Mount, at the entrance of the city, and the other object by a purchase from Messrs. White & Gillingham, of their water power, for $150,000.

The subject was submitted to Council, and approved of it, and made an appropriation of $40,000 to the object.

On the 19th of April, 1878, the important work was commenced by Captain Ariel Cooliey, under whose contract was made for the erection of the dam, the locks and canal, the head of where to the river, and the excavation of the river from the dam to the locks. The contract was for the sum of $150,000. He had nearly completed it, when he was taken off by disease, supposed to have been contracted by exposure, while attending the work. It will remain, however, a monument to his memory.

For the purpose of showing the difficulties that Mr. Cooliey would have to encounter in the construction of a dam across the stream, we will here state the nature of the work that was to be accomplished.

The river at the place intended to erect the dam is nine hundred feet in width, about one-fourth of which, at the bottom, on the eastern side, is supposed to be rock, covered with about eleven feet of mud; the remainder is rock. The greatest depth in any part, is thirty feet at a place where it gradually shoals to the western shore, where the rock is left bare at low water. The river, whose average rise and fall is six feet, is subject to sudden and violent floods.

Mr. Cooliey, therefore, determined where rock was to be found, to sink cribbs formed of logs, about fifty feet up and down the stream, by seventeen or eighteen, wide, which were sunk and filled with stone, and securely fastened to another similar long crib, having the up-stream side planked from the bottom to the top, and the space immediately above, filled to some extent with earth, small stones, and other matter, to prevent leakage. In that part where mud was found, the dam is made of quarry spoils, and earth, and raised above fifteen feet higher than the other part of the dam. which is an overfall for the water: the base of this mound is at least one hundred and fifty feet, and it rests on the top twelve feet; and the whole of the top, and the up-stream side, from the water’s edge, is paved to the depth of three feet with building stone, to prevent washing by water, and injury from fire. Between the dam and the water, there is sunk on the rock, in twenty-eight feet water, a stone pier, twenty-eight feet by twenty-three feet, which supports the end of the mound, and protects it from injury by ice or water.

The construction of the river by the mound, dam, suggested, to Mr. Cooliey the idea of, forming the dam in a diagonal line running up stream, and when nearly over, to run the rest of the distance at a right angle toward the shore, to join the head pier of the gunlock, on the western side of the dam, which means a large overfall was created, and the rise above the dam, in cases of freshness, considerably abated. The whole length of the overfall is twelve hundred and four feet; the mound dam, two hundred and thirty-five feet long, and the head and gunlock, which we shall refer to, one hundred and four feet, making the whole extent of the dam, including the western pier, about sixteen hundred feet, and backing the water up the river about six and a half miles.

On the west side of the river there is erected a head pier and gunlock, where a canal is constructed as a per agreement by the city, for the use of the Schuykill Navigation Company, which extends five hundred and sixty-five feet to a chamber locks of six feet 10 inches, by which the boats ascend or descend, and below these locks there is an overflow of water, which runs down the river, and is called the overflow. The length of the overflow is four hundred and twenty feet long.

On the east side of the river, where the mill houses and race are now situated, the whole of the bank was a solid rock, which it was necessary to remove. A width of two hundred and forty feet, running parallel with the river, in order to form a site for the former and a place for the latter. The length of the mill race is four hundred and nineteen feet; the greatest depth of the race on the middle and last six feet: the average water, alone, cost the contractor upwards of $10,000. At the upper end of this excavation were erected the head arches, above which three, in number, which extend from the end of the mound dam to the rock of the ground, thus forming a continuation of the dam.

On the west of the excavation are erected the mill houses, forming the west side of the race, which is supported on the other side by the rock rising above it seventy or eighty feet perpendicularly. The bank south, or wall of the race, also, is of solid rock, and the mill houses are founded on rock, so that nothing can be considered more secure.

The race is about ninety feet in width, and is furnished with water through the head arches, which allow a passage of water of sixty-eight feet in breadth and six feet in depth, to which the race is excavated below the overfall of the dam, and six feet wide for a continual passage of four hundred and eight square feet of water. These arches are on the north of the race, and the mill buildings being on the west, the water passes from the race to the wheels which discharge it into the river below the dam. The gate of the center arch is upon the principle of a lock gate, and admits the passage of boats, i.e., into the race; at the south end of the mill buildings there is a gate, eight feet wide, which, (the upper gate being closed) the water can be drawn off to the bottom of the race.

(To be continued.)

The mill buildings are of stone, two hundred and thirty-eight feet long, and fifty-six wide. The lower section is divided into two divisions, four of which are intended for eight double forcing pumps, six of which have been introduced. The other apartments are for the fords leading to the water wheels. The whole building and foreways are arched with brick, and are perfectly heated to avoid the mischief of the winter. On the east front of the mill buildings, immediately over the pumps and foreway room, is a terrace, two hundred and thirty-five feet long, and twenty-six feet wide, paved with broken stone, and a handsome walk along the race, and leading by steps at the end to the top of the head arches, mound, dam, and pier. Mr. John Moore, was managing engineer employed to erect the mill buildings, and his correspondence, which has been preserved, is, fully evident from one fact alone, it having been ascertained that in the whole extent of the foundation along the race, under a six feet head of water, there is no leak.

The water which is used by the mills is taken, put together with great strength. The shafts are of iron, weighing about five tons each. The great size and weight of the wheel gives it a momentum which adds greatly to the regularity of its motion, so as to prevent the pumps from injury under so heavy a head, as they are required to work, which is a weight of 7900 lbs., and the height of water forced ninety-two feet. The wheels are all of the same length, fifteen feet, and not one foot out of the same length, the diameter of the wheel being, on the 1st of July, 1872, 185 feet in diameter, and fifteen feet long, working under one head and seven feet fall. It required 1 gallon of water to the receiving reservoir in twenty-four hours, with a