eral adjacent important foundations. The earth and loose and unsound rock were all removed, and the solid rock faces exposed roughly dressed and scrupulously cleaned with wire brushes, then thoroughly washed with hose and brooms and the space filled up to elevation 112 (an average depth of 15 feet and a maximum depth of 45 feet) with a uniform mass of concrete, upon the level surface of which the cut granite pier footings are laid. The surface is nearly continuous, interrupted only by some recesses where the distances between pier footings were largest, and to leave canal-like passages about 12 feet deep for pipes, etc., although up to elevation 100 feet no openings at all were left in the concrete laid. The great tower itself rests on arches sprung high in air from four smaller corner towers with flying buttresses. Each of these four towers transmits an estimated pressure of 17,000 tons to the bed of concrete which supports its base, 38 feet square, thus producing a load of about ten tons per square foot. To distribute this and proportionate load from the rest of the structure, great pains have been taken to secure a solid and homogeneous bed. To this end the concrete, which is composed of cement, sharp sand and gravel in proportions of 1, 2 and 3 respectively, was thoroughly mixed quite dry and rammed by 20-pound rammers from 10-inch horizontal layers to 8-inch thick layers, and till the water was flooded to the surface. When night came the layers were terminated wherever it happened with long sloping edges, and when work was resumed in the morning the whole top surface was plastered with a mortar made 1 cement and 2 sand, upon which the next course of concrete was laid and rammed exactly as if setting blocks of stone. The concrete became very hard over night, and this method is believed to have secured a real monolithic condition throughout the whole mass of concrete, which now contains about 11,000 cubic yards, and will require about 2,000 yards more to complete it.

Quartz gravel, 1½ to 2 inches large, and sharp sand, both from Port Eaton, on the north shore of Long Island, are used for the concrete, which is mixed of such consistency as to be just capable of moulding into a ball in the hands. The cement (17,000 barrels of which has been used so far) is Aalborg's, Alsens, Germania, Mannheimer and Silica-Portland. The latter is used almost exclusively for masonry mortar. The cement is stored in two large houses on the site. A sample of cement taken at random from one barrel in every ten is tested on a Riehle 1,000 lbs. machine by the engineer's inspector in a laboratory equipped at the site. Here about 600 briquettes are kept hardening under water for one, seven and twenty-eight day tests. Very little of the cement has had to be rejected, much of it with three parts of sand developing a tensile strength of over 200 lbs. in seven days. The usual tests of fineness and rapidity of setting are performed with customary standard apparatus.

The foundations will contain about 5,000 yards of dimensioned granite masonry. The concrete work is notable for its unusual magnitude, the manner in which it is executed, and for the character, arrangement and operation of the plant for making and handling it. All material is carted to the site and delivered directly to the derricks, to the storehouses, to the working platforms, or is distributed by the central track. All the concrete is mixed in two standard Sooysmith machines, set on opposite sides of the work so as to deliver their product close to the place where it is required. Each mixer is set with the top of its hopper about level with a working platform that closely surrounds it at the surface of the surrounding ground, and upon which materials are delivered by wheelbarrow and derrick and placed in bins. Men with shovels keep it continuously fed into shoots that carry it down to a platform about 6 feet below, upon which rest the lower ends of three inclined chain and bucket conveyor elevators that are driven at the same speed, about 2 feet per second, by a small vertical engine on the same platform. This engine also drives the mixer. All are driven by belts which will slip and allow the machinery to stop when obstructed rather than break as a gear would. One elevator is encased throughout in a tight wooden case, the lower part of which is filled with loose cement, which it brings up and empties into the upper part of the mixer hopper. The next elevator is on the opposite side of the hopper, a couple of feet nearer the discharge end, and delivers sand from a heap at the foot of the chute below, where two men are constantly in attendance to see that each bucket is level full. The third elevator is 2 feet further away, on the same side as the cement elevator, and similarly served by two men, and delivers gravel. The mixer is about 12 feet long over all, and inclined about 1 in 12 down towards the discharge end. Its shaft makes about 20 revolutions per minute, and is fitted with about sixty inclined bevelled radial cast-iron arms that mix the materials very thoroughly, even before they are wet by a man with a hose-nozzle just opposite the gravel elevator, and considerably more afterwards. The elevator buckets each hold about 1 cubic foot and discharge their contents over to the further side of the shaft. They are set at distances apart on their chains inversely corresponding to the proportionate quantities of material they are to furnish for the concrete. Below the mouth of the mixer is a third and still lower platform, upon which are two short 30-inch gauge tracks, about 4 feet apart centre to centre, each with one car upon it. A car upon one of these tracks is run up under the mouth of the mixer and a little to one side of its axis, but parallel with it, and the mixer delivers continuously into its 1-yard iron bucket (which it can fill heaping full in a minimum time of about two minutes) by a flat wooden chute about 4 feet wide and 6 feet long, mounted on a horizontal axis just below the mixer and in a vertical plane through its own axis. This chute is operated like a butterfly valve, first tipped up to an angle of 45 degrees with the vertical on one side, so as to divert the flow from the mixer all into the bucket on the right-hand car. When that is nearly filled a bucket and car are pushed up on the left-hand track. The top of the chute is revolved 90 degrees to the right, and the discharge from the mixer is instantly diverted into the empty car, and the full one is run off and taken by the derrick, which can usually swing it to the required place and empty it immediately. Sometimes hauling and the delay of materials threaten to hinder the work, and such occasions are taken to lay concrete most remote from the mixers that takes more time or the use of two derricks to handle it. When the concrete has set it is kept constantly well sprinkled for several days.

About twenty men are required in direct attendance upon each concrete mixer, and about forty-five more are required for all the concrete work, tamping, wheeling, hoisting engines, etc., for each machine's maximum