

CHAPTER 3 HISTORY OF NEW ORLEANS DRAINAGE, 1718-1893

New Orleans was not in the national forefront of efforts by cities to improve either their drainage or sewage disposal. Prior to the mid-1890s, drainage and the sanitary disposal of sewage in New Orleans were viewed as a single issue (Enzweiler et al. 1992:14) when any serious thought was given to improvement at all. Natural conditions in New Orleans made both flooding and sanitary conditions into severe problems for the city's inhabitants, with disastrous consequences for public health. However, solving the drainage problems of New Orleans was not a simple matter. In the early-twentieth century, Sewerage and Water Board Superintendent George W. Earl summarized the major technical difficulties confronting engineers considering New Orleans' drainage problems:

First of all, New Orleans had to face the problem of overflows from the Mississippi River and from tidal waters in Lake Pontchartrain, and the construction of levees, first along the river bank, because high water in the river was above the level of even the highest land in the city, and later, in the rear, to prevent high lake tides from backing into the lower part of the inhabited area, followed. Then came surface ditches and canals to drain the storm water into the tidal bayous, which often rose to a level which precluded much relief by such method, since only a small area of land along the river bank in New Orleans is higher than the high tides of the lake, and the ditches and canals were more or less filled by tidal water and gave very inadequate drainage even for the highest portion of the city. Rainfalls of great intensity were of frequent occurrence, and these falling on a ground which was always saturated made the need for better drainage imperative...[quoted in Behrman 1914:2].

The plan for the original town of New Orleans was created by the engineer, Pierre Le Blond de la Tour, and his assistant engineer, Adrien de Pauger. The plan called for fourteen squares extending along the river with a depth of six squares back from the river. Each square was encircled by a ditch, and the whole city was surrounded by a canal. The flow from the ditches around the squares fed into two large ditches, which emptied into the canal. The canal, in turn, emptied into the swamp lying behind the city and stretching to the natural levee of Lake Pontchartrain. A map dated 1728 shows another drainage ditch at the approximate location of present-day St. Claude Street. This ditch was supposed to empty into Bayou St. John, but it extended only as far as the current Dumaine Street bridge. This drainage system was totally inadequate, even for a town with as little runoff as early New Orleans. During heavy rain storms, the streets were completely flooded, and each square became an island (Baudier 1954a:14-15).

Little was done during the French colonial period (1718 to 1769) to improve sanitary conditions. Some individuals built cesspools, but generally raw sewage ended up in the open drainage gutters. Drainage and flood protection received somewhat more attention from the government, but remained totally inadequate. During the term of Governor Etienne de Perrier (1725-1732), a levee extending eighteen miles upriver and downriver from the city was erected for flood protection (Baudier 1954a:15, 1954b:10). The Spanish were just as ineffective in improving New Orleans' sanitary conditions during their rule (1769-1800). Governor Estevan Miro, whose administration lasted from 1785 to 1791, recognized the unhealthy situation and called for an "improvement of sanitary conditions... for proper drainage of the streets, for preventing hogs from running about the streets, against keeping too many dogs and for the removal of dead animals" (quoted in Baudier 1954b:10) However, little was done to solve these persistent problems.

Francisco Luis Hector, Baron de Carondelet, served as the Governor of Louisiana from 1792 to 1797. He constructed the Carondelet or "Old Basin" Canal, which ran from Bayou St. John to the city. The canal, which was built in 1795, was intended to improve drainage and

sanitary conditions as well as to provide a better route for shipping goods from the lakeshore to New Orleans. By the early-1800s, however, the canal was choked with weeds and debris and was impassable except by pirogue at some points. The Carondelet Canal thus did little to alleviate the city's unhealthy conditions (Baudier 1954b:10; Garvey and Widmer 1989:88,229).

Sporadic efforts were made in the early American period to improve drainage and sanitary conditions, but these also met with little success. A nineteenth-century visitor to New Orleans remarked that:

[The soil is] in the driest time of the seasons... filled with humidity, and under favor of rain showers soon overflows... Shunning the river, the choking gutters send their burdens swamp-ward, littering the angles of the pavements with clumps of cotton and wood, heads of barrels, broken paper boxes, bits of pasteboard, twine and bagging rope, all of which the ever-thirsty swamp licked, in due course of time, into its capacious maw... [Sewerage and Water Board n.d.]

In 1819, architect Benjamin Latrobe described New Orleans in three words: "mud, mud, mud" (quoted in Junger 1992:44). Inadequate drainage and the necessity of collecting rainwater in cisterns for drinking had consequences that were more than merely inconvenient. The city was plagued by mosquitoes, as reported by Latrobe in 1808:

As soon as the sun sets, the muskitoes appear in clouds and fill every room in the house, as well as the open air. Their noise is so loud as to startle a stranger to its daily occurrence. It fills the air, and there is a character of occasional depression and elevation in it, like that of a concert of frogs in a marsh [Sewerage and Water Board n.d.].

Mosquitoes were the vector for yellow fever and malaria, diseases endemic (and periodically epidemic) in New Orleans throughout the nineteenth century. Mortality rates for New Orleans residents were relatively very high. Gibson reports in his *Guide and Directory of Louisiana* of 1838 that the annual mortality rate for New Orleans during this period was approximately 3,800 in "ordinary years" (quoted in Baudier 1955b:11-12).

During the administration of Mayor Louis Philippe de Roffignac (1820-1828), a canal was dug in the rear of the American Quarter for drainage purposes. This canal was later developed into the Melpomene Canal. The Poydras Canal was dug through the middle of Faubourg Saint Marie, at the location of present-day Poydras Street. This canal became clogged with weeds and filth and fell into disuse. The Marigny Canal, in unsatisfactory fashion, handled drainage below the city (Baudier 1955a:24).

During the 1830s and 1840s, yellow fever and other diseases ravaged New Orleans. Nevertheless, city officials did little to improve sanitary conditions. Sewage disposal methods had remained unchanged since the French colonial period. Fecal matter was put in shallow, open pits or cesspools with porous bottoms. These cesspools overflowed during heavy rains and floods, leaving fecal matter in the yards and streets. Occasionally, these pits were partially emptied out by sanitary excavating companies that dumped the contents into the river below the city limits. The pits smelled especially bad after these cleanings. All other liquid household wastes ended up in the gutters, which became clogged with excrement and other filth. The stagnant waters of the gutters became covered with green slime in the hot summer months. Ineffectual efforts to flush the gutters were sometimes undertaken by means of sluices in the levees during river rises. However, the gutters were never entirely drained.

In 1835, a twenty-year charter was granted to the New Orleans Drainage Company to improve drainage conditions. The charter made the company responsible for draining and re-

claiming the land bordered by the upriver limits of the Suburb Livaudais, the line of the New Canal to Lake Pontchartrain, along the shoreline of the lake to Bayou Cochon, and then a straight line to Fisherman's Canal, and on down to the Mississippi River. This monumental task was to be accomplished through a series of canals and ditches. Ditching was begun in the rear of the Vieux Carre. In addition, the Canal Girod or Orleans Canal became the primary draining artery, with a pumping station located at its junction with Bayou St. John (Baudier 1955b:17; Fitzpatrick et. al. 1895).

The New Orleans Drainage Company received some important recommendations concerning its endeavors from George T. Dunbar, the Engineer of the State of Louisiana. In 1840, the President of the Bureau of Public Works asked Dunbar to survey and make a topographical examination of the back section of the city. Dunbar reported his findings to Felix Garcia, the president of the drainage company, on February 17, 1840. This was the first drainage plan for the city that was based on New Orleans' topography and environmental conditions. It was also the first time that underground drainage was recommended for New Orleans. Dunbar stated in his report that:

No city in the Union needs underground drains more than New Orleans, and none where it could be done more easily and more cheaply, and still, it is the only city of any importance in which underground drains have not been used [Baudier 1955b:17].

Dunbar also reported that the sizes of the current drains and gutters were too small to carry off the necessary amounts of water. He recommended that their dimensions be increased. He encouraged the drainage company to use steam-powered drainage machines in order to lift the water that was drained off the streets. He pointed out that other places such as Holland utilized these machines very effectively (Baudier 1955b:17).

The specific recommendations outlined in Dunbar's report were intelligent and succinct. He proposed that two underground drains, five feet deep by four feet wide, leading to the swamp canal, be placed under Canal Street. These would drain Canal Street and its side streets as far as Customhouse Street. Two underground drains of the same dimensions under Bienville Street would drain from Customhouse to Conti Streets, terminating at the Claiborne Canal. Two more underground drains under St. Louis Street would also join the Claiborne Canal and drain from Conti to Toulouse Streets. Orleans Street would also have two underground drains which would service the streets adjacent on either side of it. This pattern of drains would be continued for the other streets, taking into account their slopes. These underground drains would empty into the Claiborne Canal which would feed into the Orleans or Girod Canal. Dunbar further recommended that canals be located on streets running parallel to Claiborne Avenue in the area beyond that avenue up to Grand Avenue or Broad Street (Baudier 1955b:17-18).

Unfortunately, New Orleans' city officials were not impressed by George Dunbar's report and did not act upon it. Following the panic of 1837, the city had little money for such a project. The public opposed the plan because mortgages in favor of the New Orleans Drainage Company would be placed on property to finance the undertaking. The drainage company finally dissolved because of the hard economic times (Baudier 1955b:18).

For the next fifty years, all efforts to drain New Orleans met with failure. The challenge of draining the city was not met because of lack of money, the apathy of city officials, and public opposition. Louis H. Pilié, the City Surveyor, submitted a drainage plan to the Common Council in 1857. Pilié's plan concentrated on draining the land behind Claiborne Avenue. Drainage would flow into Lake Pontchartrain. In the period between 1858 the Civil War, four drainage machines were installed on drainage canals in the city. These drainage machines were large wooden paddle

wheels (Figure 1), driven by Corliss steam engines. One was located at Dublin Street in the rear of Carrollton (Figure 2); one at Melpomene Street and South Claiborne Avenue (Figure 3); one at Bienville and Hagen streets; and one at London Avenue and Gentilly Road. The paddle wheels varied from 28½ feet to 34 feet in diameter, with paddles 4 feet square to 7 feet square. Providing a lift of 3 to 5 feet, the total pumping capacity of these four drainage machines was completely insufficient for the drainage requirements of the city. These machines apparently remained in use after the Civil War, although the drainage canals deteriorated (Williams 1876:26; Peyronnin 1977:2; Sewerage and Water Board n.d.).

The Civil War blocked any further efforts to follow through with Pilié's proposed system. Drainage remained woefully inadequate in the post-Civil War period (Figure 4). In 1871, more comprehensive attempts to address the drainage problems of New Orleans were initiated. The New Orleans Board of Health con-

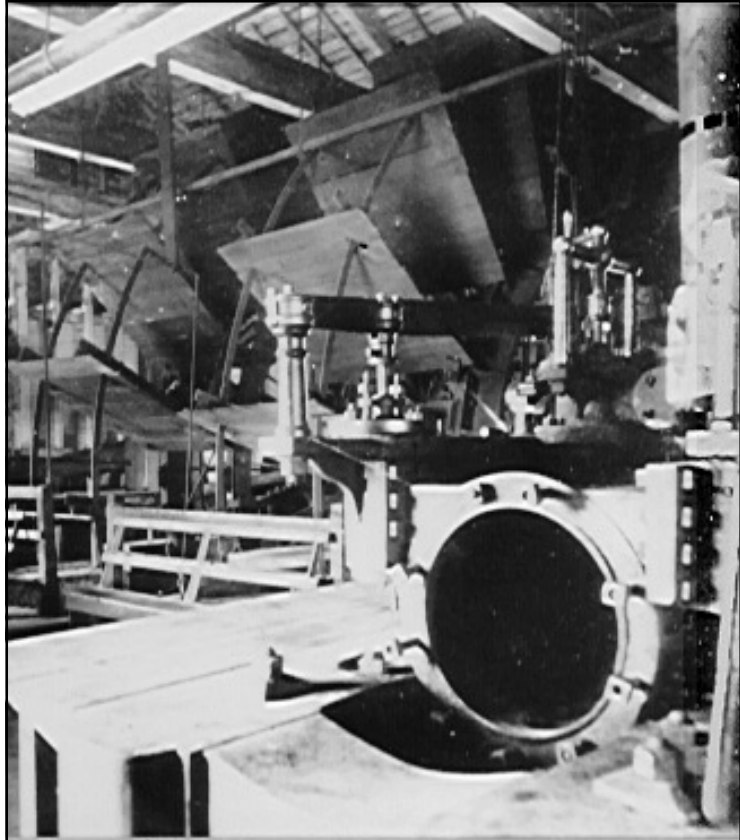


Figure 1. The Dublin Drainage Machine in the early-1890s. On the right is the Corliss steam engine powering the machine (from Sewerage & Water Board 1971:23)



Figure 2. The Dublin Drainage Machine, no date (from Sewerage & Water Board 1996)

cluded a study of drainage that year, and G.W.R. Bayley commented in the Board's report:

It is well known that canals which drain the thickly settled portions of our City, rapidly become obstructed and partially filled with the heavier and most offensive feculant and fecal portions of the city sewage, together with the garbage and dead animals thrown into them, and that during dry weather when there is not sufficient water passing through the canals to sweep away the accumulation, our canals or sewers are in their worst state. Heretofore, when the canals become thus too much obstructed to serve the purposes of drainage, the custom has been to excavate and cast out upon the margins of the canals to putrefy or dry up in the hot sun, the deposits from sewage in them [Board of Health 1871:6].

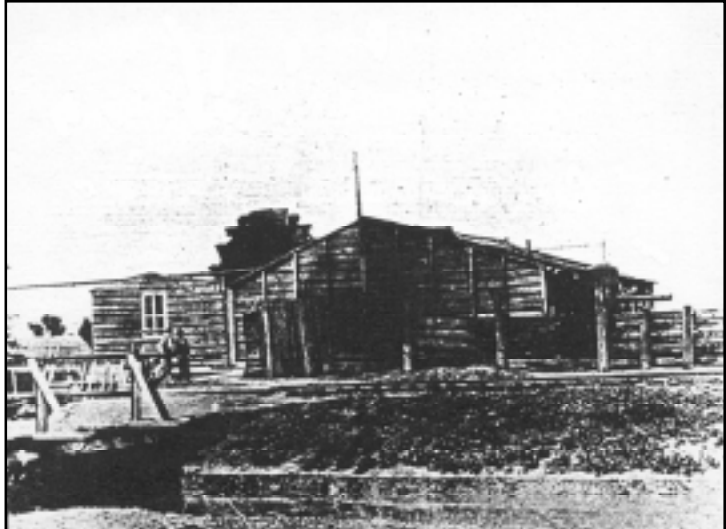


Figure 3. The "Old Melpomene Drainage Wheel," no date (from *Martin Behrman Administration Biography* 1916).

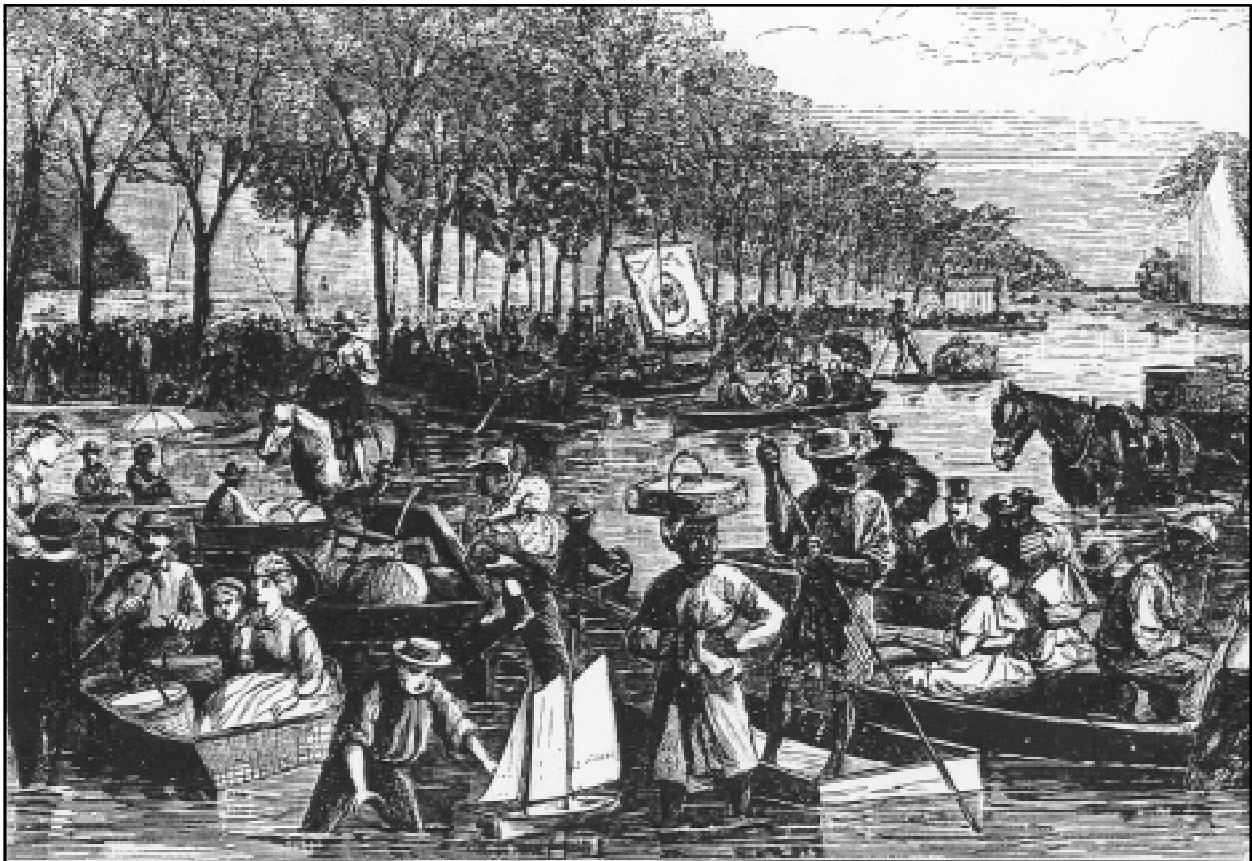


Figure 4. "A Flood at Canal and Claiborne" by A.R. Waud, 1871 (from the Louisiana Collection, Howard-Tilton Memorial Library, Tulane University).

Also in 1871, the state legislature authorized the Mississippi and Mexican Gulf Ship Canal Company, a private firm, to develop a drainage system for New Orleans. This company's initial project had been to dig a canal from St. Bernard Parish to the Gulf of Mexico. The firm managed to dig 36 miles of canals in New Orleans, and this was largely the extant drainage canal system when more substantial improvements began to be made in the 1890s (Behrman 1914:2). These measures were still woefully inadequate, and the city's drainage problems were not alleviated before the Mississippi and Mexican Gulf Ship Canal Company went into receivership. In 1872, the city of New Orleans purchased the system of drainage works for \$300,000 (Villarubia 1984). Additional plans and proposals came to naught. W. H. Bell, the City Surveyor in 1876, proposed a drainage plan that would utilize the canals already in service and place pumping stations along the lake front. In 1878, G. W. R. Bayley submitted a drainage proposal that incorporated the use of Bayou Bienvenue (Fitzpatrick et al. 1895; Baudier 1956a:18, 1956b:16).

The great yellow fever epidemic that struck many southern cities in 1878 began in New Orleans. The disease was introduced to the city by passengers on ships from South America and Caribbean ports, and the vast mosquito population of New Orleans spread the disease around the city. The first cases were unofficially reported as early as May, but no official reports were filed until July. At that time a cluster of cases appeared in one of the more affluent and cleaner neighborhoods of New Orleans. Only the French language newspapers reported these incidents. Nevertheless, rumors of the presence of the disease spread, and residents of the city panicked. By August 1878, approximately 20% of the city's population had left the city. These refugees managed to spread the disease to other southern cities. In response to the 1878 epidemic, business leaders in New Orleans formed the New Orleans Auxiliary Sanitary Association in 1879. The motto of the organization was "Public Health is Public Wealth," but the impact of their efforts was limited (Ellis 1969b 346-347, 352-353). Without proper drainage of the city and establishment of a modern sewerage system, New Orleans could not hope to conquer yellow fever, cholera, and other diseases.

In 1881, the city had an opportunity to contract with the newly established New Orleans Drainage and Sewage Company to construct a drainage system and an underground sewerage system connected to residences. Public opinion rang out against the proposal. A petition citing some very strange arguments was sent to Mayor Joseph Shakespeare, asking him to veto the measure. The petitioners believed that the sewerage system would be bad for public health. They argued that the soil was too soft for the installation of pipes. The pipes would sink, become clogged with filth, and then crack, thereby emitting harmful gases into the air. At this time, such gases were frequently blamed for the outbreak and spread of epidemic disease. The petitioners totally ignored the fact that these very gases were already being released into the air from uncovered cesspools and open gutters. Despite opposition, Mayor Shakespeare approved the measure. However, the sewerage plans were never carried out (Baudier 1956b:16).

At some point prior to 1885, the number of drainage machines may have been altered, since multiple wheels are documented at three of the four draining machine locations at that time. In that year, two machines were at the Dublin Station, located at 14th Street and Dublin. One had a wheel of 34' diameter with a 5' face, and the other wheel was 34'4" in diameter and had a 5'9" face. These wheels had a capacity of 490 cubic feet per second (cfs) against a 5' lift. The Claiborne and Melpomene wheel had a 35' diameter and 4'6" face. It had a capacity of 150 cfs and a 5' lift. The Bienville Station at Hagen and Toulouse had two wheels, one 28'6" in diameter with a 4'4" face, and one 34' in diameter with a 7' face. These wheels pumped 240 cfs against a 5' lift. The London Avenue Station had two wheels of 35' diameter with 4'10" faces, with a capacity of 300 cfs against a 5' lift. At maximum effort, all of these machines could only clear the city of about 1½ inches of rain in a day (*The Consultant* 1977:2).

The lack of a public sewerage system caused some private and public enterprises to install their own underground sewer lines which emptied into the Mississippi River. This trend would

continue up to the turn of the century. Eventually, the Cotton Exchange, A. Baldwin, the Boston Club, the Morris Building, and the Louisiana National Bank were connected to a sewerage line built by the St. Charles Hotel. The Board of Trade also had a private sewerage system which was utilized by Vonderbank's Hotel, the I.L. Lyons Company, and the Masonic Building. Other establishments which had their own sewer lines included the U. S. Marine Hospital, the Louisiana Brewery, Hershheim's Cigar Factory, the Planters' Refinery, the Louisiana Refinery, Jackson Brewery, the U.S. Mint, G. W. Dunbar's Sons, St. Mary's Boy Asylum, and the Commercial Soap Works (Baudier 1956c:11, 1956d:11). However, private, limited efforts to improve drainage could not provide significant relief from flooding and high groundwater levels, and were doomed to failure. A comprehensive, systematic approach was required.

The 1890s was a crucial decade in terms of public utilities for New Orleans. In 1893, prominent citizens of New Orleans came to realize that an adequate drainage and sewerage system and an adequate supply of drinking water were necessary for further economic growth (Enzweiler 1992: 14). A drainage report issued that year referred to "the recent establishment of a sewerage system" and described its function as the removal of solid waste from buildings to an appropriate outfall. This was a very significant distinction, because the sewerage was to be developed as a clearly separate system from drainage. The question of drainage for the city now involved only the removal of rain water and ground water saturating the soil (Fitzpatrick et al. 1895: 15). New Orleans was not the first American city to establish separate systems for sewerage and the removal of stormwater by underground drains and pipes; Pullman, Illinois had built such a system by 1885. However, New Orleans was a relatively early case of a major city choosing to build a sewerage system with separate (and more expensive) underground stormwater removal (Tarr 1979:316-325 *passim*). Ultimately, the New Orleans drainage system became a unique and world-class model of modern drainage. This was due to the excellence of the design of the original plan, and technological advances, unforeseen in 1895, developed in the context of New Orleans conditions by native engineering genius. The following chapter discusses the New Orleans Drainage Plan of 1895, which instituted modern drainage in the city, and the development of the system to the present time.

