

Old Mission Water System

THE WATER SUPPLY OF MISSION SANTA BARBARA

Note: The following facts are taken from two articles, written by student clerics of the Old Mission, Frater (now Father) Eric O'Brien, O.F.M., and Frater (now Father) Oliver Lynch, O.F.M. Both articles appeared in Priestly Studies, the quarterly publication of the students of Mission Santa Barbara, (Vacation No., 1938; Autumn No., 1938).

Santa Barbara possesses the ruins of one of California's oldest water systems. In California, where the arrival of the supply ships was always a gamble, agriculture was needed from the very first. Practically all the California missions demanded irrigation. The task of determining the water system of Mission Santa Barbara was carried during the past two years (sc. 1936-1938) by some of the student theologians of the Old Mission. The entire course of the main aqueduct has been traced from the dam in Blaksley Gardens to the lower reservoir which the city still uses. That dam is in very good condition, and approximately two thirds of the aqueduct is as good as when it was completed in 1807. The smaller dam on the Ray Skofield property in Rattlesnake Canyon is slowly being cut in two. From it the mill aqueduct has been followed for about a mile to the edge of the Skofield land. No further traces have so far (sc. 1938) been found until a point about 200 yards above the junction of Mission and Rattlesnake Canyons below Dr. Ullman's home. From this junction to the upper reservoir near the Mission, the two aqueducts run close together. It is along the mill aqueduct on the Weber and Cutter properties that the best preserved sections have been found. Over a hundred photographs have been taken. Dozens of measured sketches have been made to show cross sections, buttresses and such details (some of these appeared in Priestly Studies, Autumn No., 1938, p.44).

In 1799 the padres submitted plans for a large reservoir in Pedregosa creek. Work began in 1806, and 1808 the main units of the system had been completed: the two dams, the reservoirs, the mill, and the flumes by which water was distributed.

Neophytes from the Mission and rancherias did the work. Thousands of stone blocks were cut and finished by hand. Deep foundations were dug. The tons of lime needed for cement and plaster were made from sea-shells burned in atteries of kilns. Brick, tile and pipe were manufactured by the neophytes themselves in the pottery houses at the Mission. The padres themselves planned and directed the work.

Three units comprised the completed system and provided for diversion, storage and distribution of the water. Water was impounded by two dams and led into flumes. A flume from each dam wound down Mission and Rattlesnake canyons respectively, to the junction of the forks just below Dr. Ullman's property. Here both flumes crossed the stream on the same arch, and continued down the east wall of the canyon, one slightly above the other. Sweeping around the old vineyard, they clung to the hillside just below the present Mountain Drive until they emptied: the upper, or "mill" aqueduct into the mill reservoir; the lower, or "main" aqueduct into the main reservoir. Here the water was used for milling, or stored for use in house and fields. Distribution was made by a system of pipes and flumes.

THE DAMS

Two masonry dams were constructed.

the "Indian" or Mission Dam, now in Blakesly Bot. Gardens on the west fork of Pedregosa (or Mission) Creek, was built first, in 1807. In the following year a smaller dam was built on the east fork in Rattlesnake Canyon, on what is now the property of Ray Skofield. These dams were respectively about two and four miles from the Mission. Since the water behind the Mission Dam could rise to a height of about fifteen feet or more, a good sized lake was formed, extending about 100 yards up the canyon. The Rattlesnake Dam, tightly wedged between two jutting rock shoulders, was only a diversion dam, and had practically no forebay. Both are of the same type of masonry construction: built on bedrock and buttressed on the downstream side. From the west end of the Mission Dam a long tile flange extends some 50 feet upstream, seemingly to prevent the water from cutting too deeply into the hillside at the end of the dam. The only opening the Rattlesnake Dam was a penstock which pierced the dam about 5 feet above the base. The flume connected with this, and a small headgate (the channels of which can still be seen) regulated the flow of water. The Mission Dam is cut from top to bottom by a headgate about one third of the distance from the west end. Though some believe that this was installed about 1900, there is good reason to hold it was part of the original. Where the water entered the flume is not known, though it is very likely that the cement catch-box now on the face of the dam conceals a penstock similar to that on the Rattlesnake Dam. Even though the present headgate was cut after the Mission period, a penstock of some kind was absolutely necessary for the Padres' system.

THE FLUMES

Masonry flumes connected the

dams with the reservoirs. The sides and bottoms of the flumes were usually plastered to prevent seepage. On turns the stones of the outside walls were 30 inches long in places, laid side by side instead of lengthwise. In spite of considerable variation in width and depth, the capacity of the channels strikes a fair average. Narrow and deep channels were used where the flume descends abruptly to a lower level. Along level stretches the water flowed usually in a broad channel (2' x 2'). Usually they were open, but in some pla-

ces were covered by large stones, forming a rough sort of pipe. On the steep hillsides the inside wall is often 6 - 8 inches higher in order to shunt off debris from the upper slope. The flume was carried across the small arroyos on masonry "fills", simply thick stone walls blocking the arroyo. By forcing the water to wash over the flume, they acted as miniature dams. (An example of this is found at the upper end of the State College athletic field where both flumes crossed a small creek). To carry the pipe from the settling tank across the old road into the present Hazard estate, a massive supporting wall and a fine stone arch were constructed. The gate formed by this arch was the northern entrance to the Mission compound in early days. There seem to have been at least 2 other arches: a low arch where the flume from the mission Dam angles across Pedregosa Creek on Dr. Ullman's property; a higher arch at the junction itself to carry both aqueducts to the east bank of the Creek bed. But, at the present time, both of these crossings have been completely wiped out.

THE RESERVOIRS

The upper and lower flumes

led the water to the storage and filtration units. By means of a headgate at the entrance of the upper reservoir, water from the upper aqueduct could be diverted to the lower flume to be run to the settling tank or stored in the main reservoir, still in use, measured 110' x 110' x 7' (holding approx. 525,000 gallons). The masonry walls are 3 1/2 feet thick and surmounted by a tile walk. The wall facing Los Olivos street is supported by a buttress 6 feet thick and 4 feet high, into which is built a roomy grotto. The mill reservoir is built into the hillside and difficulties encountered in cutting away the rocky slope may account for the peculiar shape and unequal walls. The seven sides converge toward the penstock at the lower end, opposite the entrance of the aqueduct. All the wall surfaces are plastered, but the bottom was dirt except for a rough stone triangle at the front of the penstock. A wooden headgate about 9 feet high running in a slot behind huge rounded columns controls the outlet to the penstock. With an incline of about 20 degrees, the penstock contracts from eight foot entrance to an 18 inch hole in a distance of 9 feet. When the reservoir was filled to its average depth of 15 feet, the weight of the water forced a powerful stream through this small opening into the mill.

THE MILL

Details of the interior are not known.

The mill-race, slightly over 5 feet deep and 10 wide, ran the length of the building on the north. Sockets can be seen in the north wall just above the mill-race to support joists for the floor. The mill-wheel was horizontal and operated in the following way: A vertical shaft extended through the floor into the mill-race, and to its lower end was attached a wheel with spoonlike paddles; to the upper end was attached a grinding stone on which another stone rested. Water rushing through the penstock spurted against the spoons, thus turning the shaft and the mill-stone. The spent water passed on into the

main reservoir.

THE SETTLING TANK

A small building

with curved roof and facade--the most elaborate of the group, and most discussed. Neither a temescal (sweat house) nor a real filter tank, it seems to have been constructed to purify the water for domestic use by applying the principle that standing water deposits silts and impurities. The ground surrounding the building has been disturbed, and the tank inside has been modified, but the method employed seems to have been the following: By means of a headgate, water from the open aqueduct was diverted through the rear wall of the house into the tank sunk into the floor. An opening in the lip of the tank, about two inches below the top, drew off the surface water into a tile pipe line through which the purified water was led to the Mission.

Adequate distribution of the water included the supply for the Mission and the Indian village, water for the gardens, orchards, vineyards and livestock, and a supply for the presidio. Unconflicting maps make very difficult a final reconstruction of the routes of the flumes around the mission. However, it was precisely in this part of the system that new lines would have been built or the old flumes extended in order to supply new needs. With the completion of the system the Mission could face the future free from water worries. A certain amount of maintenance was necessary, but no changes of a major importance were made in subsequent years. Even after the decline of the Mission, the water system played an important part in the development of the splendid municipal system of modern Santa Barbara.