

The Carriedo Waterworks and its Significance during the Philippine Revolution (1896-1898) and the Philippine-American War (1899)

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ABSTRACT

This paper presents the history of the Carriedo Waterworks, the potable water supply system of Manila during the Spanish period. The study focuses on the waterworks' topographical and structural features and their importance during the Philippine Revolution and the Philippine-American War from 1896 to 1899.

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With the Carriedo Waterworks no longer functional and only a few of its ruins remain, there lies the need to revisit how the waterworks once became an important part of Manila. This paper presents and explains its main features through the *projecto* and *antiproyecto* (draft project and alternate project, respectively) of the waterworks retrieved from the Archivo Histórico Nacional in Madrid. These materials reveal the importance of the Carriedo Waterworks as the main provider of potable water for Manila. For this reason, Filipinos, Spaniards, and Americans all saw the need to control the waterworks to reinforce their respective interests during the wars at the end of the 19th century. Parts of the waterworks, such as El Depósito and the Santolan pumping station, became battlefields several times from 1896 to 1899. The prompt, intense, and frequent battles for the waterworks emphasize the significance of the Carriedo Waterworks during that period.

KEYWORDS

Carriedo Waterworks, El Deposito, Philippine Revolution, Philippine-American War

INTRODUCTION

“I went in and made a thorough investigation, and I think it one of the most wonderful pieces of engineering that exist today.” This was how Frank Campbell, a New Yorker fighting in the Philippines, described El Depósito

in San Juan when it was occupied by American soldiers on 5 February 1899.¹ A year later, American war veteran and author Ebenezer Hannaford added that “the most creditable of Manila’s public works is its water-supply system.”² These accounts show how the Americans regarded the importance and impressiveness of the supply of potable water to Manila.

The Manila waterworks during the late 19th century caught the interest not only of military men but also of students of science and history. Both Spaniards and Americans already conducted early studies about these Spanish public works. However, there are still more aspects of the waterworks that needed to be researched. First, there are primary sources that are left untapped and are yet to be presented. Second, previous studies tend to emphasize only the history of the waterworks until its completion in 1882 and seem to elude the events afterward.

The paper at hand, therefore, aims to address these two shortcomings. This study shall present documents from the Archivo Histórico Nacional in Madrid, focusing on the plans and schematic designs that give additional information as well as a topographical perspective on the entire water supply system. After having an outline of the waterworks, the paper proceeds to the little-known history of the waterworks during the last years of the 19th century. One will find out that during the wars of this period, including the one mentioned above, the waterworks became a crucial point of contention among the Filipinos, Spaniards, and Americans who each struggled to take control of Manila. In addition to providing new information, these

two aspects of the Manila waterworks—its features and its history—both emphasize the importance of this system during, and even after, the 19th century.

HISTORY OF THE WATERWORKS UNTIL ITS COMPLETION IN 1882

As mentioned earlier, the Manila waterworks have already become the subject of earlier investigations, which provide good information on some of its history. This section aims to revisit these initial studies.

The earliest study of the waterworks was published in 1882. The book *Carriedo y sus Obras* by Francisco de Mas y Otzet may be considered as the commemorative book for the festive opening of the Manila waterworks in that same year.³ As such, the author emphasized in his work the events during the said inauguration. The entire water supply system was officially opened on 23 July 1882, the birthday of Queen Maria Christina, although festivities already started on the 20th and ended on the 24th. The inauguration took place at the Carriedo Fountain, then in Sampaloc, Manila where potable water gushed out of that fountain for the first time in public. Commemorative tokens and coins were also distributed. There was band music, athletics, fireworks, civic processions, and theater performances in various public spaces in Manila throughout the five-day celebration.

Aside from a description of the five-day event, Mas y Otzet also attempted to write a biography of Francisco

Carriedo y Peredo, the benefactor of the Manila waterworks (which was also referred to as the *canal de Carriedo* or Carriedo Waterworks).⁴ Mas y Otzet, unfortunately, admits that despite his exhaustive efforts, sources on Carriedo were scarce and contradictory.

In consolation, one can say that one's legacy is greater than one's life. This is true for Carriedo, "whose modesty," Mas y Otzet writes, "is revealed in the obscurity of his life and in the splendor of his death."⁵ A decade before his death on 12 September 1743, Carriedo offered an amount of ₱14,000 for Manila which would be invested and later used according to his will. Ten thousand pesos from the *fondo de Carriedo* were allotted to carry potable water to Manila through pipelines. The remaining ₱4,000 were allotted to construct an industrial school for beggars. The fund eventually grew through investments and loan interests and was used to construct the Carriedo Waterworks which was, as mentioned earlier, festively inaugurated in 1882.

Overall, Mas y Otzet's study of the Carriedo Waterworks focuses on some aspects of its history, while some others are overlooked or briefly discussed. This is what the American historian and University of the Philippines professor Alexander Salt observed when he wrote in 1913 that while "Carriedo is recognized as a benefactor, the printed data as to the man himself, his charitable wisdom, and the progress of the work with which his name is associated is scanty in the extreme."⁶ Salt nonetheless recognized Mas y Otzet as the "official historiographer" of the inauguration of the waterworks.

Seeking to complement the work of Mas Y Otzet, Salt wrote the article “Francisco Carriedo y Peredo,” published in the June 1913 issue of the *Journal of Science*, which came out as the second study on the waterworks. This article found more details on Carriedo. To highlight a few, Carriedo was born in Santander, Spain on 7 November 1690 and came to the Philippines in 1722. During his stay, Carriedo accrued his fortune through the galleon trade and married Mariana de Cosio, daughter of Gov. Gen. Toribio José Cosio y Campo. During his stay in the Philippines, Carriedo became endeared to the city of Manila to which he later gave part of his wealth before his death.

While Mas y Otzet focuses on the completion of the waterworks in 1882, Salt emphasizes the tedious efforts of the officials and engineers of the city of Manila to arrive at that completion. Despite setbacks, most notably the British invasion of 1762, the Carriedo fund grew from the initial 10,000 pesos to 346,875 pesos in 1878 when work started. Engineer Genaro Palacios y Guerra was employed in 1868 to draft the plans and oversee the construction. He drew two schemes—the *proyecto* (plan) and *antiproyecto* (alternative scheme). When he submitted both plans, the city officials approved Palacios’ *antiproyecto* in terms of feasibility. Overcoming all initial problems, each elaborated in Salt’s paper, the city chose the birthday of King Alfonso XII, 28 August 1878, as the start of the construction.

The building process, likewise, encountered difficulties such as typhoons, a few accidents, and miscalculations. Nonetheless, Salt judges that “on the whole, the work proceeded with more speed than might have been

expected.”⁷ Indeed, it is surprising to know that such a large project only took four years to be completed. Salt gives due credit to Genaro Palacios who had been on the field from the planning phase in 1868 until the completion of the waterworks in 1882.

Alexander Salt ends his study with a leap to his contemporary times in 1913. By that time, the American colonial government had already opened a new reservoir in Montalban in 1908 to increase storage capacity and obtain cleaner water.⁸ The Carriedo Waterworks was relegated to back-up during the dry seasons when the new system was not enough to supply Manila with potable water. Even so, Salt concludes that the more modern waterworks “does not in any way detract from the forethought and wisdom of Carriedo, who may still be called the greatest benefactor of the city of Manila.”⁹

PLANS OF THE CARRIEDO WATERWORKS

Despite providing good information on the history of the waterworks, previous works of literature lack a description of the structures themselves. It appears that these early studies did not need to elaborate on this, because the waterworks were still visible and operational when these studies were conducted. On the other hand, more recent researchers could have found it difficult to dwell on the structural aspect of the waterworks because, unlike before, only a few parts of the system remain today.

This paper contributes to this aspect by presenting the plans of the waterworks found at the Archivo Histórico

Nacional. Genaro Palacios' blueprints of the *proyecto* and *antiproyecto* give us an overview of the waterworks and details on its main structures and operations. These will be important for the later discussion on the battles for the waterworks at the end of the 19th century.

A royal order on 26 December 1866 mandated the creation of a *proyecto* which, in keeping with Carriedo's will, shall bring potable water to Manila from a clean source.¹⁰ According to surveys during that time, the San Mateo River (now known as Marikina River) in Marikina and San Mateo (now part of Rizal Province) proved to be clean enough for drinking and sufficed to be the wellspring of this new project. Chief Engineer Don Genaro Palacios was commissioned on 27 February 1867, and on 8 December 1869, he presented his *proyecto* and *antiproyecto* to the Inspección General de Obras Publicas. The latter was satisfied with the plans, complete with the list of materials to be used, budget, and other details. All the bridges and aqueducts were drawn in detail. Because of their intricacy, Palacios' designs were deemed as the standard for other public works projects, such as when the Spanish government asked for designs for the railway system in the Philippines in 1867.¹¹ Palacios' *proyecto* is the original plan for the waterworks while his *antiproyecto* serves as the alternative. The *planos generales* of both provide the topographical setup of the entire waterworks and the location of its structures. One plan can be compared and contrasted to the other.

THE *PROYECTO*

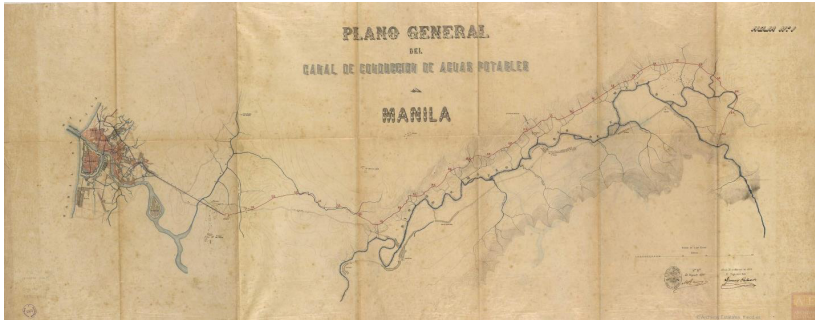


Fig. 1. General plan of aqueducts to bring potable water to Manila, by Genaro Palacios, 30 November 1869. Archivo Histórico Nacional, Ultramar, MPD.4539.

The *proyecto* includes an elaborate system of 27 kilometers of pipelines and elevated Roman aqueducts from a masonry dam in Montalban¹² (now Rodriguez, Rizal Province) to San Juan del Monte. Using gravity, water would be channeled through pipelines to keep it clean.¹³ These pipelines would be laid on elevated areas in Marikina and Montalban.¹⁴ Seventeen Roman aqueducts, with the highest measuring about 15 meters in height, would be built across deep creeks and gorges.¹⁵

Atop the hill in San Juan del Monte would be the *casa de servicios* or the service building for the Cuerpo de Fontaneros de Carriedo consisting of the engineers and other employees maintaining the waterworks.¹⁶ Underneath this building would be the Depósito or reservoir which would supply potable water for an estimated population of 300,000.¹⁷ From the Depósito, the water would again be channeled via pipelines to the city of Manila using gravity.

This flow of water could be controlled via the water gates at the *casa de servicios*, which was also called *casa de llaves* for this reason.

As a side note, there are also other historic locations included in the *plano general* such as the San Juan Polvorín, Cruz de Ligás and Balará. Although not technically related to the waterworks, these places were connected to the latter during the outbreak of the 1896 revolution.

Despite the intricacy of Palacios' designs, his *proyecto* was rejected by the Inspección General de Obras Publicas for being unfeasible. First, the project would cost an expensive total of ₱2,289,548.¹⁸ Second, the extensive system of pipelines and aqueducts was prone to earthquakes, wars, and other calamities.¹⁹

THE *ANTIPROYECTO* AND THE COMPLETED WATERWORKS

When the *proyecto* was rejected, Genaro Palacios carried into effect his *antiproyecto* drawn for this circumstance.²⁰ Far cheaper than its counterpart, the *antiproyecto* would only cost ₱745,509. A look at its *plano general* reveals the striking differences, as well as similarities, between the two plans.

With few modifications, the *antiproyecto* became the basis of the completed waterworks in 1882. Written accounts and photographs of its structures, pipelines, and aqueducts—most taken during the Philippine-American War and early 20th century—prove that the plans had been carried out faithfully.

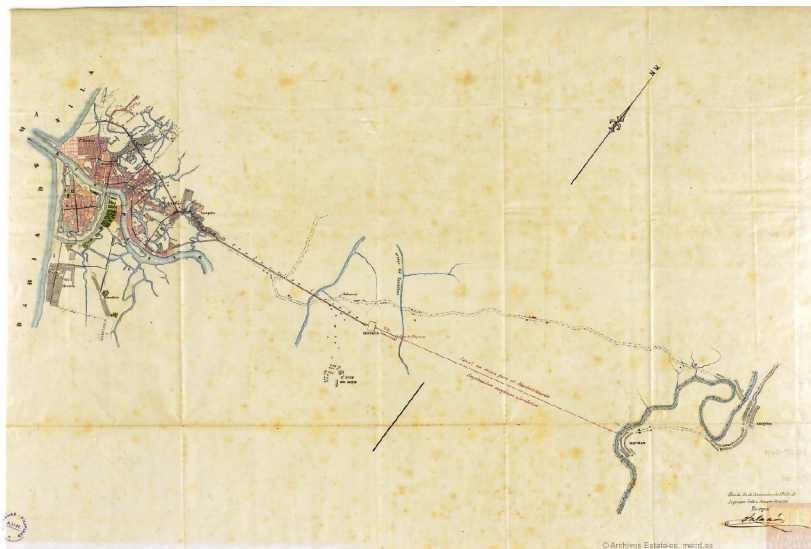


Fig. 2. Alternative plan to bring potable water to Manila, by Genaro Palacios, 30 November 1869. Archivo Histórico Nacional, Ultramar, MPD.4537.

The location of the Depósito and the layout of the pipelines from the reservoir towards Manila remained unchanged in the alternative plan. The rest of the system, however, was significantly altered. The wellspring of potable water was moved to Libis, Santolan which is the closest access to San Mateo River from the Depósito. The 27-kilometer series of pipelines and aqueducts from Montalban was replaced by a five-kilometer channel from Santolan to San Juan.²¹

Gravity could no longer be used to transport water in the shorter channel, given that the Libis wellspring was at the foothill of San Juan del Monte where the Depósito is erected.²² To carry the water uphill, a *casa de maquinas* or pumping station was built near the river.²³ The station

housed two steam-powered pumps of about 15,000 cubic meters combined.²⁴ As seen in the plan, another pumping station was constructed near the other end of the channel and just behind the Depósito to further carry the water through the steep hill.

The design of the Depósito was essentially the same for both plans. There were two underground basins with a combined capacity of 56,000 cubic meters. Seen at the surface were 207 ventilation shafts to keep the water cool and free from vegetable matter. As mentioned earlier, the flow of stored water from the Depósito to Manila could be controlled via water gates.

From the hills of San Juan, the water was carried via the *líneas maestras* or main pipelines which passed along a purchased right-of-way towards Manila.²⁵ The mainline ran through Sampaloc—where the Carriedo Fountain was located—and through the outskirts of Quiapo, Santa Cruz, and Binondo. To bring the water within the city, a network of smaller pipelines stemmed out from the main lines and slithered throughout the streets of Manila.²⁶ Again, some private lands were purchased, and some buildings were even demolished, to give way to the pipelines.²⁷ Aqueducts were constructed to carry the pipelines across the San Juan and Pasig Rivers.

There were three types of water outlets in Manila. There were metered house connections where consumers paid a monthly fee, part of which was used for the maintenance of the waterworks. There were also the *establecimientos de beneficencia*, or institutions that enjoyed the supply of

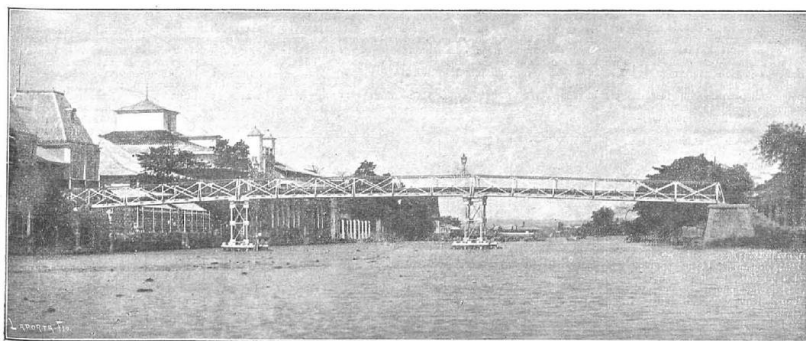


Fig. 3. Puente de Misericordia, built to carry the pipelines across the Pasig River, 1898. From *La Ilustración Española y Americana*, 8 July 1898.

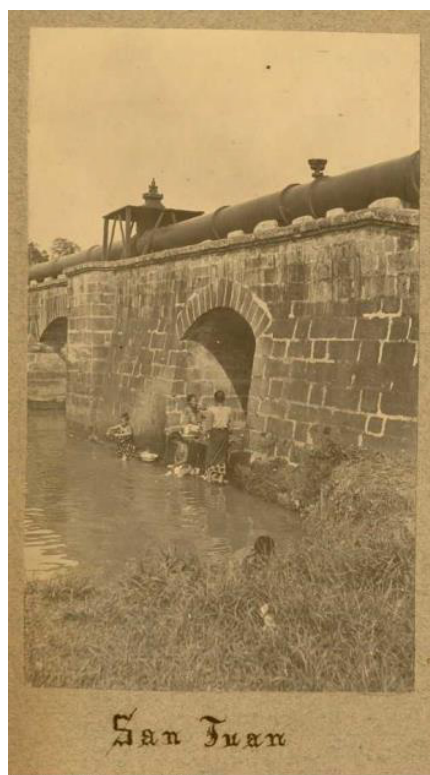


Fig. 4. The San Juan Aqueduct (different from the San Juan Bridge), early 20th century. From the Luther Parker Collection of the National Library of the Philippines.

water for free. As stated in Carriedo's will, the convents of San Francisco and San Juan de Dios, and the monastery of Santa Clara all received this beneficence. Lastly, also based on the will, there were public hydrants and fountains throughout Manila for the use of the general population. Aside from drinking, the water from these *fuentes* was used for firefighting and street cleaning.



Fig. 5. A postcard showing Filipinos queuing for a public hydrant in Paco, Manila, early 20th century. Note the sentries in black. From the postcard collection of the National Historical Commission of the Philippines.

In general, the Carriedo waterworks became a crucial part of Manila since 1882. Potable water—a basic human necessity—was being delivered to the populace through this system. Moreover, the importance of the waterworks came with its complexity. It consisted of several key structures and several kilometers of pipelines, which overall

covered a large geographical area from Manila to Santolan. The use of steam-powered pumps also entailed regular maintenance and supply of coal. If one of these structures malfunctioned, the entire system would also fail and the supply of potable water to Manila would be jeopardized. The importance and complexity of the waterworks were highlighted during the end of the 19th century when battles were fought to gain control of it.

THE BATTLE OF SAN JUAN DEL MONTE, 1896

The revolt of the Filipinos against Spain in 1896 was the result of careful planning since the founding of the Katipunan, the secret Filipino organization aiming for independence, in 1892. Its leader Andres Bonifacio and his comrades had been clandestinely increasing the members and weapons of the Katipunan. Along with it, they also discussed plans to overthrow the Spanish military forces and consequently the colonial government.

Needless to say, the center of the Spanish rule in the Philippines was in Intramuros, and the Katipuneros knew that the Spanish forces there were more in numbers and stronger than theirs. Nonetheless, Bonifacio and his military thinkers planned an uprising that could turn the tides in favor of the disadvantaged Katipuneros. Bonifacio aimed to attack Manila from four directions: Santa Mesa-Sampaloc, Caloocan, Pateros-Pasig, and San Juan-Mandaluyong.²⁸ The date was set on the evening of 29 August 1896, when the Spanish forces in the capital were weaker owing to the ongoing campaign in Mindanao. On

the other hand, Gov. Gen. Ramon Blanco knew of this attack, thereby mustering his troops in some focal points of combat. San Juan del Monte was among them because of the Polvorín (weapons and ammunitions storage) and the Depósito located there.

The forces of Bonifacio and his aide Emilio Jacinto, reinforced by those of Sancho Valenzuela, successfully captured the Polvorín at dusk of 30 August 1896. The Spanish defenders, having lost their commander and another soldier, retreated to the nearby Depósito and waited for the arrival of the 73rd “Jolo” Regiment. The capture of the Polvorín was often interpreted as part of Bonifacio’s overall plan to procure arms while reaching the capital. However, the Katipuneros could have also planned to attack the Polvorín as a step to attack El Depósito, not only to eliminate the Spaniards garrisoned there who could thwart the Filipinos’ advance to Manila but to cut the flow of potable water which would cripple the Spaniards in the capital. This goal was not explicitly stated in the 1896 revolution, but the succeeding battles for the waterworks clearly established it as a military objective.

Nevertheless, the Battle of San Juan del Monte on 30 August 1896 ended as a staggering defeat for the Katipuneros. The superior firepower and numbers of the 73rd “Jolo” Regiment and its garrisoned and uphill position proved insurmountable for the Filipinos. Over 150 Katipuneros were killed and 200 captured, including Sancho Valenzuela. He and many other prisoners were summarily tried and executed later on.

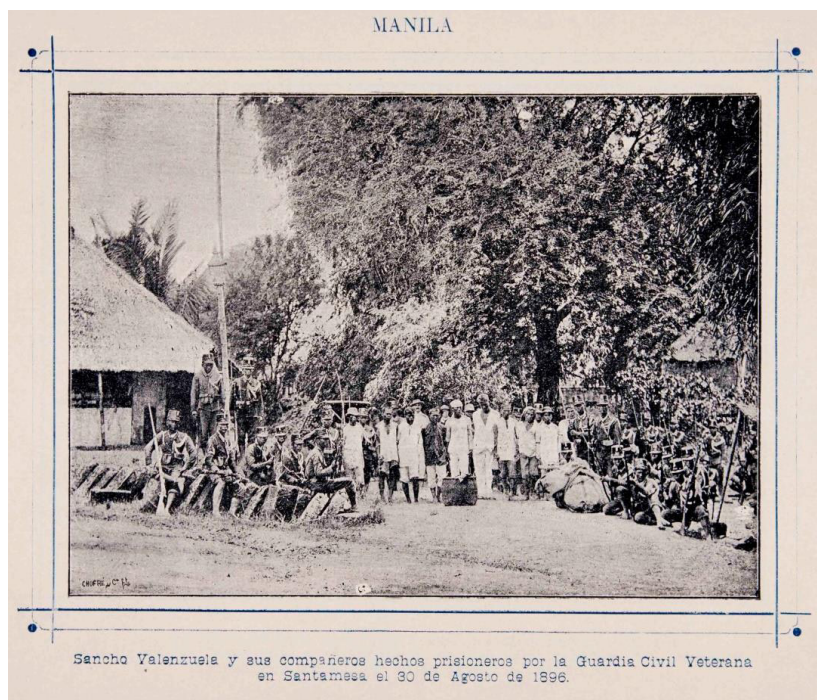


Fig. 6. Caption reads: "Sancho Valenzuela and his comrades imprisoned by the Guardia Civil Veterana in Santa Mesa on 30 August 1896." From *Tristes Recuerdos. Manila 1896* (National Historical Institute, 2004).

SPANIARDS' DEFENSE OF THE WATERWORKS, 1898

The defeat of the Katipuneros in Manila nonetheless signaled the revolution in the provinces. Emilio Aguinaldo, the revolutionary leader in Cavite, took over the reins of the nationwide uprising after Bonifacio's execution in 1897. However, primarily owing to the mounting casualties on both sides, the Filipinos and Spaniards entered a truce in Biak-na-Bato, Bulacan on 14 December 1897. As the pact entailed, Aguinaldo and his fellow leaders were exiled

to Hong Kong. The revolution weakened in Manila and nearby towns but continued in other provinces because their local leaders refused to accept the said pact.

The battle in Manila was reintensified in 1898 when Aguinaldo's party returned from exile. After successive victories in Cavite, revolutionaries continued pushing the Spanish forces towards Manila.²⁹ However, the Filipinos were not able, or rather not allowed, to enter the capital. The Americans, who Aguinaldo and many other Filipinos believed to be their allies, requested the rebels to vacate their trenches in Pasay and Baclaran, and freely crossed the Filipino positions towards Manila.³⁰ The Americans clearly aimed to take the capital for themselves.

Meanwhile, the Filipino forces continued their battle against the Spaniards beyond the exterior line of Spanish defense of Manila.³¹ Despite the Filipinos' remote positions, their military objectives were just as crucial as the Americans' interest in taking the seat of government in Intramuros. Similar to the 1896 revolution, the Filipino revolutionaries again targeted the Carriedo Waterworks. By controlling and cutting the water supply to Manila, the Filipinos could paralyze the Spaniards within Intramuros and hasten their surrender.

The Spaniards also knew of the importance of maintaining their foothold in the key structures of the waterworks, and hence heavily-guarded these positions. The Spaniards' desperate defense of the waterworks was recounted in the memoirs of volunteers Juan and José Toral, published in October 1898. Their 6 June 1898 entry narrates that:

Only the towns of Caloocan, Santa Ana, San Juan del Monte, and the Santolan water reservoir remain in our possessions outside the [defensive] line; the rest of the province is occupied by the rebels, whose advances are almost reaching us. [Spanish] reinforcements are sent to the sectors and orders are sent to build the trenches if possible and to make a desperate resistance.

Minutes pass away anxiously; at the gates, all drawbridges are prepared to be raised; the walls are also guarded...³²

The Santolan reservoir and water station, being farthest from Manila and on flat terrain, was attacked first. The Filipinos under Col. Antonio Montenegro captured it on 27 June 1898 and started shortening the supply of water to Manila to three hours a day as leverage against the Spaniards.³³ While the Spaniards still held the Depósito in San Juan del Monte, it would be emptied in two days if no water would be channeled from Santolan. Montenegro demanded that the Spaniards surrender Manila to the Filipinos to return the constant flow of water and avert their suffering. Juan and José Toral continued to describe the Spaniards' situation on their 29 June entry:

There is a streak of bad news nowadays. There are desperate days, which seem to cast all sorts of illusions. By this moment we have run out of water because the insurgents had taken the vicinity of the Santolan reservoir and the operation of the pumping machines had been paralyzed. Certainly, the forces

we had in the Depósito and in a blockhouse were surrounded and besieged by the rebels...Water is a very serious problem for us, not because we lack something to drink, which cannot happen in the rainy season and with the rivers under our control, but because we lack that precious element to fight the fires... We must have defended the Santolan reservoir with more zeal because it is a position of exceptional importance, but it has not been done...³⁴

The above account shows the multiple functions of the waterworks cited in the previous section. In addition to providing potable water, which was its most emphasized function, the Carriedo Waterworks also supplied water to fire hydrants that were especially needed during wars.

On 1 July 1898, shortly after the capture of Santolan, revolutionaries started attacking El Depósito in San Juan del Monte where the Spaniards had fortified themselves. The uphill reservoir once again proved impregnable for the Filipinos. However, seeing the futility of further defending the already empty El Depósito, the Spaniards decided to evacuate San Juan for good lest they be overwhelmed by the enemy. By early July, the forces of Col. Montenegro had occupied the Santolan pumping station, the Depósito, and the other pumping station behind it.

FILIPINO OCCUPATION OF THE WATERWORKS, 1898-1899

The Filipinos' victory at San Juan greatly benefitted the Americans in Manila, who were by this time still fighting

the Spaniards within the city. In a U.S. Senate hearing, Gen. Francis Greene recounted that the Filipino army “invested [surrounded] Manila early in July so completely that all supplies were cut off, and the inhabitants, as well as the Spanish troops, were forced to live on horse and buffalo [carabao] meat, and the Chinese population on cats and dogs. It captured the waterworks of Manila and cut off the water supply...”³⁵ In the same hearing, Gen. Charles Whittier reported that “if they [Spaniards] had not had this experience of having been driven back into the city and the water cut off, so even that Jaudenes said he could not remove his non-combatants, the government would have insisted on his making a fight, and he could have made a very good one, for his position was strong...”³⁶ The generals implied that a major factor for the surrender of Intramuros was the Filipinos’ victories in the outskirts of Manila.

With the help of Filipinos in crippling their common enemy, the Americans occupied Intramuros when they accepted the terms of capitulation of the Spaniards on 14 August 1898. Gen. Whittier related that Gov. Gen. Fermín Jaudenes surrendered Manila to the Americans because of his fear of the natives entering the city, certain of their hatred towards the Spaniards.³⁷

The hoisting of the Star-Spangled Banner in Intramuros further surfaced the Americans’ true intentions for the Philippines. To protest against this, Aguinaldo sought the help of the *Comité Central Revolucionario* in Hong Kong and sent its chairman, Felipe Agoncillo, and

his secretary, Sixto Lopez, to Washington.³⁸ Aguinaldo also resorted to more drastic measures to let his forces enter Manila. Filipinos controlling the Depósito continued to limit the water supply to Manila and refused to restore it to normal until Gen. Wesley Merritt, head of the U.S. 8th Corps occupying Intramuros, made concessions.³⁹ Merritt and Aguinaldo agreed to let unarmed Filipinos and lightly-armed officers enter Manila, in exchange for the Filipino forces' withdrawal from the outskirts of the city and the complete opening of the waterworks.⁴⁰

Despite the efforts of the upper echelons to ease the tensions between the two armies, conditions in the field continued to worsen. Both Filipinos and Americans exchanged insults and fortified their positions as if getting ready for an impending war. Gen. Elwell Otis, who replaced the frail and exhausted Merritt, reported that in case of the outbreak of hostilities, their main direction of attack would be "to the northeast [of Manila] and comprised the pumping station and Depósito of the waterworks which it was necessary to secure..."⁴¹ Otis knew well that if war broke out, the Filipinos would again cut off the water supply. Unless they captured the Carriedo Waterworks, the Americans would be forced to abandon Manila in a matter of weeks. For this reason, the Santa Mesa district which was the closest to San Juan became the most important and precarious position along the American defensive line. Just across the San Juan River was the Depósito occupied and defended by Filipinos.

THE BATTLES FOR THE WATERWORKS DURING THE PHILIPPINE-AMERICAN WAR, 1899

The war between the Filipinos and Americans finally erupted on the evening of 4 February 1899. It became no surprise when the first shot of the war took place in Santa Mesa, where Private William Grayson of the First Nebraska Volunteers fired at patrolling Filipinos and killed Corporal Anastacio Felix, while the two others ran back. When a wave of Filipino troops returned to Santa Mesa to retaliate, Grayson and his company of four retreated while using the sturdy Carriedo mainlines as an effective cover.⁴²

The next day, 5 February, Col. John Stotsenburg already reported to Otis his capture of the Polvorín and El Depósito in San Juan.⁴³ However, knowing how the whole waterworks system operated, they knew that the water in El Depósito would only last for two days. They needed to seize the Santolan pumping station to constantly supply water to the former. Hence Stotsenburg's forces attacked Santolan the very next day, 6 February. The arrival of reinforcements enabled the Americans to surround the town and traverse the hills towards the pumping station. The Filipino defenders dug up trenches and fought bravely, but they had to retreat owing to the accurate enemy fire from the front and flanks. When Stotsenburg's troops conquered the last hill, they saw the pumping station at its footholds. The building was undamaged, but its engines had been disabled by the Filipinos upon their retreat. After hours of desperate searching, the Americans found the missing pumping cylinders hidden in a pile of coal, and the

pumping station was repaired. Potable water flowed freely again to Manila and brought comfort to the soldiers as well as civilians residing in the capital.

The battle on 6 February 1899 was later recorded as the Battle of El Depósito, although it actually took place at the Santolan pumping station, not at the San Juan reservoir. As mentioned earlier, the Depósito had already been captured the day before. A reason for this error was that the Americans sometimes mistook the meaning of Depósito for the pumping station instead of the reservoir.⁴⁴ They also often called both structures waterworks, which could have also caused the interchange. Another reason was that they could have often confused the pumping station in San Juan with the one in Santolan.

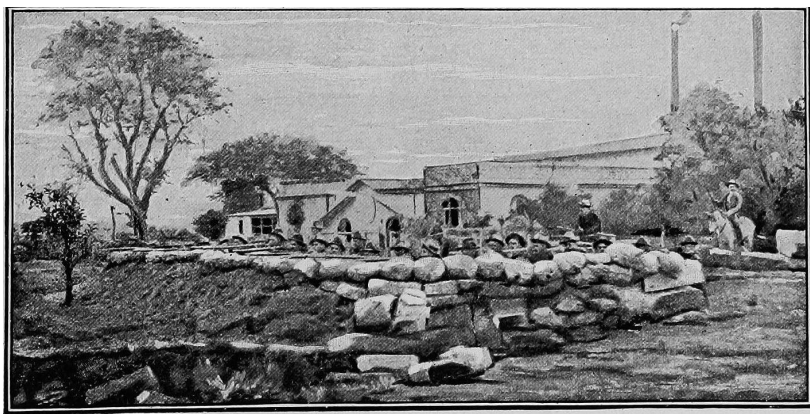


Fig. 7. The pumping station in San Juan del Monte (different from the pumping station in Libis, Santolan), occupied by the First Nebraska Volunteers. From Hannaford, Ebenezer. *History and Description of the Picturesque Philippines, with Entertaining Accounts of the People and Their Modes of Living, Customs, Industries, Climate and Present Conditions* (The Crowell & Kirkpatrick Co., 1900).

Nevertheless, the Americans' signal victory on 6 February 1899 was reported in many of their newspapers. For instance, the *New York Sun* writes:

A whole city full of people breathed sighs of relief on the evening of Feb. 6, when word was passed along that the Manila waterworks system was no longer in the hands of insurgent Filipinos. It meant much to have a thumb on the pump throttle which furnished to the Great Pearl of the Orient its drinking water. The insurgents had held it, and the question on the lips of everyone was would they ruin the works when they were driven out or shut off the supply were they only besieged?⁴⁵

The Filipino defenders' decision to only disable the pumping machines instead of irreparably destroying them was considered as "a serious blunder."⁴⁶ However, they could have chosen to do so for two reasons: they avoided inflicting long-term harm to civilians residing in Manila, and they planned to retake Santolan from the Americans.⁴⁷ The latter was evidenced by sporadic yet unsuccessful attacks of the Filipinos from February until March 1899. For this reason, Stotsenburg's command kept communications open between the San Juan Depósito and the Santolan pumping station by sending large military detachments to patrol the five-kilometer road between the two key buildings.⁴⁸ The Americans also heavily guarded these positions like the Spaniards. Troops continued to stay there until October 1901 when they were replaced by the Metropolitan Police.⁴⁹ A mounted detachment was also formed for patrol duty.⁵⁰

While many accounts tell the battle in Santolan, none seemed to elaborate on the battle in San Juan. However, the Depósito itself attracted the attention of the Americans. Newspaper reports state that the waterworks system was “a position which must be held at all hazards,”⁵¹ and was “very valuable, they supply a great many people with water.”⁵² Soldiers from St. Paul, Minnesota, described El Depósito as a “magnificent piece of work and well worth seeing, even the insurgents wishing to procure a nearer view.”⁵³ The account of New Yorker Frank Campbell, cited at the beginning of this paper, concludes as follows: “The Depósito is on ground—or rather in ground—at a sufficient height above the city to give them water in the tallest buildings, and that is thought to be enough in this benighted country—yet I do not know whether I should call it benighted or not, after seeing this wonderful Depósito.”⁵⁴



Fig. 8. The ventilation shafts of El Depósito bivouacked by American troops, 1899.
From *Neely's Color Photos of America's New Possessions* (F.T. Neely, 1899).

CONCLUSION

By studying the topographic and structural features and operation of the waterworks, one will find that the waterworks employed several key structures which were all vital in channeling potable water to Manila. The use of advanced technology and the vast geographical expanse of the waterworks added complexity to its importance.

With these factors in mind, the Carriedo Waterworks became a major military objective of Filipinos, Spaniards, and Americans during the battles from 1896 to 1899. Those who occupied the waterworks' key structures heavily defended them from the enemy, while the latter prioritized the waterworks as among their first targets to capture.

In contrast to its importance during the colonial period, only the ruins of El Depósito and a few street names remain of the Carriedo Waterworks today. While some researches are already written about it, these studies overlook some important aspects of the waterworks. Hence it is important to learn more about the bygone waterworks to recognize and appreciate its importance in Philippine history.

GLOSSARY OF TERMS (AS USED IN THIS PAPER)

Antiproyecto – Alternative plan or blueprint. Sometimes spelled anteproyecto or anti-proyecto.

Casa de Maquinas – Pumping station, or the building that housed the coal-powered pumps used to channel water uphill.

Casa de Servicios – Service center or building, housing engineers, and mechanics in charge of maintaining the waterworks. It also housed the valves that controlled the flow of water to Manila.

Comité Central Revolucionario – a Filipino organization founded in Hong Kong in 1898 to promulgate the Philippines' independence from Spain. It also solicited funds and weapons to aid the Filipino forces.

Depósito – Water reservoir.

Fuente – Hydrant or fountain.

Katipunan – A secret revolutionary society founded by Andrés Bonifacio and his comrades-in-arms in Manila on 7 July 1892. It aimed to gain independence from Spain through revolution. Its members were called Katipuneros.

Líneas Maestras – Main pipelines used to channel water from Santolan to Manila, thereafter distributed to suburbs via smaller pipes.

Plano General – General plan outlining the entire project.

Polvorín – Storehouse of weapons and gunpowder.

Proyecto – Draft architectural plan or blueprint.

NOTES

- 1 “Those ‘Savage’ Filipinos,” *Kansas Agitator*, 21 July 1899, 4.
- 2 Ebenezer Hannaford, *History and Description of the Picturesque Philippines, with Entertaining Accounts of the People and Their Modes of Living, Customs, Industries, Climate and Present Conditions* (Springfield: The Crowell & Kirkpatrick Co., 1900), 71.
- 3 Francisco Mas y Otzet, *Carriedo y sus Obras: Memoria de las Obras Pias de los Pobres y del Agua Instituidas por D. Francisco Carriedo y Peredo y Crónica de los Festejos que el Ayuntamiento de la Ciudad de Manila ha Celebrado para Conmemorar la Inauguración de la Primera Fuente de Aguas Potables* (Estab. Tip. de Ramírez y Girandier, 1882).
- 4 Ibid., 71. Various newspapers such as *Diario Oficial de Avisos de Madrid*, 3 September 1882 also refer to the waterworks as *Canal de Carriedo*.
- 5 Mas y Otzet, 37.
- 6 Alexander Salt, “Francisco de Carriedo y Peredo,” *The Philippine Journal of Science*, Vol. VIII, No. 3 (June 1913), 200.
- 7 Ibid., 198.
- 8 George W. Heise, “Notes on the Water Supply of the City of Manila,” *The Philippine Journal of Science*, Vol. XI, No. 1 (January 1916), 1. Heise explains that the Marikina River, the source of the Carriedo Waterworks, “passes through a thickly populated area including a number of large towns....” Hence, the Marikina River was at times infected by cholera, exemplified by a cholera outbreak in Marikina on 4 January 1908 which claimed 43 lives. “Cholera in Manila Water Supply,” *The Spokane Press*, 4 January 1908, 1.
- 9 Salt, 208.

- 10 Proyecto de conducción y distribución de aguas empleando máquinas. Archivo Histórico Nacional (AHN), Ultramar, Legajo 491, Expedientes 3-7.
- 11 Ferro-carriles en general. Archivo Histórico Nacional, Ultramar, Legajo 587, Expediente 1.
- 12 Trozo Segundo. Hoja No. 33: Presa. AHN, Ultramar, MPD.4581.
- 13 The use of pipelines to conduct potable water is set as a condition in Carriedo's will. The conditions, 14 in total, are cited in Mas y Otzet, 48-51.
- 14 Trozo Primero. Hoja No. 5: Perfil longitudinal. AHN, Ultramar, MPD.4543.
- 15 Looking at the longitudinal outline, the deepest and widest gorge was the one called Arroyo del Hermitaño, just behind the Deposito. Accordingly, the longest and highest aqueduct in the *proyecto* is the Aqueducto del Hermitaño. On a side note, it is also interesting to see in the said outline the names of the creeks and gorges, many of which are now forgotten. Some creeks are now gone owing to urbanization.
- 16 Trozo Primero. Hoja No. 10 F: Casa de servicio. AHN, Ultramar, MPD.4553.
- 17 Salt, 191.
- 18 Ibid.
- 19 Proyecto de conducción y distribución de aguas empleando máquinas. AHN, Ultramar, Legajo 491, Expedientes 3-7.
- 20 Mas y Otzet, 59-60.
- 21 In 1901, the *carretera de Santolan* was constructed alongside this channel to facilitate the maintenance of the pipelines and the pumping station in Libis, Santolan. From "History and Cultural Life of Barrio Santolan (1952-1953)" of the Historical

Data Papers. This road was renamed Bonny Serrano Avenue – its present name – in 1970.

- 22 The place name Libis came from a Tagalog word meaning “everything that is lower than the other, such as a foot, slope or skirt of a hill.” From Noceda, Juan de and Pedro de Sanlucar, *Vocabulario de la Lengua Tagala* (Manila: Imprenta de Ramirez y Giraudier, 1860), 179.
- 23 The location of the pumping station was possibly at the present site of Camp Atienza (known before as Santolan Barracks), the only military camp in Santolan. According to “History and Cultural Life of Barrio Santolan (1952-1953),” the Philippine Constabulary and Rizal Detachment were once stationed in the pumping station during the early 20th century because “it [was] a government property and because of its utility for the masses.” It was targeted and destroyed during World War II. While the pumping station was no longer rehabilitated because it was already obsolete, the Santolan Barracks could have been rebuilt in the same space after the war.
- 24 Salt, 191.
- 25 Similar to the *carretera de Santolan*, a road was constructed along this right-of-way in San Juan. This narrow street, appropriately named Tuberías (pipelines), still exists today.
- 26 Plano de las líneas de tuberías de la distribución de aguas potables en Manila y sus arrabales, según el trazado aprobado por R. O. de 10 de junio de 1875, indicando las longitudes y diámetros de las tuberías, la situación de fuentes y llaves de comunicación y de desagüe. AHN, Ultramar, MPD.4634.
- 27 Variación del trazado de la tubería de 22” en la calle de Arlegui en Quiapo; Variación del trazado de tuberías entre la calle de la Concepción y la de Sn. Roque del arrabal de Quiapo, AHN, Ultramar, MPD.4653-4654. Some structures in the plans are marked *arruinada* (demolished). Similar to Santolan and San Juan, a road was constructed along a right-of-way in Quiapo and was also named Tuberías (now Concepción Aguila St.)

- 28 Milagros C. Guerrero and John N. Schumaker, S.J. *Kasaysayan: the Story of the Filipino People*, Vol. 5 (Asia Pub. Co. Ltd., 1998), 172.
- 29 Account of Gen. Wesley Merrit. In *Harper's Pictorial History of the War with Spain*, Vol. II (Harper and Brothers, 1899), 410.
- 30 Milagros C. Guerrero and John N. Schumaker, S.J., 224. Also see Ricarte, Artemio. *Memoirs of Gen. Artemio Vibora Ricarte* (National Historical Commission of the Philippines, 2012). Ricarte, who won battles in Cavite, was among those who were not allowed to enter Intramuros. Hence, he established his headquarters in Santa Ana.
- 31 *Annual Reports of the War Department for the Fiscal Year Ended June 30, 1903*, Vol III (Reports of Department and Division Commanders) (U.S. Government Printing Office, 1903), 429. The northern portion of the exterior line of Spanish defense of Manila consisted of a line of blockhouses and small forts with connecting lines of intrenchments, held by a force of 6,750 Spanish soldiers.
- 32 Juan y José Toral. *El Sitio de Manila: Memorias de un Voluntario* (Manila: Imprenta-Litografía Partier, 1898), 161.
- 33 Sastrón, Manuel. *La Insurrección en Filipinas y Guerra Hispano-Americano en el Archipiélago* (Imprenta de la Sucesora de M. Minuesa de los Ríos, 1901), 471.
- 34 Juan y José Toral, 216-217.
- 35 "Memoranda Concerning the Situation in the Philippines on August 30, 1898, by F. V. Greene, Major-General, Volunteers, and Accompanying Papers" (30 September 1898). In *United States Senate Document* No. 62, Part 2 (Washington: Government Printing Office, 1899), 420.
- 36 "Statement of Gen. Charles A. Whittier, U.S.V., before the United States Peace Commission at Paris" (14 October 1898). In *United States Senate Document* No. 62, Part 2, 501.

- ³⁷ Ibid., 499.
- ³⁸ Letter of Felipe Agoncillo to Apolinario Mabini, 21 June 1898. In Mabini, Apolinario. *Las Cartas Politicas de Apolinario Mabini* (Manila: Dia Filipino Press, 1930).
- ³⁹ Brian McAllister Linn, *The Philippine War, 1899-1902* (University Press of Kansas, 2000), 26.
- ⁴⁰ Linn, 27.
- ⁴¹ “The Island Campaign: Some Extracts from the Report of General Otis.” *The McCook Tribune*, 2 February 1900, 3.
- ⁴² “Fired the First Gun,” *The North Platte Semi-Weekly Tribune*, 8 September 1899. This Nebraskan paper published its interview with Grayson, who by that time had already been discharged and returned to Nebraska.
- ⁴³ *Harper’s Pictorial History of the War with Spain* (New York and Londond: Harper and Brothers, 1899), 474.
- ⁴⁴ For instance, see the 1900 report of Gen. Otis, cited in “The Island Campaign: Some Extracts from the Report of General Otis” in *The McCook Tribune*, 2 February 1900, 3. The said report cited Stotsenburg’s plan to attack the powder magazine and Deposito on 5 February 1899. Gen. Arthur MacArthur, mistaking El Deposito for the Santolan pumping station, questioned Stotsenburg’s plan because it would be “so far out.” Otis corrected his fellow general by saying that “Stotsenburg meant reservoir, not waterworks” in Santolan.
- ⁴⁵ “The Fighting at Manila,” *The New York Sun*, 26 March 1899, 26.
- ⁴⁶ Linn, 56.
- ⁴⁷ John F. Bass, “The Advance on the Waterworks, and the Taking of Caloocan” (10 February 1899) in *Harper’s History of the War in the Philippines* by Marrion Wilcox (New York and London: Harper and Brothers, 1900), 128.

- 48 *The McCook Tribune*, 3.
- 49 *Report of the Municipal Board of the City of Manila for the period from August 7, 1901 to June 30, 1902* (Bureau of Public Printing, 1903), 31.
- 50 *Report of the Municipal Board of the City of Manila for the Fiscal Year Ended June 30, 1904* (Bureau of Public Printing, 1905), 224.
- 51 “As Viewed at Washington,” *Houston Daily Post*, 20 June 1899, 4.
- 52 “Concerning the Soldiers,” *Columbus Journal*, 22 March 1899, 2.
- 53 “St. Paul Soldiers Write of their Experiences with the Filipino Bullets,” *Saint Paul Globe*, 21 May 1899), 24.
- 54 *Kansas Agitator*, 4.

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Plano de las líneas de tuberías de la distribución de aguas potables en Manila y sus arrabales, según el trazado aprobado por R. O. de 10 de junio de 1875, indicando las longitudes y diámetros de las tuberías, la situación de fuentes y llaves de comunicación y de desagüe. AHN, Ultramar, MPD.4634.

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Trozo Primero. Hoja No. 5: Perfil longitudinal. AHN, Ultramar, MPD.4543.

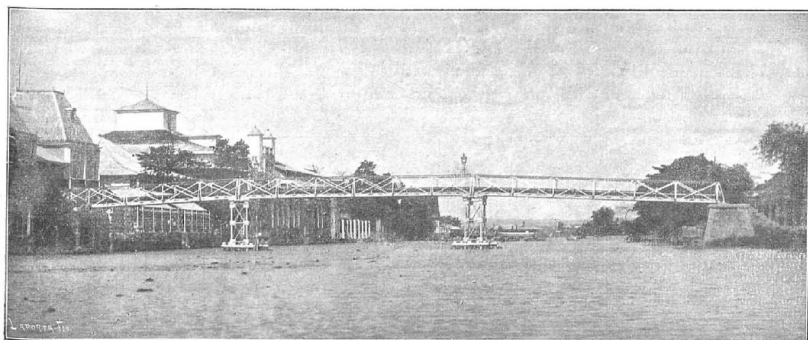
Trozo Primero. Hoja No. 10 F: Casa de servicio. AHN, Ultramar, MPD.4553.

Trozo Segundo. Hoja No. 33: Presa. AHN, Ultramar, MPD.4581.

Variación del trazado de la tubería de 22" en la calle de Arlegui en Quiapo; Variación del trazado de tuberías entre la calle de la Concepción y la de Sn. Roque del arrabal de Quiapo. AHN, Ultramar, MPD.4653-4654.

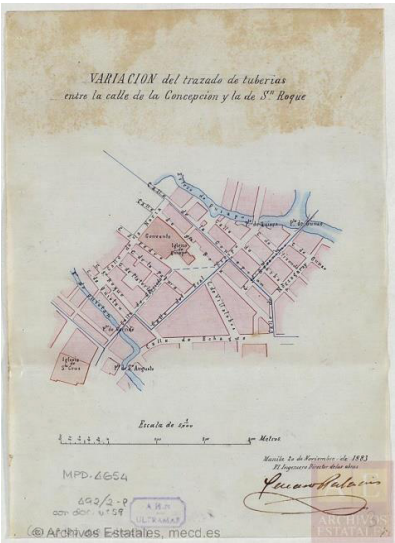
APPENDIX

1. Puente de Misericordia



The Puente de Misericordia (also known as the “Little Eiffel Bridge”) was among the metal bridges constructed to bring the water pipeline accross the Pasig River and its *esteros*. From *La Ilustración Española y Americana*, 8 July 1898.

2. City Pipelines



Some houses and buildings had to be demolished to give way to the water pipelines within Manila. Two Tuberías Streets can be found in Quiapo (now Concepcion Aguila St.) and San Juan which were then pathways of these pipelines.

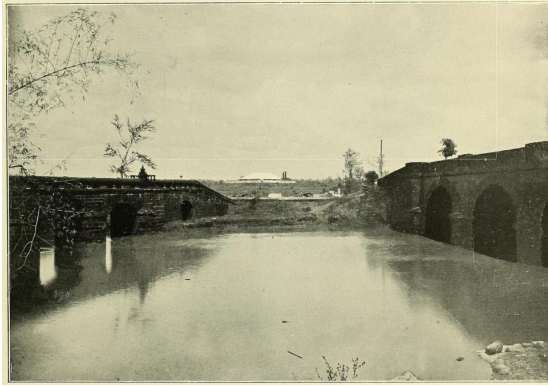
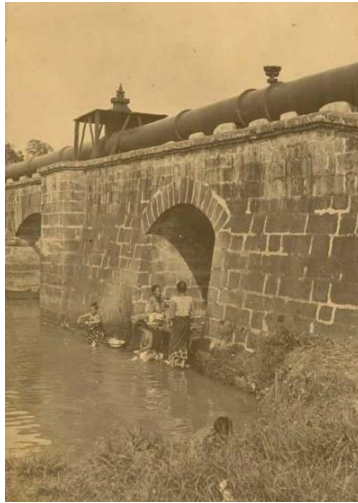
3. Carriedo Fountain



Named in honor of Francisco Carriedo, the Carriedo Fountain was then located in Sampaloc as the first water outlet from El Depósito in San Juan. This was the venue for the inauguration of the entire Carriedo Waterworks on 23 July 1882, where commemorative tokens and coins were distributed. A centerpiece was later added to the fountain.

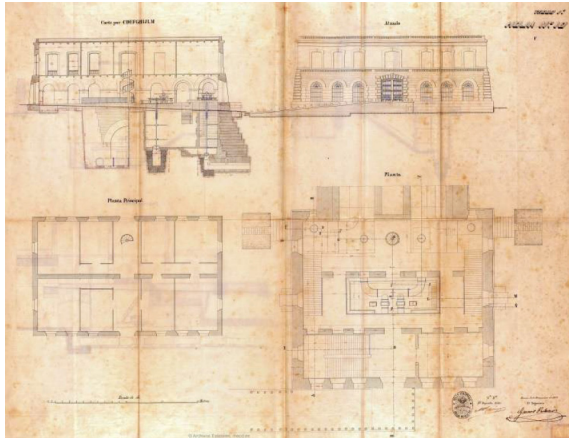
JOHN TEWELL COLLECTION

4. Aqueducto de San Juan



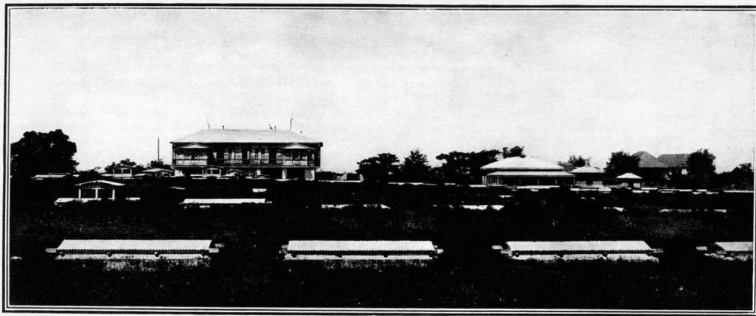
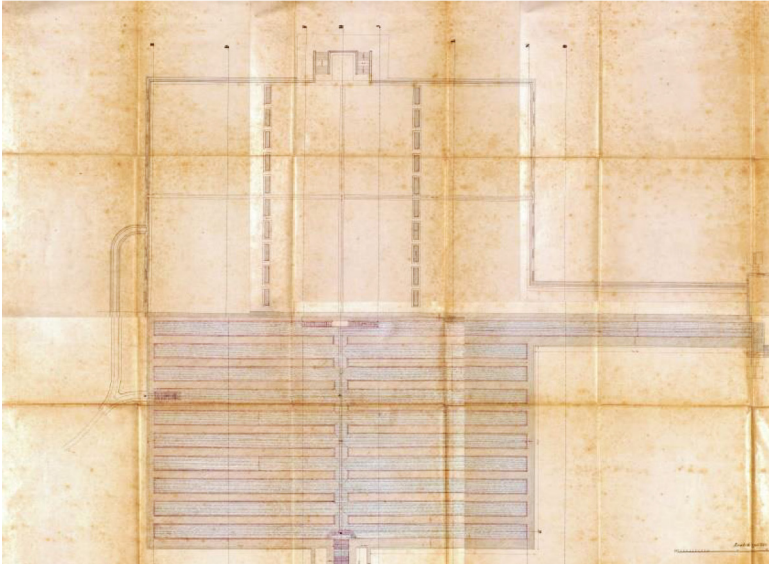
The Aqueducto de San Juan was the only stone aqueduct of the entire Carriedo Waterworks, built to bring the water pipeline across San Juan River. Beside it was the San Juan Bridge which was used by pedestrians and vehicles. From the Luther Parker Collection and *Our Boys in the Philippines* (1899) by Perley Rockett.

5. Casa de Servicios



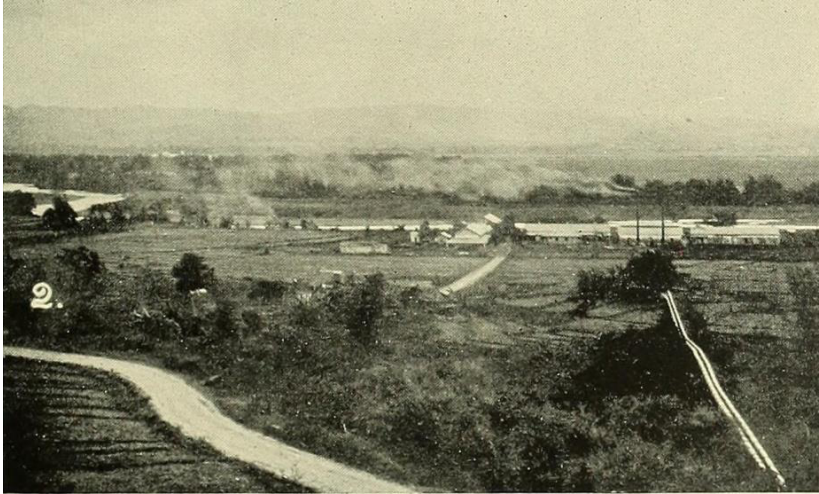
The Casa de Servicios (Service Building) was the office of the Cuerpo de Fontaneros (Plumbing Corps) formed by Genaro Palacios to take charge of operating and repairing the Carriedo Waterworks. It also housed the valves which controlled the flow of water towards Manila. The building was also called Casa de Llaves (“llaves” means valves) for this reason.

6. El Depósito



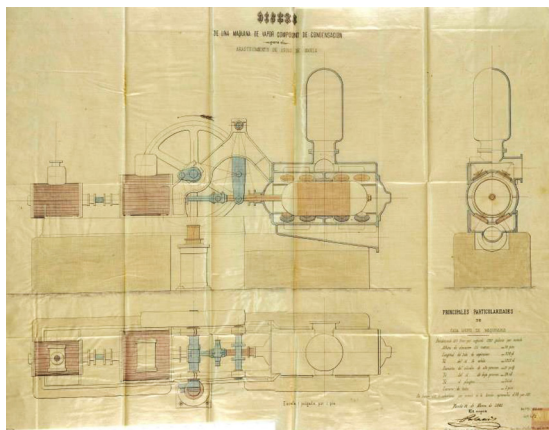
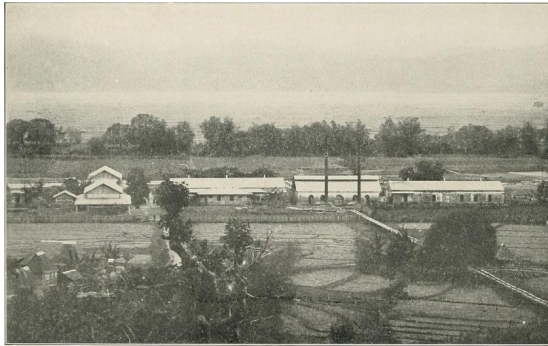
Beneath the Casa de Sevicios was El Depósito or the water reservoir. It can store up to two days' supply of clean water for the entire city of Manila. Behind the Casa de Sevicios were 207 ventilation shafts to keep the stored water cool and free from vegetable matter. Photograph from *Harper's Weekly* (1899).

7. Carretera de Santolan



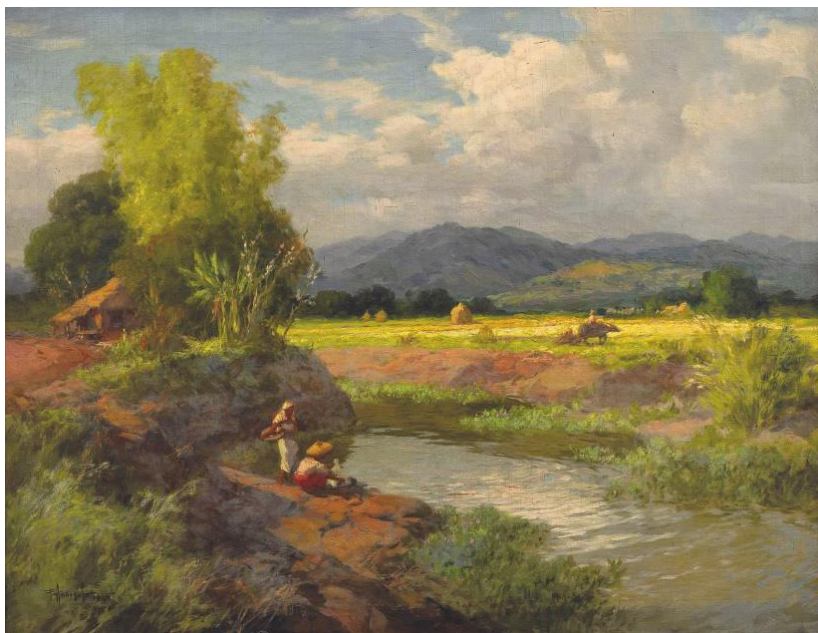
To facilitate the protection and repair of the pipelines and the delivery of coal for the Casa de Maquinas (Pumping Station) in Santolan, the five-kilometer Carretera de Santolan (Santolan Road) was built parallel to the pipelines ascending to El Depósito in San Juan. Although already renamed Boni Serrano Avenue in 1970, the name Santolan Road can still be seen in street signs. From *Our Boys in the Philippines* (1899) by Perley Rockett.

8. Casa de Maquinas de Santolan



The Casa de Maquinas (Pumping Station) was built in Libis, Santolan near the Marikina River. This building housed the steam-powered machines that pumped water uphill to San Juan. It also had a storage room for coal imported from Britain and Australia. It is said that Camp Atienza is the former site of the Pumping Station because the latter also became a barracks during the American period. Photograph from *Fighting in the Philippines* (1899) by Frank Neely.

9. Marikina River



Genaro Palacios chose the Marikina River (also called then as San Mateo River) as the source of water for the Carriedo Waterworks owing to its pristine waters and lightly populated surroundings. The government also discouraged living near the river and using it for transportation and washing laundry to avoid pollution. Painting by Fernando Amorsolo (1948).