants gradually adjusted their design and construction practices to this reality, virtually no generation escaped the necessity to rebuild at least part of the city. Three major earthquakes occurred in the sixteenth century (1565, 1577, and 1586) and another four in the seventeenth (1607, 1651, 1663, and 1689). The eighteenth century, in turn, experienced three particularly serious shocks. After the first two, in 1717 and 1751, the city underwent substantial rebuilding programs. The last one in 1773, however, resulted in the virtual abandonment of Santiago when royal authorities decided to move the capital to a supposedly safer location, modern Guatemala City (founded officially in 1776).¹¹ Thereafter, Santiago, now called Antigua Guatemala to distinguish it from the new city, receded into provincial obscurity.

The Municipal Water System

The history of the municipal water system in Santiago in general paralleled that of the city itself. Availability of water was a major consideration in the choice of new townsites in the Spanish colonial empire, and the 1541 survivors chose well when they selected the valley of Panchoy as the new location for their city. Panchoy was a small, shallow valley hemmed in by surrounding hills, all of which were rich in natural springs.¹² Two small

10. Markman, *Colonial Architecture*, 15–17 and passim.

11. *Ibid.*, 18. The decision to abandon Santiago and relocate the capital after the 1773 earthquake represents a major turning point in the city's history. Most studies of colonial Santiago terminate at this point, while the focus of urban historiography shifts to Guatemala City. On this controversial episode in late colonial history, the best account is María Cristina Zilbermann de Luján, *Aspectos socioeconómicos del traslado de la Ciudad de Guatemala (1773–1783)* (Guatemala, 1987). Very little has been written on the old city after 1773, but the foundation and early years of the new one receive extended treatment in Inge Langenberg, *Urbanisation und Bevölkerungsstruktur der Stadt Guatemala in der ausgehenden Kolonialzeit: Eine sozialhistorische Analyse der Stadtverlegung und ihrer Auswirkungen auf die demographische, berufliche und soziale Gliederung der Bevölkerung (1773–1824)* (Cologne and Vienna, 1981). Some useful information on the inauguration of public water service in Guatemala City following the relocation can be found in Pedro Pérez Valenzuela, *Memoria de los trabajos del M. N. Ayuntamiento de la Nueva Guatemala de la Asunción en el año MDCCCLXXVI* (Guatemala, 1970), 31–37; and, esp., Carlos Navarrete and Luján Muñoz, *El gran montículo de la Culebra en el valle de Guatemala* (Mexico City, 1986).

12. Lutz, *Historia sociodemográfica*, 58–59. Lutz challenges the traditional version, repeated at least since the 1680s, that the noted Spanish military engineer Juan Bautista Antonelli was responsible for the choice of the site and for the original town plan. Antonelli is

but permanent rivers flowed through it, the Pensativo, which entered from the northeast, and the Magdalena (or Guacalate), which entered from the northwest. The two streams came together near the southern end of the valley and drained off to the southwest toward the Pacific Ocean. The site of the new city lay in the narrowing vee between the two rivers, and thus afforded its inhabitants easy access to the waters of both (see Map 1).

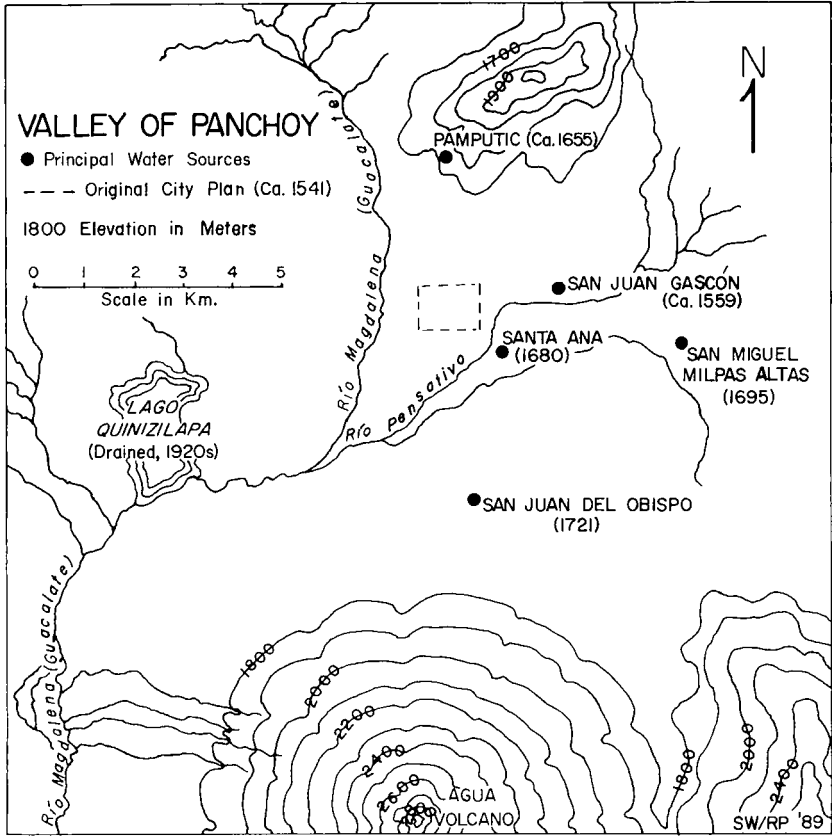
In the early years, inhabitants of all classes appear to have relied on the rivers and perhaps on shallow wells for their water supply. By the middle of the sixteenth century, however, the town had grown in size and prestige, especially after the audiencia established itself there, and there were demands for a more formal and more convenient water supply system. The configuration of the valley with its surrounding hills meant that traditional gravitational, low-pressure technology, of the sort practiced in ancient Rome and well familiar in Spain from at least the Roman occupation, would be entirely sufficient to the task.¹³ The construction of an aqueduct would be expensive, but it need not be a major engineering feat, because there were no deep chasms to be bridged on dramatic arches such as those at Segovia in Spain or even those built to supply towns and haciendas in Guatemala's northern neighbor, the colony of New Spain (modern Mexico).¹⁴

A traditional water delivery system consisted of an aqueduct (*atarjea*, or in colonial documents sometimes *tauja*), which would carry water from a sedimentation tank below an impounded spring to feed a distribution tank (*caja de agua*) at the edge of town. From this main tank (sometimes called the *caja matriz*), underground conduits (*caños*, or *cañería*) would direct the flow of water to other distribution tanks or directly to fountains (*pilas*) in public plazas or in the open patios of buildings or residences. All structures would be of masonry, and the aqueduct itself was

supposed to have based the case for Panchoy in part on its water supply, at least according to the late seventeenth-century historian Fuentes y Guzmán, who cited documents long since lost (*Obras históricas de don Francisco Antonio de Fuentes y Guzmán*, Carmelo Sáenz de Santa María, ed., 3 vols. [Madrid, 1969–72], I, 160–161). On the alleged role of Antonelli, see also José Joaquín Pardo, *Miscelánea histórica: Guatemala, siglos 16 a 19: Vida, costumbres, sociedad* (Guatemala, 1978), 13–15. Whether Antonelli was involved or not, there can be no doubt that the valley was then, and continues to be, exceptionally well watered.

13. This technology was, in fact, experiencing a revival throughout Mediterranean Europe at the time. See D'Onofrio, *Acque e fontane*, on the rebuilding of the Roman system during the Renaissance and R. J. Forbes, "Hydraulic Engineering and Sanitation" in *A History of Technology*, Charles Singer et al., eds., 5 vols. (Oxford, 1956), II, 689–692. The great Roman aqueduct at Segovia was repaired and returned to full service in the early sixteenth century. See María Asenjo González, *Segovia: La ciudad y su tierra a fines del medievo* (Segovia, 1986), 67–76.

14. Annis, *Architecture of Antigua*, 385. On Mexico's colonial aqueducts, see Manuel Romero de Terreros, *Los acueductos de México en la historia y en el arte* (Mexico City, 1949).



MAP 1: The Valley of Panchoy in the central highlands of Guatemala, showing the location of the new city of Santiago de los Caballeros (ca. 1541) and the major sources of water later incorporated into its aqueduct system. After Christopher H. Lutz, *Historia sociodemográfica de Santiago de Guatemala, 1541–1773* (Antigua Guatemala, 1982).

usually, but not always, vaulted over to protect the cleanliness of the water supply. Such a system, when completed, not only made it possible to carry fresh water to serve the public at communal fountains, but also served the fortunate few who could afford the luxury of running water inside their own homes. Between 1555 and 1680, Santiago authorities built three major aqueduct systems to serve the city: San Juan Gascón, Pamputic, and Santa Ana.

San Juan Gascón

In 1555, the cabildo of Santiago proposed building an aqueduct to carry water from a spring near the town of San Juan Gascón in the Pen-

TABLE I: Santiago de Guatemala: Municipal Water Service Expansion, Sixteenth and Seventeenth Centuries

	1567	1617	1696
Public fountains	1	2	7
Public buildings	3	14	21
Private subscribers	10	69	168

Sources: AGCA, A1–2820–24,947 (1567); AGCA, A1–2250–16,336 (1617 and 1696). These documents report data for San Juan Gascón and Pamputic for the applicable dates, but they omit Santa Ana.

sativo River valley to a fountain in the Plaza Mayor. Some sort of system, however rudimentary, must have been in place by 1559, and some inhabitants must have had running water in their residences, because the cabildo found it necessary in November to order that all such persons construct proper drains to prevent the water from running in the streets.¹⁵ By 1567, the San Juan Gascón aqueduct was serving, in addition to the fountain in the Plaza Mayor, 3 public buildings and 10 private residences.¹⁶ Over the next 50 years, the system expanded, and, by 1617, it was delivering water to 2 public fountains, 14 public establishments, both civil and ecclesiastical, and 69 individual residential subscribers (see Table I).¹⁷

Because the water from San Juan Gascón entered the city from the northeast, it served best the eastern part of town, particularly the northeast quadrant. The Dominican monastery, at the northeast corner of the original *traza*, was famous throughout the region for its waterworks, which included what contemporary observers called “the finest fountain in the kingdom,” completed by 1618.¹⁸ The neighborhoods in this favored part of the city were also the earliest, other than the Plaza Mayor, to receive public fountains, the first being installed in the atrium of the church of Santo Domingo in 1615. Six years later, a fountain was inaugurated in the barrio of San Francisco, near the Franciscan monastery in the southeastern corner of the *traza*, and, about the same time, fountains appeared also in the barrios of La Candelaria (just north of Santo Domingo) and La Concepción (in the vicinity of the convent of the same name, halfway between Santo Domingo and San Francisco).¹⁹ As late as 1770, most of the

15. Pardo, *Efemérides para escribir la historia de la Muy Noble y Muy Leal Ciudad de Santiago de los Caballeros del Reino de Guatemala* (Guatemala, 1944), 13; Chinchilla Aguilar, “Ramo de aguas,” 19; Archivo General de Centro América, Guatemala City (hereafter AGCA), Libro de Cabildos 4 (hereafter LC 4), Nov. 20, 1559, fol. 143v.

16. AGCA, secc. A1, leg. 2820, exp. 24,947 (año 1567) (hereafter A1–2820–24,947 [1567]).

17. AGCA, A1–2250–16,336 (1617).

18. Annis, *Architecture of Antigua*, 77.

19. AGCA, LC 10, Sept. 16, 1615, fol. 245; AGCA, LC 11, 1621, fol. 157; Luján Muñoz, *Fuentes de Antigua*, 41.

city's major public fountains were still located east of the Plaza Mayor (see Map 2).

Municipal authorities attempted to serve the western part of town with water from San Juan Gascón as well. In spite of difficulties posed by distance and elevation (the western neighborhoods lay uphill from those on the east side), both the Jesuits and the Augustinian friars had running water by 1617.²⁰ In the barrio of San Sebastián, a neighborhood of poor and middle-class whites and mestizos to the northwest of the city center, population growth since the midsixteenth century led to demands for local water service. In 1619 the city began an expansion project to pipe water to the small plaza in front of the parish church, and this work was completed by 1621.²¹ Such expansions eventually overburdened the San Juan Gascón system. Water rights were difficult to acquire in the western neighborhoods, and those who had them often complained of poor service. There was virtually no water service at all southwest of the Plaza Mayor.

Pamputic

The obvious solution to water shortages on the west side of town was to identify another source more favorably situated, and construct an aqueduct to bring it to town. Municipal leaders selected a small stream known as Pamputic, which rose as a spring below the hill of El Rejón to the northwest of town and which had a reputation for purity as well as abundance of flow, even during the dry season. Financial and technical difficulties delayed the beginning of construction until the 1640s, and it was apparently not until the 1660s that the new aqueduct was finally in service.

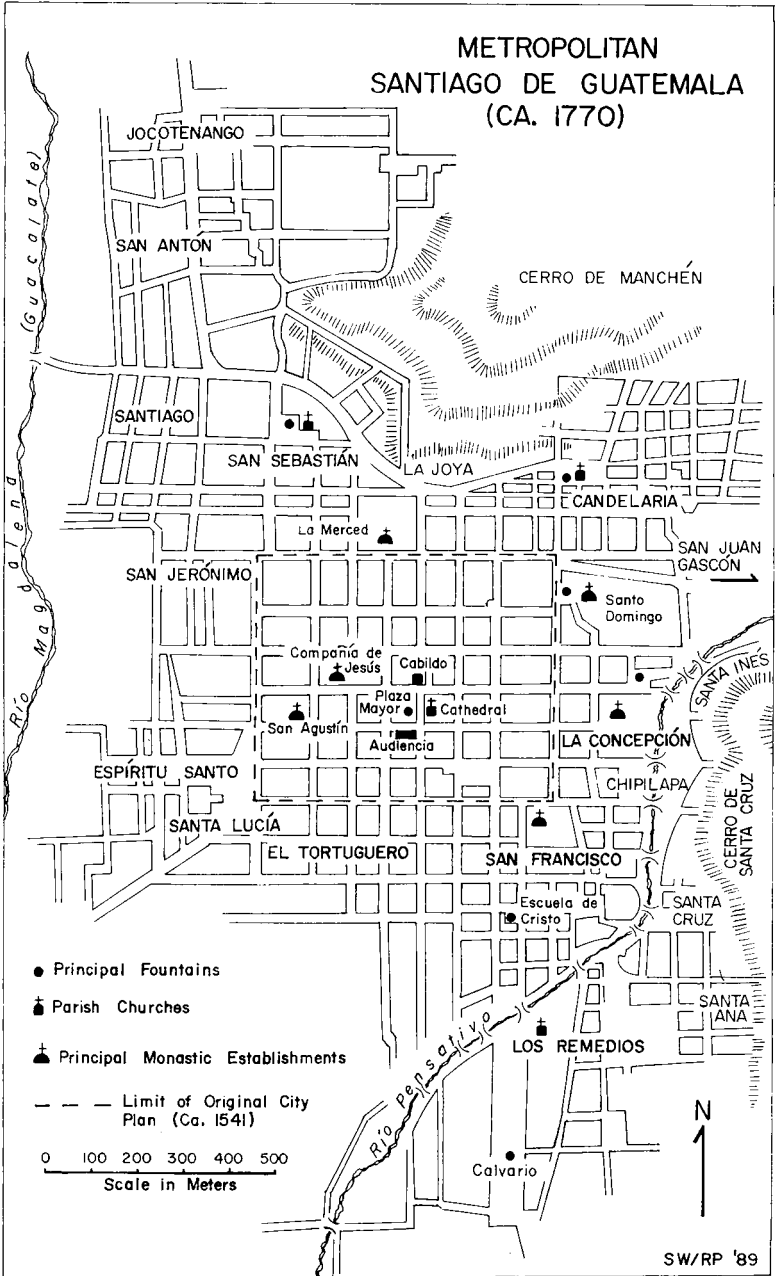
The Pamputic system, which like the San Juan Gascón system terminated at the Plaza Mayor fountain, brought badly needed water to western neighborhoods. San Sebastián, for example, which was located on the route of the new aqueduct, now drew from it rather than from San Juan Gascón, while some water rights concessionaires within the original *traza*, such as the Society of Jesus, exchanged their San Juan grants for water from Pamputic.²² More significantly, the Pamputic aqueduct made it possible to deliver water to areas which previously had had no service at all. These included the residential blocks immediately to the southwest of the Plaza Mayor and also the mestizo and Indian barrios to the west and northwest of the city center, such as San Jerónimo and San Antón.²³

20. AGCA, A1-2250-16,336 (1696), fols. 34-34v; AGCA, LC 11, Oct. 6, 1617, fol. 38.

21. Lutz, *Historia sociodemográfica*, 201; AGCA, LC 11, 1619-20, fol. 125; AGCA, LC 11, Mar. 2, 1621, fol. 131.

22. AGCA, A1-2367-17,897 (1655); AGCA, A1-2250-16,336 (1696), fols. 34-34v.

23. AGCA, LC 15, Oct. 30, 1646, fol. 160v; AGCA, LC 25, July 20, 1708, fol. 76; AGCA, A1-2288-16,566 (1673), fols. 85-103v; AGCA, LC 19, Apr. 21, 1673, fol. 115-116; AGCA, LC 19, May 2, 1673, fol. 116.



MAP 2: The city of Santiago de Guatemala and its immediate suburbs at the greatest extent of metropolitan growth (ca. 1770). After José Joaquín Pardo, Pedro Zamora Castellanos, and Luján Muñoz, *Guía de Antigua Guatemala*, 3rd ed. (Guatemala, 1968).

Santa Ana

Although the addition of the Pamputic system increased the availability of communal and residential water service in the city, it still left unsupplied the poor neighborhoods at the southern end of the urbanized area, in particular Los Remedios, located immediately across the Pensativo River. Although already a burgeoning area by the end of the sixteenth century and a separate ecclesiastical parish since 1641, Los Remedios had no running water. Municipal authorities long recognized the need to initiate service there, but it would have been difficult, if not impossible, to supply a neighborhood so far south with water from either of the two existing aqueducts. Finally, in 1679, the city began work on a new aqueduct to bring water from yet a third source, a spring in the hills above the Indian town of Santa Ana, to feed a fountain in Los Remedios. The aqueduct of Santa Ana and its principal terminus, known as the Calvario fountain after a nearby hermitage, were in service by 1680. Although the Santa Ana system never achieved the size or complexity of the San Juan Gascón or Pamputic systems, it did supply Los Remedios and its immediate environs, including some neighborhoods, such as the barrios of San Francisco and Santa Cruz, which previously had been served inadequately at best by San Juan Gascón.²⁴

Expansions and Enhancements

A few years after completing the Santa Ana system, the city undertook a long-discussed extension of the San Juan Gascón aqueduct to add water from an important spring near the town of San Miguel el Alto (modern San Miguel Milpas Altas). The San Miguel addition, completed by 1695, significantly increased the availability of water in the city and permitted the expansion of San Juan service even somewhat to the southwest of the Plaza Mayor.²⁵ By the close of the seventeenth century, according to surviving records for San Juan Gascón (including San Miguel) and Pamputic, the municipal water service of Santiago de Guatemala was supplying at least 7 public fountains, 21 public buildings, and 168 private residences. Were data available for Santa Ana as well, these numbers would, of course, be greater (see Table I).

Completion of the Santa Ana aqueduct and the San Miguel el Alto extension of San Juan Gascón coincided roughly with the apparent peak in

24. Lutz, *Historia sociodemográfica*, 201; AGCA, LC 20, July 7, 1679, fols. 27v–28; AGCA, LC 20, July 14, 1679, fols. 29–29v; AGCA, LC 20, Dec. 20, 1680, fols. 76–76v; AGCA, A1–228–15,939 (1755).

25. Chinchilla Aguilar, “Ramo de aguas,” 20; AGCA, A1–2283–16,574 (1695); AGCA, A1–2283–16,575 (1695).

the growth of the city's population. No important new aqueducts would be built in the eighteenth century, although the city did agree in the 1720s to extend Santa Ana to bring water from the distant town of San Juan del Obispo on the slopes of the Agua volcano.²⁶ Most of the city's inhabitants remained without an adequate water supply, either public or private. There were, nevertheless, some significant increases in service during the eighteenth century. These were not the result of major new construction initiatives, but of expansions and renovations to the three existing systems.

Improvements to the Pamputic system made it possible, by the late 1730s, to serve the water-starved southwestern barrios of El Tortuguero, Espíritu Santo, and Santa Lucía, among the last urban neighborhoods to receive running water.²⁷ At about the same time, other enhancements at the northern end of the Pamputic service net brought residential water to householders in La Joya, a recently developed neighborhood on elevated ground to the west of La Candelaria church. It also enabled the Indians and mestizos of the barrio of Santiago, on the far western fringe of the city just beyond San Sebastián, to obtain water in 1739 for a public fountain. This neighborhood, in existence since 1549, had never had running water before.²⁸

Administration and Finance

Building and maintaining a complex system such as the municipal water service was expensive and required both administrative and technical expertise as well as a reliable, affordable labor supply. In colonial Spanish America, such a system was unlikely to be anything but a state undertaking. When the town council first proposed building a water supply system for Santiago de Guatemala, the audiencia assumed responsibility for the effort and actually built the original San Juan Gascón aqueduct. Because Spanish law and custom vested ownership and administration of water in municipal authorities, however, the cabildo petitioned in 1573 for control of the system and its source, alleging that the spring rose on town lands and that the town's inhabitants had largely borne the costs of construction. In response, Audiencia President Antonio González granted Santiago and its council "property and lordship over the water which comes channeled to the said city."²⁹

26. Markman, *Colonial Architecture*, 15–16.

27. Luján Muñoz, *Fuentes de Antigua*, 45; AGCA, A1-4000-30,034 (1740); AGCA, LC 32, Apr. 11, 1747, fols. 224v-225; AGCA, LC 33, Aug. 18, 1750, fols. 137-138v.

28. Lutz, *Historia sociodemográfica*, 76; AGCA, A1-2284-16,605 (1733-35); AGCA, A1-2212-15,810 (1739-40); AGCA, A1-2225-15,943 (1740), fol. 104v.

29. Archivo General de Indias, Audiencia de Guatemala, leg. 42 (hereafter AGI/AG, 42), real merced, Guatemala, Feb. 3, 1573.

The city's title, confirmed in 1580 and again in 1641, authorized it to cede rights to whomever it wished in whatever amount it wished, to do so by grant or by sale, and, if by sale, at whatever price it wished. The only significant reservations were that the city must recognize all titles previously granted by the audiencia, maintain existing service to royal and ecclesiastical buildings, and keep the system in good repair.³⁰

As had been the practice in ancient Rome, the city distributed water rights on the basis not of the volume of water consumed but of the area of the circular outlet (*data*) set in the appropriate distribution tank. The standard measure in colonial Guatemala, as in Spain, was the *real*, supposedly the size of a Spanish silver coin of that denomination. The owner of a *real* of water owned the right to the equivalent of the flow of water through an opening of that size. Multiples and fractions of the *real* were also in general stated in terms of coinage. A *peso* of water was the flow through an opening eight times the area of a *real*, while a *cuartillo* was one fourth of a *real*. The smallest unit used was the *paja* (straw), which was equal to one-eighth the area of a *real*.³¹ Whatever the size of the opening, the flow was assumed to be full, unobstructed, and constant. In practice, however, it seldom was. It varied, instead, according to the state of maintenance of the aqueduct and distribution system as well as according to the season of the year.

Until the last decade of the seventeenth century, the city disposed of most of its water by selling it for cash. The income from such sales was non-recurring (the right being purchased in perpetuity), and the usual practice was to deposit the proceeds in the cabildo's general fund (the so-called *proprios de la ciudad*) rather than dedicate them to system expansion or maintenance. In fact, throughout the sixteenth and seventeenth centuries, local authorities relied on situational expedients and crisis management to finance construction, major repairs, and even some routine maintenance. The precedent for this was established early when the audiencia undertook to finance construction of the original San Juan Gascón aqueduct by relying on judicial fine collections. Faced eventually with a two-thousand-

30. *Ibid.*; Pardo, *Efemérides*, 25; AGCA, A1-2196-15,750 (1580), fols. 203 ff.; AGCA, A1-2197-17,251 (1641), fol. 6.

31. "Real de agua," Real Academia Española, *Diccionario de la lengua española*, 19th ed. (Madrid, 1970); Chinchilla Aguilar, "Ramo de aguas," 20; Markman, *Colonial Architecture*, 146. This is the terminology common to Guatemala throughout the colonial period and, even today, water is still measured in *pajas*, although the definition has changed since the introduction of high pressure systems and metered service in urban areas. Although the term came from Spain and was to be found there contemporaneously, it was not the only one used in Spanish-speaking areas. In Mexico, for example, a *real* could also be called a *limón* (lemon) and a *peso* a *naranja* (orange). See Romero de Terreros, *Acueductos de México*, 18. In ancient Rome, the basic units were the *quinaria* and its multiples (Forbes, "Hydraulic Engineering," 673). For more on Roman practice, see Ashby, *Aqueducts of Rome*, 1-47.

peso shortfall, the oidores sought to raise the balance through a voluntary public subscription. There must have been less enthusiasm than expected, because in 1556 the judges complained that while “some citizens contribute what they can, there are other wealthy ones who do not care whether [water] is brought or not.”³²

Later, after the cabildo had assumed control over the water supply and with it the responsibility for its maintenance and development, municipal authorities relied on a number of one-time arrangements and agreements with third parties to finance major expansions and renovations. For example, in 1619 when the city undertook to expand service into the barrio of San Sebastián, it did so with money it raised by selling its annual beef supply contract to the friars of the nearby monastery of La Merced.³³

The beef supply monopoly also figured in another, much more controversial, construction project undertaken during the seventeenth century—the Pamputic aqueduct. For years, municipal authorities, although convinced of the desirability of the project, had done nothing about it because of a lack of financing.³⁴ In 1643, a private entrepreneur, Martín de Loyzaga, proposed to build the new aqueduct at his own expense, in return for the city’s beef contract for the four-year period from 1644 to 1648. Loyzaga promised to provide the municipal slaughterhouses with cattle at the unusually attractive price of ten pounds to the silver real.³⁵ In lieu of the customary cash payment to the city treasury to secure the contract, Loyzaga agreed to build a masonry aqueduct from the source of the Pamputic water to the fountain in the Plaza Mayor. The arrangement called for Loyzaga to deliver a satisfactorily completed work by the end of the second year of the beef contract. To reward him for his efforts, the city would allow him to sell one-fourth of the water for his own profit.³⁶

Unfortunately for the city, Loyzaga was unable to meet his commitments. He failed to finish by the date promised and, alleging cash flow

32. AGI/AG, 9, audiencia to crown, Guatemala, Apr. 31, 1556. In any event, resources were scarce in the midsixteenth century. Three years later, the bishop was complaining that the priority given the water system was causing delays in the construction of the cathedral. AGI/AG, 156, Marroquín to crown, Guatemala, Dec. 3, 1559.

33. AGCA, LC 11, 1619–20, fol. 125.

34. One of the audiencia judges had offered to donate seven thousand pesos for the project, but was unable to persuade a master builder to contract for the job at that price. The builder, Diego Carrillo, testified in 1643 that the design was feasible but that it would cost ten thousand pesos. AGCA, A1–2367–17,897 (1655).

35. Stock raising and beef contracting in colonial Guatemala await serious historical investigation. Useful information can be found, however, in Lutz, *Historia socioeconómica*, 345–351, esp. App. IX. See also Francisco de Paula García Peláez, *Memorias para la historia del antiguo reino de Guatemala*, 3rd ed., 3 vols. (Guatemala, 1968–73), II, 191–198. Ten pounds to the real was attractive when Loyzaga offered it, but the price of beef would drop significantly in the second half of the seventeenth century and thereafter.

36. AGCA, A1–2367–17,897 (1655).

problems, petitioned the city in 1645 for relief in the form of permission to sell his share of the water rights in advance. Still trusting in his promises, the cabildo agreed, but Loyzaga suddenly abandoned the project the following year and ceded all his rights and obligations to yet another party, Don Pedro del Valle Antillón, whose interests he claimed to have represented from the beginning.³⁷ Loyzaga would claim later that Antillón had spent more than 14,000 pesos on the aqueduct project; however, there was little evidence of it. By 1654, the line was complete but not serviceable. Antillón meanwhile had died and the city attempted to sue Loyzaga and his guarantors, who in turn disclaimed all responsibility. The litigation dragged on fruitlessly while more than 20 individuals who had bought and paid for water rights since the mid-1640s waited for some resolution.³⁸ Eventually, the city managed to repair the Pamputic aqueduct and put it into service by the 1660s, but the episode of the Loyzaga contract was ample evidence of the weakness of its own institutional financial arrangements.

When Loyzaga, boasting of the public service he was performing, described the project he had undertaken as “worthy of the Romans,”³⁹ he was, perhaps unwittingly, recalling the historical precedent for the city’s reliance on third parties to undertake important public works. It is no exaggeration to suggest that Spanish American municipal authorities derived not only their water supply technology, but also their administrative practices from ancient Rome. Under the late republic and the empire, the Roman state had become increasingly dependent on public-spirited men of wealth anxious to curry favor or enhance their prestige.⁴⁰ Although the scale of the works involved, not to mention of the prestige, was much smaller, such men certainly existed in colonial Santiago de Guatemala. Construction of the Santa Ana aqueduct, for example, was greatly assisted by two of them, Don José de Aguilar y Rebolledo, one of the *alcaldes ordinarios* for 1679, and José Agustín de Estrada, a regidor, both wealthy peninsular merchants. Aguilar proposed the idea and offered to pay part of the cost of the terminus fountain, while his colleague Estrada, who owned the property adjacent to Santa Ana which contained the spring, offered to donate the water and a right-of-way as well as to make a cash donation of his own. Even so, the city bore most of the expense out of the general fund.⁴¹

37. Ibid. The text of Loyzaga’s petition appears also in Chinchilla Aguilar, “Ramo de aguas,” 21–23.

38. AGCA, A1–2367–17,897 (1655).

39. Chinchilla Aguilar, “Ramo de aguas,” 21.

40. Ashby, *Aqueducts of Ancient Rome*, 40–41.

41. AGCA, LC 20, July 7, 1679, fols. 27v–28; AGCA, LC 20, July 14, 1679, fols. 29–29v; AGCA, LC 20, Dec. 20, 1680, fols. 76–76v.

Water service was a marketable commodity, and, as such, a source of revenue which could have been made to pay for its own development. At no time in the sixteenth or most of the seventeenth century, however, did municipal authorities appear to perceive a significant relationship between what they took in on water operations and what they spent. Funds from the sale of water rights went into the general fund and expenditures came out of it, or were solicited from private parties.

This situation changed at the end of the seventeenth century when, compelled to by new royal legislation, the city adopted a radically new policy on the distribution of water entitlements. Beginning in 1695 with the additional water made available by the San Miguel el Alto extension of the San Juan Gascón aqueduct, the city no longer sold perpetual rights, but entered into usufructuary leases known as *censos enfiteúticos*. Under these agreements, the lessee, instead of making a single cash payment, was required to pay 5 percent of the value of the water each year for the life of the grant. The reinvestment in the distribution system of the recurring revenues from the leases made possible a substantial expansion of service during the eighteenth century. By 1759, the city had 185 residential water censos in force, yielding more than one thousand pesos annually in interest income.⁴²

In spite of the progress the city made in developing its water delivery system throughout the colonial period, it was never an efficiently managed or entirely adequate operation. There were major problems in maintenance and day-to-day administration. The maintenance requirements of such an extensive and complicated system were constant and costly. The physical care of the aqueducts and of the settling and distribution tanks, of the underground supply lines and the public fountains, was the responsibility of a municipal official known as the *fontanero*. Although at times in the seventeenth century there were two *fontaneros*, one for each of the major aqueduct systems, the practice by the eighteenth century appears to have been to employ only one.⁴³ These men were master masons and practical engineers. Many of these skilled craftsmen were nonwhite, and, in fact, this salaried position was one of the most prestigious employments to which mestizos or mulattos could aspire in colonial society.⁴⁴

42. AGCA, LC 33, Aug. 18, 1750, fols. 137–138v; AGCA, A1–2250–16,336 (1696); AGCA, A1–1981–13,538 (1759), fols. 11v–22v. In the last document cited, an audit of municipal accounts by Don Pedro Ortiz de Letona, it is clear that city officials had come to think of the water system as a source of income to be invested in as such. See fols. 35–35v.

43. An earlier arrangement appears to have been for the city to maintain a mulatto slave and a full-time Indian employee for the purpose. AGCA, LC 11, May 30, 1617, fol. 27.

44. Because the *fontaneros* were also involved in other important construction activities, some of the most notable of them are subjects of brief sketches in Markman, *Colonial Architecture*, 56–64, e.g., Bernabé Carlos, Juan Bautista Vallejo, Diego de Porras (or Porres), Francisco de Estrada, and Bernardo Ramírez.

The *fontaneros* drew their labor crews from neighboring Indian communities, which received special privileges or considerations in return for their efforts. For example, assigned to the maintenance of the San Juan Gascón aqueduct were the villages of Santa Inés and San Juan Gascón itself, both of which received exemption from certain tribute obligations. The inhabitants of Jocotenango, who also received a tribute exemption, were responsible for work on the Pamputic system, as were those of the barrio of San Antón who labored in return for a water grant for their neighborhood fountain.⁴⁵

The *fontaneros* and their crews contended regularly with maintenance problems which ran from the ordinary (daily wear and tear, siltation, and routine damage to masonry structures caused by dampness and running water) to the extraordinary (damage caused by rockslides along the aqueduct route and by log drags pulled by oxen through city streets).⁴⁶ Of course, the greatest threat to the physical integrity of the system was always that of earthquakes. The first case of earthquake damage to an aqueduct was apparently in 1585. Tremors wrecked the underground conduits on the Pamputic system in 1663, and 90 years later the earthquake of 1751 did so much similar damage in the barrios of La Merced and Santo Domingo that the repair costs forced the city to abandon an ambitious expansion program. This postponement became permanent when the 1773 earthquakes did such extensive damage, not only to the water system but also to the city in general, that the royal authorities decided to evacuate Santiago and relocate the colonial capital to another site.⁴⁷

Other maintenance problems were the result of fraud and tampering. Distribution tanks were equipped with access doors which the *fontanero* was supposed to keep under lock and key. But as the number of tanks in the city multiplied, many of them fell into disrepair, and it was easy for individual consumers to enter them illicitly and enlarge the openings through which their water flowed.⁴⁸ Even persons with no right to city water managed on occasion to tap the tanks or lines and enjoy domestic water service without paying for it. By 1714, the problem of unauthorized taps had become so serious that the cabildo found it necessary to threaten the *fontanero* Diego de Porras with dismissal if he did not exercise greater care and vigilance.⁴⁹

45. Fuentes y Guzmán, *Obras históricas*, I, 374; AGCA, A1-1777-11,771 (1646); AGCA, A1-2288-16,566 (1673), fols. 85-103v; AGCA, LC 19, May 2, 1673, fol. 116.

46. AGCA, A1-4000-30,019 (1734); AGCA, A1-4054-31,418 (1734); AGCA, A1-4000-30,043 (1744).

47. Pardo, *Efemérides*, 28; AGCA, LC 18, May 18, 1663, fol. 21v; AGCA, A1-2285-16,646 (1762); AGCA, LC 40, Oct. 12, 1764, fol. 76v. On the 1773 earthquakes and the relocation of the city, see n. 11.

48. AGCA, LC 18, Aug. 14, 1663, fol. 26v; AGCA, A1-2282-16,570 (1686).

49. AGCA, LC 26, Aug. 21, 1714, fols. 120-121v.

Managing the municipal water supply system's paperwork and financial transactions was quite as difficult as seeing to its physical upkeep. Although the members of the *cabildo* made policy and exercised oversight, the everyday tasks of keeping records, making disbursements, and collecting lease payments fell to the *escribano*, or town clerk, and the *mayordomo*, who was administrator of municipal property and finances. We have abundant evidence that the clerks kept records—there is a large quantity of water documents still extant from the colonial period. But there is also ample contemporary testimony that, in organization and in completeness, they were inadequate to the purpose of efficient administration. It was frequently impossible, for example, to find titles on file to match all the various outlets in the distribution tanks, or, for that matter, as the *fontanero* Bernardo Ramírez complained as late as 1770, to find outlets to match all the recorded titles.⁵⁰

Inadequate records, maintenance, and policing made life particularly difficult for the *mayordomo*. They forced him to make greater expenditures for upkeep, but reduced the amount of water available for leasing to raise the revenue to cover them. Further, resulting deficiencies angered existing leaseholders, who, finding the flow to their houses reduced or even interrupted entirely, refused to make their annual interest payments. Collecting sums owed to the city was never easy in any case, as many a *mayordomo* had occasion to complain. One recourse with consumers in arrears was to plug their outlets, thus shutting off their water service, but such an expedient only strengthened their resolve not to pay. In 1765, the *cabildo* directed the *mayordomo* not to discontinue service in the future, but to seize movable property in order to enforce payment.⁵¹

Difficulties such as those described above, along with an increase in demand for public water in marginal neighborhoods and an apparent increase in the number of persons of sufficiently comfortable means to afford residential water service, meant that, despite the abundance of water in the valley and the *cabildo*'s best efforts, there was never enough water available to satisfy everyone. Complaints of shortages were constant, especially in the eighteenth century and in such outlying barrios as Santa Lucía and Espíritu Santo in the south and San Sebastián and La Candelaria in the north. By 1756, the inhabitants of the barrio of San Francisco were so unhappy that they were threatening to appeal for royal intervention.⁵²

50. AGCA, A1-2285-16,649 (1770).

51. AGCA, A1-4000-30,092 (1764); AGCA, LC 41, Sept. 6, 1765, fol. 65v. On the difficult life of the *mayordomo*, see the complaints of Don Lorenzo de Montúfar in AGCA, A1-3093-29,714 (1768).

52. AGCA, A1-4000-30,079 (1760); AGCA, A1-263-5785 (1765); AGCA, A1-4000-30,086 (1772); AGCA, A1-4000-30,071 (1756).

TABLE II: Santiago de Guatemala: Distribution of Water from San Juan Gascón and Pamputic, 1695

Category of service	Total allotment (in reales)	Percentage
Public fountains	8.5	7.7
Government buildings	5.0	4.6
Religious establishments	23.5	21.4
Private residences	68.5	62.4
Miscellaneous ^a	4.25	3.9
Total	109.75	100.0

Source: AGCA, A1-2250-16,336 (1696).

^aIncludes schools, hospitals, individual nuns' cells, and surplus water distributed in various amounts for various purposes.

Social and Spatial Inequities

The kinds of shortages the outlying neighborhoods complained of reflected not only the inadequacy of the system's capacity for the size of the city's population but also glaring inequities in the distribution of water service. Even for an age and society in which there was no expectation on anyone's part that benefits would be, or even should be, distributed equitably, the disparities in access to municipally supplied water are startling. At the close of the seventeenth century, for example, more than 62 percent of Santiago's water supply was allotted to fewer than two hundred private residences whose inhabitants probably represented less than 4 percent of the city's population (see Table II).⁵³ It is clear that the con-

53. Calculations based on, among other things, data presented in AGCA, A1-2250-16,336 (1696), a municipal water rights register compiled by the notary Nicolás de Panigua, which represents the status of the San Juan Gascón and Pamputic systems as of 1695. Although an important source for much of the preceding discussion and potentially of great value to the urban historian, the register must be approached cautiously. The compiling notary based his work on the titles and other records on file, which were often incomplete, on a visual inspection of the *cajas de agua* accompanied by the *fontanero*, and on other oral sources. His entries follow no determined format and occasionally omit important information.

Using a multiplier of 8.1, based on figures for Sagrario parish found in Bishop Pedro Cortés y Larraz's *Descripción geográfico-moral de la diócesis de Goathemala*, 2 vols. (Guatemala, 1958), I, 21-34, the 168 households with domestic water titles in 1695 are expanded to 1,361 individuals, who are then presented as a percentage of the total population of 37,500 estimated by Lutz, *Historia sociodemográfica*, 11, for the 1680s. Sagrario parish corresponded roughly to the original *traza* of the city, where most residential water service was concentrated and where the preponderance of elite households would suggest a larger household size, given the presence of servants, poor relations, and other hangers-on. To use Cortés y Larraz's figures for the whole city would yield a lower multiplier, on the order of 6.2, and, therefore, an even smaller number of inhabitants benefiting from domestic water service.

TABLE III: Santiago de Guatemala: Water Prices, 1574-1750 (Value in Silver Pesos of One *Real* of Water)

Year	Price	Source
1574	250	AGCA, A1-2282-16,567 (1574)
1618	400	Ernesto Chinchilla Aguilar, "El ramo de aguas de la ciudad de Guatemala en la época colonial," <i>Antropología e Historia de Guatemala</i> , 5 (1953), 20
1675	500	AGCA, A1-2288-16,566 (1675), fols. 104-106v
1696	500	AGCA, A1-2250-16,336 (1696), fol. 37v
1750	800	AGCA, LC 33, Aug. 18, 1750, fols. 137-138v

temporary chronicler Don Francisco Antonio de Fuentes y Guzmán exaggerated considerably when he boasted that there was "hardly a house in all this populous community that [did] not enjoy the delight and benefit of water."⁵⁴

Residential running water was, in fact, a luxury limited to the very few. It cost money to purchase water rights and to install the necessary waterworks, which included a supply line to run from the nearest distribution tank as well as some sort of fountain, either free standing or set into a wall. In the period before the introduction of the *censos enfitéuticos*, one could purchase water rights directly from the city or from a previous owner. Such sales were usually for cash. The prevailing price in the closing years of the sixteenth century appears to have been 250 pesos for one *real*. It rose steadily during the seventeenth century and would reach 800 pesos in the eighteenth (see Table III).

Cabildo members routinely afforded themselves the privilege of purchasing water titles at less than the market price. All others had to pay the full amount, unless they negotiated an exchange for some service or concession of value.⁵⁵ Given the restriction of access, domestic water service,

Cortés y Larraz's data, admittedly, are for 1770, some 75 years after the water register was compiled. It is not known what change, if any, there may have been in average household sizes during this period, but, in any case, Cortés y Larraz provides the only information of this sort readily available.

54. *Obras históricas*, I, 64. It is equally clear that the purpose of Fuentes y Guzmán's reportage was patriotic, that he saw what he wanted to see, and that to his patrician eyes there were houses that mattered and houses that did not. See the excellent analysis of his world view by Severo Martínez Peláez, *La patria del criollo: Ensayo de interpretación de la realidad colonial guatemalteca* (Guatemala, 1971).

55. For examples of discounted sales to cabildo members, see the cases of Don Gregorio de León Moratalla, AGCA, LC 18, May 17, 1669, fol. 230; June 14, 1669, fol. 234v; Jan. 24, 1670, fols. 291v-292; Don Antonio de Cálvez, AGCA, A1-4000-29,969 (1671); and Don Francisco de Lira y Cárcamo, AGCA, LC 19, Mar. 14, 1673, fol. 112v. Free grants in recognition of services may have been quite common in the sixteenth century. Records

although clearly a desirable convenience, was perhaps just as important a symbol of elite status, similar to the possession of a tile roof rather than a thatched one.⁵⁶ It should not be surprising, therefore, that there was apparently a close relationship between the socioeconomic composition of a neighborhood and the quality of water service there.

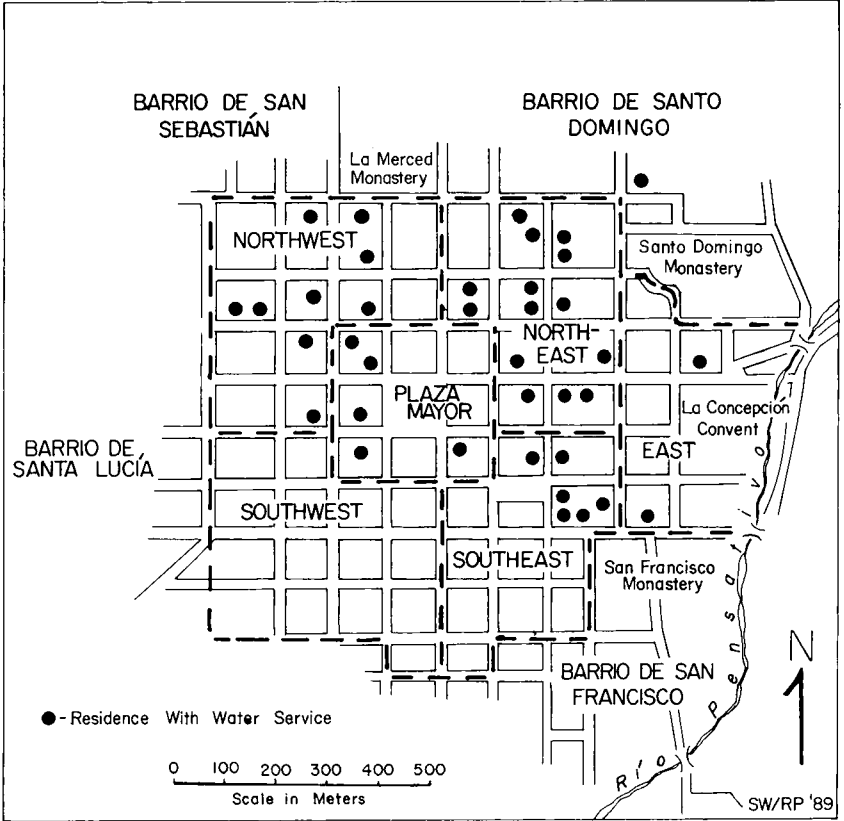
Elite households tended to locate in those parts of the city where water was abundant, leaving those where it was not to inhabitants of more modest means. This pattern was established as early as the second decade of the seventeenth century, as is evident from a comparison between early registers of water titles and alcabala apportionments.⁵⁷ For example, the 10-square-block area to the northeast of the Plaza Mayor accounted in 1604 for fewer than 11 percent of the Spanish households in the city, but it assumed almost one-third of the alcabala assessment for that year. By 1617, this obviously wealthy neighborhood alone boasted nearly 40 percent of the identifiable private water rights owners. By contrast, the 15-block area to the southwest had a slightly larger number of Spanish households, but among them they shared less than 4 percent of the alcabala payment and not one of them owned water rights (see Map 3 and Table IV).

It is difficult to determine whether the availability of water dictated residential patterns or whether authorities directed the development of the system toward those areas where the more favored members of society lived. Such evidence as is available on the evolution of the spatial distribution of the urban population suggests that both processes were at

from this early period are sparse, but see the entries on Francisco de Santiago and Juan de Cuéllar in Pardo, *Efemérides*, 24, 27. Such entitlements were rare in later years, going primarily to medical professionals whom the municipal authorities hoped to induce to remain in town. See the cases of Sebastián de Sotomayor, AGCA, A1-2250-16,336 (1696) and Manuel Carranza, AGCA, LC 30, Dec. 22, 1734, fols. 244-245.

56. Pilar Sanchiz Ochoa, "Españoles e indígenas: Estructura social del Valle de Guatemala en el siglo XVI," in *La sociedad colonial en Guatemala: Estudios regionales y locales*, Stephen Webre, ed. (Antigua Guatemala, 1989), 62-63. Tile roofs were apparently much more common than domestic water service, however, and were required by law in the city center after 1679. See Lutz, *Historia sociodemográfica*, 142-143.

57. Tax apportionment data are from AGCA, A1-1804-11,810 (1604-26). A list of water titles in force as of 1617 appears in AGCA, A1-2250-16,336 (1617). The city bought the alcabala farm for its jurisdiction from the crown, but collected the tax indifferently at best. It routinely covered its annual shortfalls by apportioning the difference among the Spanish inhabitants roughly in accordance with their ability to pay. The alcabala document used here is a register of several such apportionments in the early seventeenth century organized in the form of block-by-block economic censuses. David L. Jickling, "The Vecinos of Santiago de Guatemala in 1604," in *Estudios del reino de Guatemala: Homenaje al profesor S. D. Markman*, Duncan Kinkead, ed. (Seville, 1985), 77-100, has pioneered in its use to study residential patterns in early Santiago, and the analysis here and in Map 3 and Table IV owes much to his advice. On the city's administration of the alcabala, see Webre, "Política y comercio en la Guatemala del siglo XVII," *Revista de Historia* (Heredia, Costa Rica), 15 (Jan. 1987), 31-32.



MAP 3: Distribution of residential water service, Santiago de Guatemala, 1617. Based on a conjectural reconstruction by Jickling from data presented in AGCA, A1-2250-16,336 (1617). The division of the city center into wards or neighborhoods is an analytical artifice which corresponds to the presentation in Table IV and follows that developed in Jickling, "The Vecinos of Santiago de Guatemala in 1604," in *Estudios del reino de Guatemala*, 80-87.

work, although the former, more sensitive to technological and geographic constraints, was probably dominant. The initial aqueduct of the 1550s terminated at the Plaza Mayor, around which elite families, in keeping with a longstanding urbanistic tradition, had clustered since the founding of the city.⁵⁸ In subsequent decades, however, well-to-do households spread from the central blocks to the northeast corner of the *traza*, which was also the entry point of the San Juan Gascón aqueduct. From at least the

58. Markman, "Gridiron Plan in Central America," 473-476.

TABLE IV: Santiago de Guatemala: Residential Patterns and Domestic Water Service, Early Seventeenth Century

Neighborhood	Percentage of Spanish households, 1604 (n = 762)	Percentage of alcabala burden, 1604 (n = 1,809 pesos)	Percentage of identified water titleholders, 1617 (n = 37)
City center			
Plaza Mayor	13.8	25.3	13.5
northwest	11.7	14.0	24.3
northeast	10.9	31.2	37.8
east	9.4	5.2	5.4
southeast	9.4	8.5	16.2
southwest	11.7	3.9	0
Santa Lucía	2.4	0.4	0
San Sebastián	15.6	6.2	0
Santo Domingo	10.0	5.1	2.7
San Francisco	5.1	0.2	0

Sources: David L. Jickling, "The Vecinos of Santiago de Guatemala in 1604," in *Estudios del reino de Guatemala: Homenaje al profesor S. D. Markman*, Duncan Kinhead, ed. (Seville, 1985), Fig. 1; AGCA, A1-2250-16,336 (1617) and reconstruction based on data from same in letter from Jickling to author, June 8, 1981.

1620s until the destruction of the city in 1773, one of Santiago's wealthiest and most prestigious neighborhoods would be along and to the south of the Calle Ancha de Santo Domingo, the wide avenue which ran from the Dominican monastery to that of the Mercedarians.⁵⁹ By contrast, the area to the southwest of the Plaza Mayor, where water service was virtually nonexistent (and, in fact, remains notoriously poor to this day) was home to few households of wealth or distinction.

At the close of the seventeenth century, the average water entitlement per participating household was 0.4 *real*. The vast majority of these residences (74 percent) enjoyed grants of from one *cuartillo* to one *medio real*, while a small privileged group (13 percent) held larger grants of from three *cuartillos* to one *real*. One residence even owned a grant of two *reales*.⁶⁰ These amounts seem generous indeed when compared with the allotments of water made to public fountains, which were quite small (see Table V). In 1695, about 8 percent of the water distributed from the San Juan Gascón and Pamputic aqueducts was assigned to from seven to

59. Jickling, "Vecinos of Santiago," 83-84; J. Eric S. Thompson, ed., *Thomas Gage's Travels in the New World* (Norman, OK, 1958), 186; Jickling, "La Calle Ancha de Santo Domingo en Santiago de Guatemala, en el siglo XVIII," *Revista de la Academia Guatemalteca de Estudios Genealógicos, Heráldicos e Históricos*, 3/4 (1969-70), 437-456.

60. AGCA, A1-2250-16,336 (1696).

TABLE V: Santiago de Guatemala: Public Fountains, 1695^a

Fountain	Water allotment (in <i>reales</i>)
Plazuela de Santo Domingo ^b	2
Plazuela de Escuela de Cristo ^c	0.5
Plazuela de La Concepción	1
Barrio de San Jerónimo	1
Plazuela de San Sebastián	3
Barrio de San Antón	1

Source: AGCA, A1–2250–16,336 (1696).

^aIncludes those served by San Juan Gascón and Pamputic only. The table excludes the fountain in the Plaza Mayor whose allotment the source does not specify, but which was almost certainly larger than the others.

^bThis allotment was probably shared with the fountain in the Plazuela de La Candelaria, which does not appear in the source but was certainly in service at this time. See Luis Luján Muñoz, *Fuentes de Antigua Guatemala* (Guatemala City, 1977), 41.

^cThis fountain either replaced or shared water with that of the Barrio de San Francisco, inaugurated with a one-*paja* grant in 1621. *Ibid.* The San Francisco fountain does not appear in the 1696 register.

nine such fountains, which, scattered about the city and its eastern and northwestern suburbs, served the needs of the 96 percent or more of the population which did not have residential water service.⁶¹

Although the municipal authorities did not as a rule charge for grants of water to supply these neighborhood fountains, they would accept a *quid pro quo* if offered. For example, when in 1655 the Indians of the barrio of San Antón, complaining of the great need for water service in their neighborhood, offered to provide as needed a master mason and eight laborers for the maintenance of the new Pamputic aqueduct, the city responded with a grant of one *real* for a communal fountain.⁶² Indeed, the city's stinginess with respect to such grants belied any serious charitable intent, as did the fact that the *cabildo* routinely left the problem of financing installation and maintenance to the neighborhood residents themselves.

Because, like almost all cities, Santiago was unable to meet its need for water solely from within its own boundaries, the development of a water system necessarily brought city officials into conflict with neighboring communities.⁶³ If the city was unforthcoming with assistance for its own peripheral neighborhoods, it was even more so with regard to adjacent towns, even those which lay along the aqueduct routes and supplied

61. *Ibid.*

62. AGCA, A1–2288–16,566 (1673), fols. 85–103v; AGCA, LC 19, Apr. 21, 1673, fols. 115–116; AGCA, LC 19, May 2, 1673, fol. 116.

63. Jones, *Towns and Cities*, 94.

labor for system maintenance. In some cases, these communities claimed traditional rights to the water sources involved. Municipal authorities in general did not recognize such claims, but they were often willing to make small concessions in order to avoid litigation or ill feeling. The Indians of Jocotenango received promises of a fountain and a water grant in return for not insisting on their ownership of the Pamputic spring and its outflow, while those of Santa Ana, who had customarily drawn water from the stream channelized to form the new southern aqueduct in 1680, were able to convince the city to leave the latter uncovered so that they could continue to do so.⁶⁴

Leaving an aqueduct uncovered was a significant concession, which could compromise the quality of the water and the quantity of flow. The willingness of the municipal authorities to permit it in the case of Santa Ana may have been due to the fact that water from that source did not supply any elite neighborhoods. The cabildo was much more vigilant with regard to the San Juan Gascón and Pamputic systems, both of which terminated in the heart of the Spanish city. In the case of the former, a reconnaissance revealed in 1685 that the inhabitants of Santa Inés were tapping into the aqueduct and drawing water from it for their own use. To dissuade the Indians from this activity, the city agreed to build them a small fountain and to supply it with a minuscule grant of one *paja*.⁶⁵

Later, in the eighteenth century, a similar situation developed in the town of San Juan Gascón itself, where the townspeople had broken open a considerable stretch of the aqueduct in order to take water from it. Here the cabildo was even less generous than it had been with Santa Inés. In 1731, it voted to allow San Juan Gascón “a *paja* or half a *paja*” of water, to be diverted into a small fountain if the Indians were willing to pay for it, but into some sort of earthen catchbasin if they were not. It is perhaps not surprising that this proved an insufficient incentive for the Indians of San Juan Gascón to leave the aqueduct alone. They were still stealing water in the 1750s.⁶⁶

The extreme parsimony with which the city addressed communal water needs, both within its limits and outside them, was due in great part to real financial and technological constraints. Residential service produced income and financed expansion while public fountains did not. What is more, there is evidence that the system was straining its capacity in the eighteenth century. Residential grants were much smaller on average than they had been before 1695. By 1743, the great majority of new residential

64. Chinchilla Aguilar, “Ramo de aguas,” 21; AGCA, A1-2302-16,916 (1736).

65. AGCA, LC 21, Jan. 9, 1685, fols. 62-63.

66. AGCA, LC 29, Oct. 23, 1731, fols. 308-309; AGCA, A1-4000-30,074 (1756).

leases (76 percent) were in amounts of one *paja* or less. This reduction in the size of grants possibly did not represent deliberate rationing so much as the entry into the market of a new clientele, humbler of means than the elite water title holders of previous centuries, although still more comfortably off than the vast majority of the city's inhabitants. The introduction of the censo system eliminated the need for a large cash payment and made it possible to acquire rights for a modest annual sum. Even so, many of these new customers might still have been able to afford only the smallest possible allotment. There is some evidence from this period of censos shared among several neighboring households as well as of some expansion of domestic service into previously plebeian quarters, such as San Antón, La Candelaria, La Joya, Chipilapa, San Francisco, and even neighboring Indian towns such as Santa Inés and Jocotenango.⁶⁷

With supply barely adequate to meet the demand of a growing paying clientele, it is perhaps not surprising that the city would make no more than perfunctory efforts to provide for the needs of the great majority which could not pay. How municipal authorities might have dealt with the challenges this situation presented as time went by we do not know. As noted previously, ambitious plans to expand the Pamputic system were postponed following the earthquake of 1751. The disaster of 1773, of course, occasioned the transfer of the capital and, with it, much of the city's population of all classes.

Conclusion

This history of municipal water supply in a single colonial city is an introduction to a neglected topic, but it will be more meaningful when it can be placed in greater comparative perspective. The sparseness of the secondary literature restrains generalization, but it is at least possible to assert that, although the water system built by Guatemalan authorities from the sixteenth through the eighteenth century did not represent an innovation in technology, neither did it lag appreciably behind the technological level of similar services even in major European capitals. In fact, there is considerable evidence that the authorities of "advanced" metropolitan cities were not much better at supplying their inhabitants with water than were those of colonial Guatemala. In eighteenth-century London, for example, water of questionable purity was pumped from the Thames through wooden pipes to household consumers three times a week. Both Amsterdam and Venice depended heavily on barge shipments

67. AGCA, A1-1806-11,825 (1738 with glosses through 1743); AGCA, A1-2283-16,575 (1715).

of fresh water, while in Paris bearers carried buckets of polluted Seine water from door to door.⁶⁸

It is likely as well that comparison with other cases will reveal a pattern of elite-centered official priorities and conflict over scarce supply similar to that described for Santiago de Guatemala. The allocation of water rights and capital outlay reveals the value system which dominated local decision making. The tiny Spanish minority which monopolized the Guatemalan cabildo assumed that the need for water varied with social status and racial identity, and considered it perfectly proper to make grants to entire neighborhoods smaller than those enjoyed by some individual affluent households. Although most recent works on water in Spanish American societies deal with rural irrigation rights rather than urban supply, the two topics can certainly be related. The discussion above does not treat agricultural grants in the valley of Panchoy, but surviving records make it clear that, by the eighteenth century, there was increasing demand for irrigation leases on the part of owners of nearby pastureland, as well as for tanneries and flour mills.⁶⁹ Municipal efforts to supply these elite requirements may well have contributed to the shortages of which city inhabitants complained in this period. Certainly, urban households, neighboring landowners, and nearby Indian communities in the Santiago area found themselves locked in competition for shares of a limited water supply, resembling somewhat the situation revealed in a recent study of late colonial Puebla.⁷⁰

68. Fernand Braudel, *The Structures of Everyday Life: The Limits of the Possible* (vol. I of his *Civilization and Capitalism, 15th–18th Century*), Siân Reynolds, trans. (New York, 1981), 228–230. Water bearers were a feature of street life not only in Paris but probably in all preindustrial cities. Gabriel Haslip-Viera mentions them for Mexico City (“The Underclass,” in *Cities and Society in Colonial Latin America*, Louisa Schell Hoberman and Susan Migden Socolow, eds. [Albuquerque, 1986], 297), and, although I found no reference to them in municipal water records for Guatemala, it is likely that research in criminal dossiers, which are particularly rich on proletarian culture, would reveal them.

69. By 1740, the city had 14 irrigation leases in force, which produced an annual income of 106 pesos. AGCA, A1–1806–11,825 (1738 with glosses through 1743). This figure does not include outright grants such as that obtained in the 1680s by the wealthy merchant José Agustín de Estrada for a pasture and tannery he owned adjacent to the Indian community of Santa Ana. Estrada was one of the authors of the Santa Ana aqueduct project, and community leaders later complained that, between the water diverted to serve the city and that granted to Estrada, Santa Ana had been left with very little for its own use. This conflict would occasion a lawsuit in the 1730s, when, in response to growing urban demand, the current owner of the property sought to trade his rights to the city in return for an expanded claim at Santa Ana’s expense. See AGCA, A1–2302–16,916 (1736).

70. Sonya Andrea Lipsett, “Water and Social Conflict in Colonial Mexico: Puebla, 1680–1810” (Ph.D. diss., Tulane University, 1988). Lipsett’s emphasis is on agricultural water rights, but she does consider the relationship between the latter and the Puebla city supply. In particular, her description of the combination between urban growth and increased irrigation demand as a factor in causing shortages in the city’s marginal neighborhoods during the eighteenth century seems to parallel the Guatemalan experience.

The comparative study of major communal undertakings, such as municipal water supply systems, may also increase our understanding of the history of local administration. The management of a complicated system, such as the one described above, required attentive and responsible officials. Although it is not clear at present how common the arrangement was, in Guatemala the ascendancy of city officials in water matters was virtually absolute and the water system represented a major source of municipal revenue.⁷¹ It is possible that the income the system generated and the attendant daily necessity to maintain and operate it accounted, at least in part, for the unusual vitality the Guatemalan cabildo demonstrated throughout the late seventeenth and early eighteenth centuries, a period traditionally considered one of municipal decline and atrophy.⁷² Although the differences, including size and degree of social and economic complexity, between the two communities are so great that they make any comparison adventurous, it is interesting to note that, unlike Santiago, the provincial center of Ciudad Real de Chiapas (modern San Cristóbal de Las Casas) saw its cabildo cease to exist entirely during several decades of the eighteenth century. Ciudad Real depended on well water for most of its history, and had no public fountain at all until 1737.⁷³

Elaboration on issues of technology transmission and development, resource allocation, and public administration (including management, funding, and labor procurement) may certainly enhance our understanding of colonial urban history, but the study of water supply may address other questions as well. The Guatemalan case suggests that the history of efforts to expand service can reveal how, when, and in what direction a city grew. Also, patterns of distribution can reflect a city's social

71. James D. Riley ("Public Works and Local Elites: The Politics of Taxation in Tlaxcala, 1780-1810," paper presented at the 53rd meeting of the Southern Historical Association, New Orleans, Nov. 14, 1987) calls attention to the dominant role of royal officials in specific communities in central New Spain. Although the early history of the Santiago de Chile system appears to have resembled that of Guatemala, in Lima, during the sixteenth century, there was an acrimonious competition between viceregal and municipal authorities. See John Preston Moore, *The Cabildo in Peru under the Hapsburgs: A Study in the Origins and Powers of the Town Council in the Viceroyalty of Peru, 1530-1700* (Durham, 1954), 70, 181-182. Moore does not include water revenues in his discussion of municipal finances (*ibid.*, 150-167).

72. For the traditional account of the decadent cabildo, see, especially, Moore, *The Cabildo in Peru under the Bourbons: A Study in the Decline and Resurgence of Local Government in the Audiencia of Lima, 1700-1824* (Durham, 1966). In Guatemala, the size of the cabildo's membership did decline during this period, in conformity with the generally accepted model of municipal decay, but council activity (as measured by the number of meetings held each year) increased dramatically. See Webre, "The Social and Economic Bases of Cabildo Membership in Seventeenth-Century Santiago de Guatemala" (Ph.D. diss., Tulane University, 1980), 91-104.

73. Markman, *San Cristóbal de Las Casas* (Seville, 1963), 18.

geography. For example, public fountain grants apparently responded not primarily to neighborhood population size, but rather to proximity to existing facilities and to the quality of the inhabitants' social claim on the municipal authorities' largess. Finally, domestic water service can provide a material indicator of high elite status, facilitating efforts to estimate the number and locate the residences of the community's most influential members. Not all Spanish cities in the New World had complex water supply systems, but many important ones did. For those for which good documentation exists, urban historians will wish to make note of the riches that await us in municipal water records.