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Water and Social Space: Using georeferenced maps and geocoded images to enrich the history of Rio de Janeiro's fountains

Keywords: Rio de Janeiro; fountain; aqueduct; georeference; geocode

Summary: Water infrastructure is essential to any city, but especially so in the history of Rio de Janeiro. Historically, Rio de Janeiro lacked easy access to fresh water. Not only was it not situated along a river but it was impractical to dig wells over much of the original city because of marshes and a high water table. A single aqueduct completed in the eighteenth century supplied the city with water until the nineteenth century when additional aqueducts began to be built. By necessity, public fountains were vital for the city. The public spaces around fountains were frequented by many residents, the majority of whom were slaves responsible for the delivery of water. Using a geospatial database with georeferenced historical maps and geocoded historical images, this article explores the waterworks of the city of Rio de Janeiro in the late eighteenth and early nineteenth centuries, paying particular attention to the functional, monumental, and social aspects of fountains.

Despite its name, the city of Rio de Janeiro was not built along a river. Unlike ancient and early modern European cities that typically relied on rivers in addition to wells, aqueducts, and fountains for fresh water,¹ Rio could not. Situated on a hill, named the Morro do Castelo (Castle Hill), the early city had limited water. As the city moved down from the hill and spread out on the flat terrain along the Guanabara Bay, marshes and a high water table made it difficult to dig wells. On the nearby hills, wells could be sunk or streams diverted, but these hilltop sites benefitted mainly the monasteries, convents, and forts. The city was largely supplied with water via a single aqueduct finished in the eighteenth century. Known as the Carioca aqueduct, it fed only a few public fountains until the early nineteenth century. By necessity, public fountains were vital to this city. Designed to be aesthetically pleasing, the major fountains stood in squares or along streets, and around them a public space came into being. These public spaces were frequented by many, but the majority were slaves responsible for the delivery of water. Historians have studied historical maps to determine the location of fountains in the city of Rio de Janeiro, and have examined historical images to probe the meanings of fountains and their social spaces, but a geospatial database opens up new ways for historians to understand how water and slavery were entwined at Rio de Janeiro's fountains.

Historical maps enable the historian to visualize the early cartographic knowledge of the Guanabara Bay, to perceive the initial layout of the settlement of Rio de Janeiro, to locate the nearby sources of fresh water, and to accompany the building of waterworks for the city. Sixteenth-century maps make clear that when the city of São Sebastião do Rio de Janeiro was founded in 1565, the Portuguese well

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¹ See for example Rinne (2010) and Graber (2007) for a discussion of the use of river water for supplying the needs of Rome and Paris, respectively.

knew that the Guanabara Bay was no river.² While some maps, notably Piri Reis' map of 1513, depict the Guanabara Bay as a river, the Portuguese maps, such as the map of Brazil in the *Atlas Miller* of 1519 clearly show the contours and extension of the bay. French maps of the Dieppe School depict the barter trade developed by French *truchements* (go-betweens) from Dieppe, Rouen, Honfleur, and Le Havre in Brazil with Guarani-speaking peoples, as can be seen in the *Rotz Atlas* (1542) and the anonymous *Portolan Atlas* [Vallard] (1547).³ This trade began in the first decade of the sixteenth century. It was a coastal phenomenon that extended from Rio de Janeiro in the south to Pernambuco in the north. Sixteenth-century written texts make clear that many of these exchanges of knives, mirrors, combs, fishhooks, colored woolen cloth, and beads for Brazilwood, parrots, monkeys, peppers, and cotton took place within the environs of the Guanabara Bay. (Léry [1580] 1994).

Historical maps also reveal the first locations of European settlement in the Guanabara Bay, none of which were close to a source of fresh water. The first European settlement began in 1555, under the leadership of the Frenchman Nicolas Durand de Villegagnon, who built a fort on an island in the bay (today connected to the mainland). This island had no natural source of water, but it lay just across from the mouth of the Carioca River, which rose beneath the Corcovado Peak and flowed through the thick Atlantic forest to the shore (at present day Praia do Flamengo). Presumably, indigenous groups defended the valuable sites along the rivers feeding the bay, and left the less desirable island to the French. Since Villegagnon hoped to establish a colony in Brazil for French Huguenots, and to use this colony to protect the French trading interests in Brazil, the island location was excellent for defense, even if water was not easily obtainable. A cistern on the island collected water, and most likely canoes brought water from the mainland (Lery 1994: 34; Abreu 2010 I: 72). In 1560, Brazil's third governor, Mem de Sá, attacked the French fort, and at one point in the battle, he ordered the mouth of the Carioca River seized so that the French would abandon their positions in order to protect their water supply (Abreu 2010 I: 112). Whether or not this was a significant maneuver, the Portuguese troops did defeat the French garrison, and the French survivors fled to the mainland where they took up residence among the Tupinambá. Without sufficient men to occupy the fort, Mem de Sá razed it and later his nephew, Estácio de Sá, founded the first Portuguese settlement just inside the Guanabara Bay, at the base of the Sugar Loaf Mountain. A shallow well and a small spring were the only sources of water (Silva 1965: 113). Two years later, Mem de Sá moved the Portuguese settlement farther inside the bay.⁴ The new site lay on top of a prominent hill (the Morro do Castelo) on the western side of the Guanabara Bay, and while this location offered protection, it too lacked easy access to fresh water, even though the Guanabara Bay had many fresh water streams and small rivers feeding into it ([Teixeira] c. 1586: 17). The nearest source of fresh water was the same that the French had depended on: the Carioca River, south of the settlement (Silva 1965: 114).

The map of the Guanabara Bay, attributed to Luís Teixeira, and dated c. 1586 (see Fig. 1), shows the many fresh water rivers flowing into the bay, Villegagnon Island (labeled as Forte Vilaganhão), the first Portuguese settlement (labeled Cidade Velha), the second settlement (labeled Cidade de S.

² Historians have reconstructed, through studies of toponyms on early charts, how the first Portuguese landings along the coast of Brazil were named by associating places with dates on the Roman calendar (Varnhagen 1854 I: 19); "Rio de Janeiro" was named after the first day that the bay was entered: January 1, 1502 (Abreu 2010: 36).

³ Since the early sixteenth century, the French had actively trafficked in Brazil see Bonnichon (1994: 27-43) and Brunelle (1991: 9-18).

⁴ See Abreu (2010 I: 35-125); Belchior (2008: 88-91); Anchieta (1565: 244-255).

Sebastiam), and below it the Carioca River (labeled A carioca). Near the entrance to the bay the cartographer has drawn a large rendering of the Pão de Açúcar (labeled Pão da Sucar).



Figure 1: The Guanabara Bay in the Sixteenth Century.

As the early residents moved down from the Morro do Castelo, and built houses, shops, and churches along the straight streets laid out parallel to the shore between the Morro do Castelo and the Morro de São Bento (São Bento Hill), water was seemingly everywhere—marshes, lagoons, and tidal pools—but it was not fresh water suitable for drinking. Fresh water was carried into the city on the heads of *aguadeiros* (water carriers), many if not most of whom were Indian and African slaves. Not only did the residents need fresh water, but so too did sailors. Many ships called at Rio de Janeiro, whether headed there or to other destinations, and all needed to replenish their sea casks with fresh water. In the sixteenth and seventeenth centuries, sailors filled their water casks at the mouth of the Carioca River, and the beach became known as Praia da Carioca (Carioca Beach) or Praia da Aguada dos Marinheiros (Beach of the Sailors' Watering Place) (Albernaz 1631; Silva 1965: 311).⁵ A second good place for sailors to acquire water lay around behind the city, slightly up into the finger-shaped bay called Saco de São Diogo. Here, the fresh waters of the Rio Comprido, which flowed down from the Tijuca Forest, emptied into the bay. A small fountain later erected there was known as the Bica dos Marinheiros (Sailors' Fountain) (Correa 1939: 28).

It became apparent as the settlement grew in size that water would have to be engineered directly into the city. In the first decade of the seventeenth century, the governor of the captaincy recognized the need for a tax that would fund a project to bring the water from the Carioca River (Abreu 2010 I: 257; Silva 1965: 312). Yet, progress was extremely slow. The engineering of gravity-flow waterworks began at least as early as 1659 when the municipal council of Rio de Janeiro reported that the governor was working on bringing water from the Carioca River to the city.⁶ Master stonemasons were formally contracted in 1672, and both Indians and African slave laborers were pressed into service. It was not an easy project, and subsequent municipal council documents record a variety of problems.⁷ Initially the project envisioned bringing water to the Campo da Ajuda, but in the early eighteenth century, Governor Aires de Saldanha Albuquerque ordered a redesign that would bring the water to Campo de Santo Antonio, which was later known as the Largo da Carioca (Abreu 2010 I: 258).

Rio's first public fountain was the Carioca fountain, finished in 1723. The fountain itself was created in Lisbon and shipped to Rio, where it was installed in the square now called Largo da Carioca. It had sixteen ornamental bronze spouts: ten on the front, two on the angled sides (*angulos chanfrados*), and four on the sides. The coat of arms of Portugal topped the fountain (Correa 1939: 16). Located at the foot of the Santo Antonio monastery, it served as the terminus of the aqueduct behind it, and it was located on the back edge of the central city. So much water flowed from the aqueduct into it that the fountain overflowed and the *largo* (square) became a swamp. The excess water was eventually channeled away to the bay along a ditch known simply as *vala* that ran behind the city to the beach known as Prainha (Correa 1939: 15-17; Silva 1965: 314). Apart from the fountain, but fed by its water, long granite tanks were installed for washing linens and clothing. In 1731, the governor

⁵ On João Teixeira Albernaz's 1631 map of the Guanabara Bay, an explanatory text reads "20 braças afastada da Praya esta a Agoa a que chamão da Carioca onde os navios fazem Aguada" (20 *braças* from the beach is the water source called Carioca, where the ships replenish their water) (Albernaz 1631).

⁶ Carta dos oficiais da Câmara da cidade do Rio de Janeiro ao rei, 8 July 1659 AHU-Rio de Janeiro, cx 3, doc. 134 (Digitized AHU document d322).

⁷ 1681, Maio, 21, Rio de Janeiro. Carta dos oficiais da Câmara da cidade do Rio de Janeiro ao Príncipe Regente [D. Pedro] AHU-Rio de Janeiro, cx. 5, doc. 12. (Digitized AHU document d451)

ordered a sentinel posted next to the fountain, while the municipal council ordered those who vandalized the fountain to be whipped or sentenced to the galleys (Correa 1939: 17). Subsequently, the monumental double arched water bridge known as the “Arcos da Carioca” was finished in 1750, connecting the Morro de Santa Teresa (Santa Teresa Hill) with the Morro de Santo Antonio (Santo Antonio Hill), thereby replacing an older part of the aqueduct.⁸

Rio’s second monumental fountain was located in the Largo do Carmo, the main square of the city. This square lay along the main street—the Rua Direita (today Primeiro de Março)—that ran from the base of the Morro do Castelo to the Morro de São Bento. The square opened out onto the bay. The water for this fountain came from the Carioca aqueduct to the Carioca fountain, and from the fountain it moved through underground pipes to the Largo do Carmo. A royal order to Governor Gomes Freire de Andrada, dated 1747, stipulated that iron pipes be laid to carry the water (Correa 1939: 29-30). The fountain, designed and built in Lisbon, was finished in 1750. Twenty-five years later, this fountain was moved from the center of the square to the edge of square on the water side. When the waterfront was redesigned and rebuilt following the movement of the capital from Salvador to Rio, a new fountain was erected in its place at the edge of the new seawall. At this time, or perhaps earlier, the square became known as Largo do Paço (Palace Square) in reference to the vice-regal palace located on one side.

Using traditional sources, historians can plot where these early waterworks were (Frias 2010). Working with digitized historical maps in high resolution provides many more clues for historians. For example, the 1775 map of Rio, titled *Prospecto da Cidade de S. Sebastião do Rio de Janeiro* available in digital form from the Biblioteca Nacional, Brazil, has a long profile of the city beneath which are two inset maps: one of the city and one of the Guanabara Bay (*Prospecto 1775*). The inset map carries information on the history of the Carioca aqueduct. On the map the older aqueduct, which is labeled “Arcos antigos do Carioca” and the newer channel “Canos do Carioca” both appear. The cartographer labels, and symbolizes with a dotted line, the drainage from the Carioca fountain to Prainha beach. Identified in the map legend as the “valla por onde o Carioca se dezagôa” (ditch through which the Carioca discharges), this is the channel that carried the overflow from the Carioca fountain. Also identified in the legend, and symbolized on the inset map, is the underground pipe that carried water to the fountain in the Largo do Carmo. Comparing the inset map to the profile of the city, the two locations of the fountain can be seen. In the profile, the fountain appears in its first location—in the center of the Largo do Carmo—while the inset map shows its relocation to the edge of the shore. The legend on the inset map reads “Fonte que se mudou do meio da Praça” (Fountain that was moved from the middle of the square).

⁸ Built by the military engineer José Fernandes Pinto Alpoim from local stone and finished in 1750. On one arch is inscribed: “El Rei D. João V N. S. R. mandou fazer esta obra pelo Illmo. E Exmo. Sr. Goes Freire de Andrada do seu Cons. Sarg. Mor de Batalha de seus Exercit. Gouv. E Cap. Gener. Das Cap. Ptns. Do Ro de Janr. E Minas Gers. Anno MDCCL” (“The king, D. João V, our royal highness ordered this work from the illustrious, his excellency Sr. Go[m]es Freire de Andrada of his Council [and] Sergeant Major of the Army, Governor and Captain General of the Captaincies of Rio de Janeiro and Minas Gerais, in the year 1750”) (Correa 1939: 17).

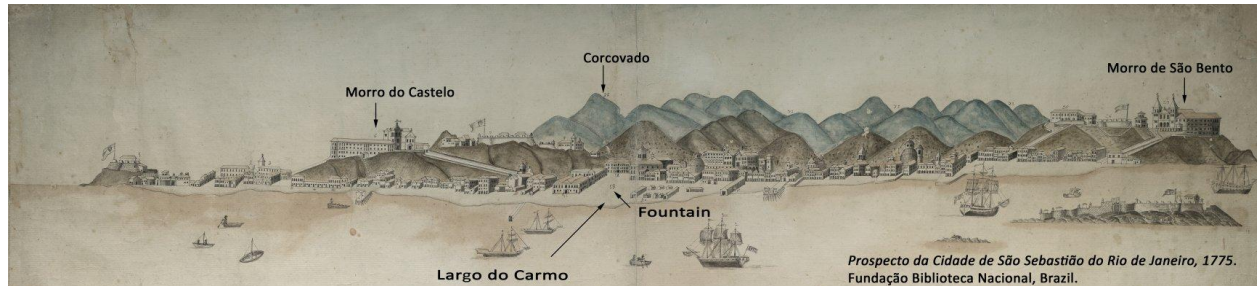


Figure 2: Profile of Rio de Janeiro, 1775.

Why move the fountain? The moving of the fountain created a more majestic main square, suitable for Rio de Janeiro's new status as the capital of Brazil. In the late eighteenth-century painting by Leandro Joaquim, possibly depicting the dedication of the newly remodeled Largo do Paço, a military review takes place in the huge open space.⁹ The new fountain appears in the center front, poised between the plaza and the bay. Behind the fountain, the viceroy's palace sits on the left, the Convento do Carmo (Carmelite Monastery) runs along the Rua Direita at the back of the plaza, and a three-story commercial building anchors the right. On the fourth side, that which opens out into the bay, the new fountain presides. Built in native stone—granite—and erected on the liminal space between the Largo do Paço and the Guanabara Bay, the fountain makes a majestic statement about Rio de Janeiro's role as a colonial capital in the Portuguese maritime empire.¹⁰ At the same time, the new fountain supplied fresh water directly to boats, as well as to those living in the central city.

While historians can accompany changes from paper map to paper map (Ferrez 1978), or digital map to digital map, the advantages of working with georeferenced maps in a GIS spatial database maps are greater. Brovelli and Minghini (2012) define geo-referencing as “the geometrical transformation which associates a metrical framework, i.e. a reference and projection system, to the map image derived from digitization.” When a map is georeferenced, its geographic information is made to match, or to closely approximate, actual geographic space as represented in high quality modern digital maps. As Brovelli and Minghini note, this not only adds considerable geographic information to the historical map, but it also enables historian to use the tools of GIS analysis in the study of historical maps.¹¹

In geo-referencing a digitized historical map, much new geographic information is released. In the geospatial database, data derived from several maps can be combined into a single layer, such as a layer that contains the spatial locations of fountains. If a range of georeferenced maps is available, changes that disappear from maps over time can be retained. For example, in the 1775 map of Rio de Janeiro discussed above, the inset map contains evidence of the city's water infrastructure. When

⁹ Joaquim, *Revista Militar*, Museu Historico Nacional, Brazil

<http://www.museuhistoriconacional.com.br/images/galeria26/mh-g26a011.htm> accessed 10/28/2014.

¹⁰ The coat of arms of Viceroy Luís de Vasconcelos e Souza (Viceroy 1779-1790) appear on the fountain, which is still standing but is no longer a working fountain. A date given in one of inscriptions is 1789 (Correa 1939: 35). This fountain is attributed to Valentim da Fonseca e Silva “Mestre Valentim,” possibly based on and adapted from plans drawn up by the military engineer Jacques Funck (Correa 1939: 29-33; Ferrez 1978: 47-50).

¹¹ To georeference a map, Ground Control Points are selected on the historical map and linked to the same points on a current digital map. In the Rio de Janeiro spatial geo-database, we use the center points of street intersections.

georeferenced and added to the geospatial database, we can create new layers on underground pipes, the abandoned aqueduct, or drainage ditches. Later maps may no longer display this information, but it is possible to see it overlaid on the map by using the geospatial database. A map from 1791, re-copied by a military engineer in 1803, and titled *Plano da Cidade do Rio de Janeiro elevado em 1791*, offers an exceptional view of the Carioca aqueduct at the end of the eighteenth century. The ditch known as “vala” no longer appears on the 1791/1803 map, nor does the information on the underground pipes, nor that of the old aqueduct. When this map is georeferenced and viewed in our geospatial database, it is possible to see these features created from the 1775 map. For example, the street labeled as the Rua da Vala (today Uruguaiana) on the 1791/1803 map matches with the feature “vala” created from the 1775 map. This information missing from the 1791/1803 map enables us to remember that the street doubled as the drainage ditch. It is also apparent that this ditch is no longer at the edge of the city in 1791, but rather it has become part of the central city.

A series of georeferenced historical maps can enable the historian to decode some of the conventions used by the historical cartographer. For example, the location of the Marrecas fountain is difficult to pinpoint, as the fountain no longer exists, and historical sources describe its location differently. A georeferenced map from 1812 has the fountain labeled, and using this we created a location point for the fountain. In looking back at the 1791/1803 map, the fountain is clearly there, but it is represented by a symbol that the cartographer does not label. The information from the later map allows us to “read” the cartographer’s symbol for the fountain. It is now possible to find three fountains along Mata Cavalos street.

With any historical map, the success of the geo-referencing will vary greatly, depending on the skill of the historical cartographer. It is striking how well the aqueduct drawn on the 1791/1803 map matches the actual geographic location of the aqueduct in our geospatial database.¹² On the 1791/1803 map, the waters of the Carioca aqueduct (highlighted in blue) flow down from the Corcovado, around the hills of the Tijuca Forest, and are carried from Morro de Santa Teresa by the double-arched water bridge into the city. The cartographer has labeled the Largo da Carioca, and has drawn in Rio’s first fountain, which is labeled as “Carioca, ou Fonte grande” (Carioca or the big fountain). On this georeferenced map from 1791/1803, we geolocate the major waterworks of Rio de Janeiro at the turn of the century. We include the new fountain at the Campo de Santana (Santana Field, today Praça da República), which began to flow in 1818 (see Fig. 3).

¹² The Carioca aqueduct no longer carries water, but according to historical sources, the street Almirante Alexandrinho in Santa Teresa follows it. Our drawing of the aqueduct in our geospatial database follows the contours of this street. A walking of the street in 2014 by the author and Wright Kennedy reveals that much of the original aqueduct channel still stands, as do some of the holding tanks.



Figure 3: The Major Public Fountains of Rio de Janeiro, 1720-1820.

Our map of Rio's major public fountains illustrates that the fountains are clustered on the southern side of the city, at the bases of the hills of the Tijuca Forest. Most city residences and shops were quite distant from these fountains. As a result, an extensive amount of time, effort, and energy had to be spent to supply water to the city's residents. As we shall see, slaves supplied most of this labor. Rio de Janeiro had the largest urban slave population in the Americas in the first half of the nineteenth century (Karasch 1987: xxi), and a significant number of slaves worked delivering water daily. The limitations of the rudimentary water infrastructure—so few fountains for so many residents—was masked by the extensive ownership of slaves in the city. Slave-owning residents devoted much of their slaves' time and labor to domestic chores, such as carrying water and laundering clothes (Graham 1988: 36-41). The daily necessity for water, the city's reliance on a few public fountains, and the many domestic servants in the city (both slave and free) affected, in turn, the nature of the social spaces around the fountains.

When the Portuguese royal family fled Lisbon on the eve of Napoleon's invasion of Portugal and arrived in Rio de Janeiro in 1808, Dom João, the Prince Regent, opened Brazil's ports to friendly nations. This act, coupled with the residence of the Portuguese royal court in Rio, caused the number of foreigners in the city to increase dramatically.¹³ Among these foreigners were artists who arrived in the city attached to foreign delegations, scientific expeditions, ships, or even in the employ of the

¹³ Belluzzo (1995 II: 92). The decree opening Brazil's ports to trade with other friendly nations, and which primarily benefited Great Britain, was signed by the Prince Regent soon after arriving in Brazil in 1808.

Portuguese crown. Fascinated by Rio de Janeiro, these artists produced scenes of the city and its landscape in sketches, watercolors, oils, and later lithographs and engravings. Historians have long recognized that these are rich sources for understanding life in Rio (Belluzzo 1995:I; Ender and Ferrez 1956; Karasch 1987: xvi-xvii). Among the most prominent of these artists were Jean Baptiste Debret, who arrived in 1816 as part of the French artistic mission, and Thomas Ender, who arrived with the Swiss expedition led by Spix and Martius in 1817.¹⁴ In addition to these professional artists, amateur artists, some of whom were sailors, others writers, sketched and painted Rio.¹⁵

Most travelers arriving in Rio by sea would see the Largo do Paço fountain as they approached the city in small boats and prepared to disembark. Debret described it as an obelisk that adorned the quay of the Palace Square, and he recognized that it had been costly to build.¹⁶ Debret's representation of the Largo do Paço clearly projects the monumentality of this fountain, which Debret places in the center foreground of his composition. The steps leading down to the water suggest both arrival and departure by sea, which underscores Rio's identity as a major port city. Debret presents the large square behind the fountain as symmetrical and balanced, which conveys order and power.

Debret worked as an artist for the royal court, and part of his job was to manage the royal presence in the city. As such, he understood the meaning of the Largo do Paço, and in his representation of it (Fig. 4), he underscored the way in which the Palace Square and its monumental fountain symbolically spoke of royal authority. Other artists did not paint it in the same way. Thomas Ender's representation of the same fountain is quite different. Unlike Debret, Ender does not project the political importance of the fountain. Rather, Ender depicts the fountain in isolation from the royal palace and the royal chapel that had been created in the church of the Carmelite Monastery along the Rua Direita at the back of the main square. Ender does not choose to reproduce the symmetry of the Palace Square, rather he has represented the fountain as a social space where slaves, free blacks, and others congregate.

¹⁴ Debret created sketches and watercolors in Rio and later published lithographs after he returned to Paris (Debret 1965). In the published 3 volume work (*Voyage*) each lithograph includes a textual description of each scene. Many of the original watercolors are in the Museu Castro Maya (Chácara do Céu), Rio de Janeiro. Johann Baptist Ritter von Spix was a biologist and Carl Friedrich Philipp von Martius was a botanist; both visited Brazil from 1817-1820. Thomas Ender was an artist on the expedition. Ender's watercolors of Rio de Janeiro are catalogued in Wagner and Bandeira (2000). The original Ender watercolors are in the Akademie der Bildenden Künste, Vienna.

¹⁵ One such example was Maria Graham, the wife of a British sea captain who wrote about her two visits to Rio de Janeiro and provided her own sketches to illustrate her account, see Graham (1924). Another was Charles William Browne, a Royal Navy midshipman and later lieutenant who visited Rio twice, in 1816 and 1823, see Martins (1998).

¹⁶ "La fontaine construite avec luxe, et qui décore le quai de la place du Palais, sert également à l'approvisionnement d'eau de ce quartier, et à celui de la marine stationnée dans la baie" (Debret 1965 III: 113).

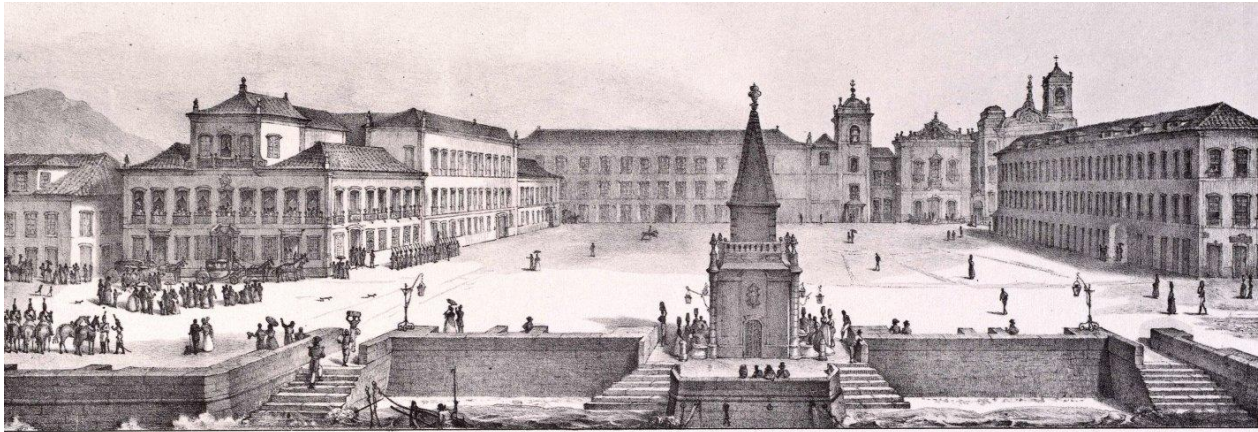


Figure 4: The Largo do Paço and its Fountain c. 1820.

Debret has a second lithograph of the Largo do Paço based on an original watercolor that focuses less on the monumentality of the space and more on its social interactions. This lithograph, titled “Les Rafrâchissement[s] de l’après Diner sur la Place du Palais,” has as its subject the middle class of Rio de Janeiro. Debret describes them as *petit rentiers* who might own a slave or two, and who live off the daily earnings of these slaves (paid to their owners at the end of each week). At four p.m., Debret writes, these middling sorts come from the streets adjacent to the Largo do Paço to enjoy the cool air of the late afternoon, and they remain there until the church bells strike the Ave Maria at 6 to 7 p.m. As the men chat, they are served by black women, most likely slaves, who sell them sweets and water from the fountain. The sociability of the public space is conveyed by Debret in his text and in his image. The fountain is majestic in the background, but it is not a symbol of political power. Rather it supplies the water that the women sell, while other slave men and women continue to fill their pots and barrels; their domestic duties still continue. As night falls, Debret writes, others come to the square, each group in its special area—the merchants, the sea captains, and naval officers. By midnight, the square is empty, except for the military patrols (Debret 1965 II: 44-5).

As can be seen in Figure 3, the Carioca fountain lay several blocks back from the Largo do Paço, deep within the city. It was an extremely busy place, and images and descriptions of it tend to reflect its utilitarian nature, rather than its monumentality. When artists and travelers visited this fountain, they devoted more attention to the work performed there than to the aesthetics of the fountain. John Luccock gives only the most rudimentary description of the Carioca fountain: “[t]he water issues from horizontal brass pipes, about eight feet higher than the street. Part of the water is delivered into a large cistern” before turning to what seems to have interested him more: the work of washing clothes. “A curious scene is daily exhibited here,” he continues, “great numbers of men and women, generally black people, and more than half naked, some within the cistern and others around it, are busily employed in the occupation to which the place is devoted” (Luccock 1820: 77) Maria Graham gives only a slightly more detailed description of the fountain before similarly transitioning to how it is used. Graham notes that the Carioca fountain is the largest in Rio, with twelve “mouths” and is “most picturesque in itself.” She then segues to who is using the fountain: “it is constantly surrounded by slaves, with their water-barrels, and by animals drinking. Just beyond are troughs of granite, where a

crowd of washerwomen are constantly employed; and over against these, benches are placed, on which there are constantly seated new negroes for sale” (Graham 1824: 17).

Thomas Ender rendered the Carioca fountain in an unfinished watercolor, which shows the large fountain anchoring one end of the Largo da Carioca. The fountain is positioned at the center of the watercolor, but is only sketched out; nevertheless, one can see that Ender penciled in what must have been the coat of arms that topped the fountain, and the place where what can only have been its inscription was chiseled into the stone. The fountain serves as the background for the scene, for Ender’s main focus is on those who gather its water. Of the thirty-five persons who can be counted in the watercolor, all but two appear to be slaves or free blacks; all are associated with water jugs. An ox and a horse are yoked to carts with large water casks (one being filled by a pipe), thus revealing that in Rio as in Lisbon and other European cities, water was also delivered by animal drawn conveyances.¹⁷ A slave-driver, or perhaps a sentinel stationed to maintain order at the fountain, appears next to a group of slaves on the left. A few years later, the population of the central city was 79,321 people (Karasch 1987: 62); most of these received their water from the public fountains. The task of getting enough water to each household every day was a major domestic chore.

When compared to Admiral William Harry Smyth’s painting of the Carioca fountain in 1833,¹⁸ we can see how Ender might have finished his watercolor. In Smith’s finished painting, the fountain is better delineated, and it is possible to see how the Carioca fountain was an artistic achievement in its own right. Smith also focuses his attention on the work at the fountain, and in his rendering, we can see some changes in the delivery of water in Rio. By 1833, far fewer individual water carriers with water jugs are at the fountain. More in evidence are huge water barrels to be dragged on carts by animals. Also visible is a large water barrel carried by four slaves using a rope. By the 1834, the population of Rio had grown to 97,599 persons (Karasch 1987: 63), all of whom required water every day.

A third painting of the Carioca fountain by Jacob Jansson, estimated to have been painted between 1824 and 1829 dispenses with the fountain entirely and shows only the laundresses.¹⁹ The two granite tanks used by the laundresses lie apart from the fountain right in front of the entrance to the Ordem Terceira de São Francisco de Penitencia (Third Order of Franciscan Penitents). The painting shows mainly women, nearly all of them black, standing in the water with their dresses rolled up bloomer style, rinsing, wringing, and slapping the laundry against the sides of the fountain. Two sentinels stand guard. Jansson’s painting reveals that besides delivering water, a second major domestic chore performed at fountains was laundry. Frequently, this was work done by slave women who washed linens and clothing at the public fountains or beside the banks of streams on the edges of the city (Graham 1988: 40-41).

Debret did not paint the Carioca fountain, but he provides a useful explanation of the domestic work of laundresses. Rich families in Rio, he writes, had domestic servants—the *négresses blanchisseuses* (black laundresses) who washed clothes, and a *mocamba* (maid) who took care of the ironing, because, according to Debret, “a lady [of this class] will not wear anything that is not freshly washed

¹⁷ In eighteenth-century Paris, two kinds of water carriers supplied largely the private homes: those on foot who carried water from the fountains (or the river) in buckets vs. those who used animal—drawn carts and delivered water in huge barrels, see Graber (2007: 317).

¹⁸ Collection of Cândido Guinle de Paula Machado, Rio de Janeiro, available through Artstor.

¹⁹ Coleção Geyer, Museu Imperial de Petrópolis, reproduction available in Banco do Brasil & Horta 2000.

and ironed, and will even change her clothes before going out a second time” (Debret 1965 II: 147).²⁰ Poor households, on the other hand, who own only one slave, will send the slave to wash the linens at the public fountains, particularly at the Carioca and Campo de Santana fountains, because of the large basins used for laundry found there. “One finds the washers there, day and night,” Debret writes (1965 II: 147).²¹

If the limited water infrastructure of Rio had an advantage, it was that it gave slaves and free blacks a place where they could congregate, even though their work was hard and long. The artists noticed and recorded that the public fountains were places where slaves not only worked but also greeted one another, shared information, and sang. All of the paintings of fountains show slaves in conversation, even though the work of lifting large jugs of water or the even heavier wooden casks was extremely onerous. The laundresses’ work was also physical, but artists depict them talking as they stand in the water and wash linens and clothing. The French artists Hippolyte Taunay and Ferdinand Denis write in their account of the customs of Brazil that “the few fountains [of Rio] mean that they are always surrounded by hundreds of slaves waiting and playing their instruments from their homelands until their turn comes to fill their barrel.” A sentinel watches over the scene “with a whip that he dispenses liberally to the right and the left to those who do not wait their turn. . . . there is always a great racket” (Taunay and Denis 1822 II: 23-25).²² Similarly, Debret notes that the public fountains are “places of usual gathering of slaves,” where the observer can hear music and singing of the different nations of slaves. Debret’s image of *L’Aveugle Chanteur* (the blind singer) accompanies this statement, suggesting that place where the old black man plays the *berimbau* (African musical bow) is at one of Rio’s fountains. A second man playing what Debret calls a *marimba* is sitting on what is clearly a water barrel (Debret 1965 II: 128-9).

Artists painted other, less frequented public fountains in Rio. The Largo de Moura fountain was built at the end of the eighteenth century in a small square on the bay near the *calabouço* (jail).²³ John Luccock notes the similarity in its structure to the Largo do Paço fountain and describes the two large troughs used for washing clothes. However, the water flow was considerably smaller than at other fountains, and for this reason he writes, “it is little used” (Luccock 1820: 76). Ender also painted this

²⁰ “Une famille riche, donc, a toujours ses négresses blanchisseuses, et la *mocamba* (femme de chambre) est chargée spécialement du repassage des pièces ornées de garnitures; ce qui l’occupe au moins deux jours par semaine : car une dame ne porte rien que de fraîchement repassé, et renouvelle même sa toilette pour sortir une seconde fois dans la matinée” (Debret 1965 II: 147).

²¹ “Le plus pauvre ménage brésilien, au contraire, qui ne possède *qu’un nègre*, l’envoie laver le linge aux fontaines publiques de la ville, et particulièrement à celles de la *Carioca* ou du *Campo Santa-Anna*, parce que toutes deux sont environnées de vastes bassins destinés à cet usage. Aussi trouve-t-on jour et nuit des *laveuses*, dont les battoirs retentissent au loin” (Debret 1965 II: 147).

²² “Le petit nombre de fontaines fait qu’il y a presque toujours auprès d’elles plusieurs centaines de nègres qui attendent, en jouant des instruments de leur pays, que leur tour arrive de remplir leur baril. Un soldat de la police veille, avec une courroie dont il distribue largement à droite et à gauche, à ce qu’il ne se fasse pas de passe-droits pour le rang. C’est là surtout que les mauvais esclaves corrompent les bons; il s’y fait ordinairement un tapage extraordinaire: dans les tems de sécheresse l’eau est très-chère” (Taunay and Denis 1822 II : 23-25).

²³ Its inscription: “Illmo e exmo. sr. d. José de Castro, conde de Rezende, vice-rei e capitão general de mar e terra do Estado do Brasil mandou edificar esta fonte. Anno MDCCXCIV” (Correa 1939: 69) According to Correa, this fountain was named for the Portuguese regiment, originally from Moura, lodged there. It was a place known to be violent and a place where slaves and free blacks battles for control over it (Correa 1939: 68).

fountain in a watercolor in which the fountain appears as the most prominent structure in a large and somewhat deserted square.

The Marrecas fountain was located opposite the first public garden in Rio known as the Passeio Público. Maria Graham describes the fountain of the Marrecas as “opposite to the public gardens, and near the new barracks; and, besides the spouts for water for the inhabitants there are two troughs always full for the animals” (Graham 1824: 167). Luccock praises this fountain stating that “[a]t the head of the Rua das Marrecas, is a fountain, which, in a city so little ornamented, may be called splendid” (Luccock 1820: 76-77). He notes its bronze statues, and its two troughs: one for horses, the other for washing clothes. This fountain was painted by Armand Julien Pallière between 1817 and 1830.²⁴ Pallière’s representation of the fountain carries a familiar theme: the fountain serves as a backdrop for his true subject: slave water carriers. While we can see the royal coat of arms at the top of the fountain and the inscription below, his picture is not about the fountain, but rather the social space around the fountain. As Pallière makes clear, it is a space inhabited by slaves and free blacks, who go about their work and who greet each other and talk as they work.

In the first decades of the nineteenth century, a new aqueduct was built to bring the waters of the Maracanã River into the city. This aqueduct ended with the fountain at the Campo de Santana, a large green common at the back of the city, much frequented by laundresses. Thomas Ender painted the fountain, with laundresses around it, soon after it must have opened in 1818. Next to the fountain is an open shed where women are washing clothes. The campo appears quite rustic, muddy, and isolated. A later engraving (1835) illustrates the fountain nearly twenty years later.²⁵ The campo has urbanized rapidly; it is lit, and the fountain clearly has many spouts of water. Yet the water delivery infrastructure has hardly changed. Individual slave men and women still carry tall jugs to be filled at the fountain, and women kneel to wash clothes at a tank in the square. At this time, the fountain may have supported the work of two thousand laundresses (Correa 1939:87).

Because of the great transformations of the city of Rio de Janeiro over time, especially the leveling of three of the original four hills that confined the original city center, as well as the extensive landfill projects (Andreatta 2008), georeferenced maps can provide greater clarity for historians. Specific places, such as fountains, can be studied in their actual historical-spatial contexts. When historical imagery is geocoded into a georeferenced map, the map provides the historical/spatial context in which the artist stood (or sat) when sketching (or painting) a view. Ender’s watercolor of one of the fountains on Mata Cavalos street, when geocoded, reveals that this simple fountain, which seems to have been used primarily by laundresses, was on the very edge of the city. If we geocode other images of the fountains, it is possible to construct viewsheds that comprise that which the artist rendered. The first map printed in Brazil in 1812, made by order of the Prince Regent, when georeferenced, provides an excellent platform onto which images of fountains can be geocoded. This creates a rich spatial environment in which we can study the public space of fountains in the early nineteenth century (see Fig. 5).

²⁴ Pallière, *Chafariz das Marrecas*, Museu Histórico Nacional, Rio de Janeiro, <http://www.museuhistoriconacional.com.br/images/galeria22/mh-g22a002.htm>, accessed 10/26/2014.

²⁵ Willem Karl Theremin and W. Loeillot, *Chafariz do Campo (1835) tomado da Igreja de S[ant]a Anna*, Biblioteca Nacional, Brazil, http://objdigital.bn.br/acervo_digital/div_iconografia/icon393016/icon393016_06.jpg, accessed 10/26/2014.

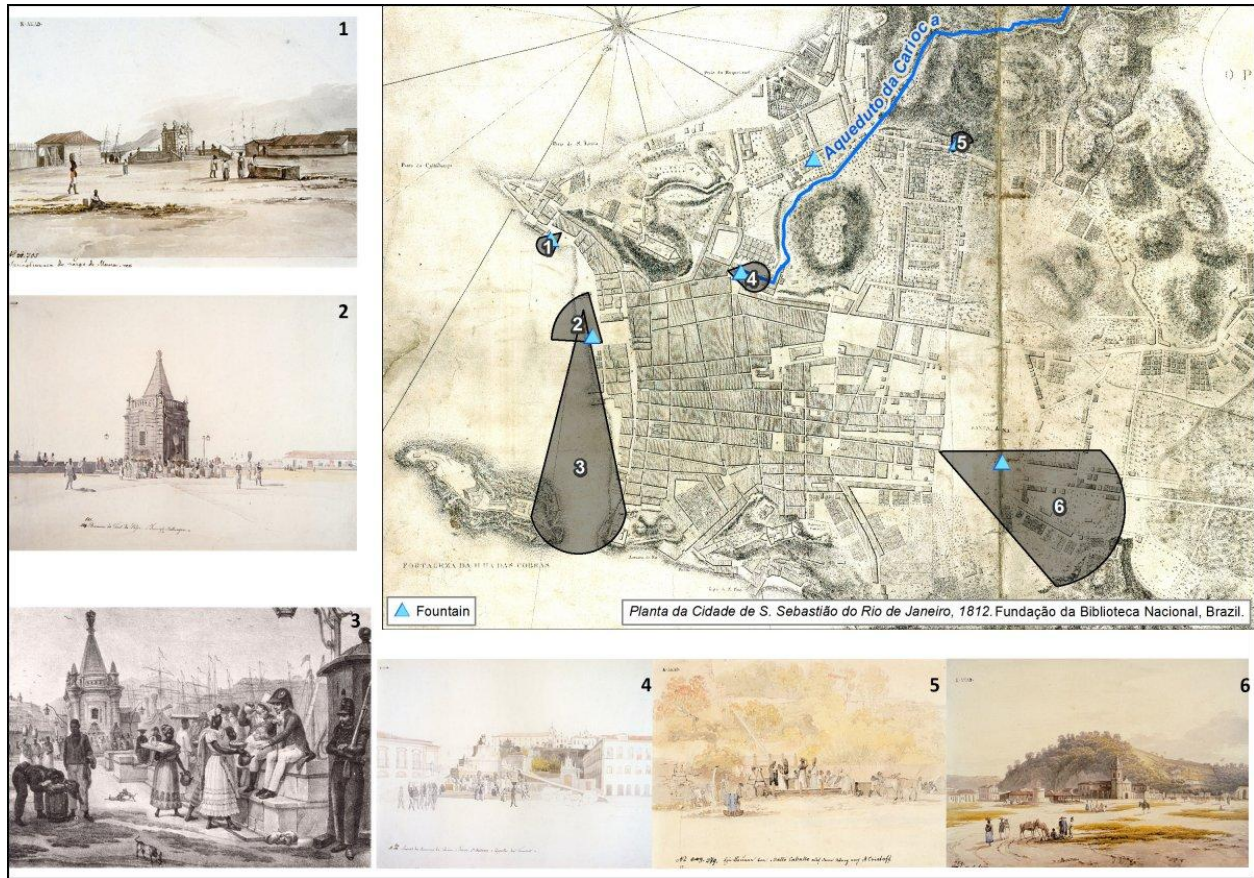


Figure 5: Scenes at the Fountains of Rio de Janeiro, c. 1820.

In Figure 5, two views of the Largo do Paço fountain by Debret (#3) and Ender (#2) show the gathering of residents around the fountain, some at work, some relaxing. The Largo de Moura fountain (#1) is largely deserted, although the long granite tank for washing is clearly visible. The monumentality of the Carioca fountain (#4) can be seen, even though Ender leaves its details unfinished in his watercolor. Ender’s image of the Mata Cavalos fountain (#5) emphasizes the work of laundresses while his image of the Campo de Santana fountain (#6) shows the new fountain in the still very rural campo at the back of the city.

Georeferenced historical maps and geocoded images greatly enhance the study of water in the early nineteenth-century city of Rio de Janeiro. When the fountains are studied in their historical and spatial contexts, historians can better reconstruct the nature of domestic work, the urban water infrastructure, and the social spaces of fountains. Knowing the exact locations of fountains offers new interpretations of their role in city infrastructure. While dependent on the artist’s gaze, the paintings of fountains, when geocoded, can allow historians to understand better the public use of the space around the fountains. While kings and viceroys created fountains to benefit those who lived in the city (or those who visited Rio by ship), the public spaces of fountains were taken over by slaves and free blacks during the day. The heavy weight of their domestic work must have been lightened somewhat by the chance to visit, exchange news, gossip, and even romance around the fountains. The sentinels stationed at the fountains might crack their whips, but they could not prevent singing, music,

and drumming at the fountains, even if through these slaves and free blacks communicated independently of the master class. Even the violence that erupted between slaves and free blacks can be read as expressions of independence and autonomy. For the violence between slaves and free blacks often emanated from loyalties to African homelands (*nações*) and reflected the competition between social groups among slaves and free blacks (Soares 2001).

In the public space of the fountain, a gap opened up in the control of masters and the state over slaves. In these public spaces, slaves and free blacks exercised some power. They asserted their cultural identities, and they cultivated relationships with others. They were able to do so because the water infrastructure of the city was limited. The work done at fountains—by water carriers and laundresses—was essential to daily life in Rio. Without this work, the city could not function. Moreover, the delivery of water in Rio hardly changed, even as the population grew in size. Slaves continued to deliver water in individual jugs, and to wash laundry at public fountains well into the nineteenth century. The existence of so many slaves in the city made it possible for an extremely limited water infrastructure, predicated on long hours of domestic service performed by male and female slaves, to function. The exploitation of slaves was great in Rio, but slaves claimed the right to converse, to sing, to play music, and to compete as they worked at the fountains. These expressions in these public spaces were ways in which slaves took control over some aspects of their daily lives.

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