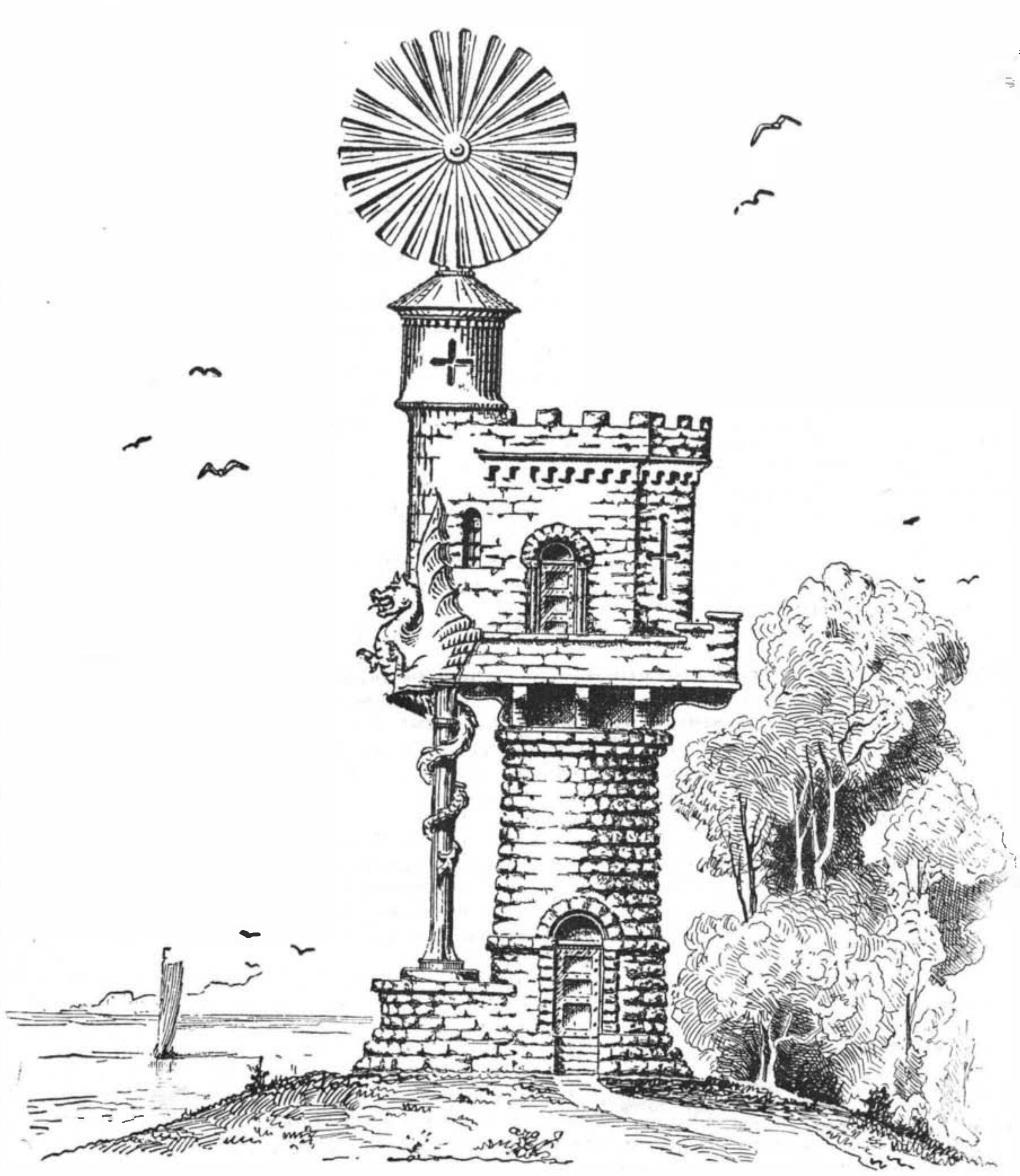
DESIGN FOR A WINDMILL TOWER AND WATER TANK.

The accompanying design for a windmill tower is worthy of attention for the novelty and boldness of its conception. It is a striking departure from the common plan of such structures, which are ordinarily devoid of taste or elegance. This design shows how prettily such a subject may be treated. The example we give will serve a useful purpose in leading owners and builders to think and study how they may improve the forms and lines of all such structures. This windmill was erected at Narragansett Pier, R. I., by Edward Earle, Esq., to supply water for ten cottages built by him at that place. It was designed by Constable Brothers, engineers and architects, of this city, and, in its position among the summer cottages at Narragansett Pier, forms a very ornamental addition to the landscape. The water is supplied by driven wells, and is pumped up by the wind power into the reservoir at the top of the tower, whence it is distributed by gravity pressure throughout the ten cottages erected adjacent to it. It has proved adequate for all demands made upon it, and not only furnishes an abundant supply of water for domestic purposes, but provides an ample means of fire protection.

The engraving we take from the March, 1887, number of the BUILDERS EDITION of the SCIENTIFIC AMERICAN.



TOWER AND WATER TANK AT NARRAGANSETT PIER, R. I.

Manufacturing Ice.

Strolling into one of these factories recently, in the belief that it would be cool, but finding that it was actually the hottest place he had been in during the entire day, an *American* reporter watched the process.

Passing through the outer office, you get abruptly into the factory, an enormous apartment and very lofty. Three graceful engines from fifteen to twenty-five feet tall were moving with mysterious strength at the head of the apartment, and several big pipes overhead connected them with the floor below and an upper room.

Negro men were walking about over square places in the floor, and occasionally lifting the lid of one, they took out of it with a crank a block of ice weighing 200 pounds. This was attached to a chain suspended from a double bridge truck, rolled to one side, and tipped through a hole in the wall into the ice house.

There are in this factory about 1,000 of these little tanks. Each is filled with water distilled from the steam of the three engines; and each tank, which is made of galvanized iron, rests in a well of brine or salt water. Running about under these tanks, which form a flooring over the whole place, is a continuous coil of iron pipes, charged with ammonia, that penetrate the wells of brine and keep the salt water at a temperature of twelve degrees. After filling the tank with the distilled water it is left undisturbed for thirty-six hours. The lid is then raised, the iron tank or can is drawn up and dipped into a small vessel containing boiling water to melt the ice from the interior sides that it may be removed. This is the large block of ice one sees in the ice wagons. The ammonia comes from a factory at Wilmington, Del., in iron retorts carefully packed and air tight. When it is about to be used, a tiny escape is made through which the ammonia oozes in a gaseous form, though the contents of the retort are liquid. This gaseous ammonia is transferred directly to the submerged coils of pipe. Two charges during the summer will run a factory of fifty tons daily capacity. After this gas has performed its mission and passed through all the pipes, the engines suck it through the pipe overhead, pass it to the upper floor, and force it through pipes submerged in cold water, where it is condensed. It is then received into a large tank below and made ready for another tour of the pipes in the form of gas. In its rounds the gas makes more or less escape to the open air and is lost for all time, but very little is lost and the same ammonia is used until it is consumed by the escapes. Three hundred thousand pounds of ice are used every day in Nashville and the towns for 100 miles around. One of these factories turns out thirty-five tons daily; the other produces forty tons, and there is being brought here eighty tons of lake ice. The three companies manufacturing and importing ice into Nashville sell to the small dealers, who supply the consumers. They also ship to the neighboring towns. But the larger portion of this 300,000 pounds per day is consumed in Nashville.—*Nashville American.*

Excavating and Handling Rock.

The "Charcoal Iron Workers" publishes a paper on the cost of excavating and handling rock, originally presented by Mr. Roger Rigly before the Western Pennsylvania Mining Institute, of which the following is a summary. The average weight of a cubic yard of sandstone or conglomerate in place is given as 1·8 tons, and of compact granite, gneiss, limestone, or marble, 2 tons, or an average of 1·9 tons, or 4,256 pounds. A cubic yard when broken up ready for removal increases about four-fifths in bulk, and one-fourteenth of a cubic yard, or 177 pounds, is a wheelbarrow load. Experience shows that with wages at $1 per day of 10 hours, 45 cents per cubic yard is a sufficient allowance for loosening hard rock. Soft shales and allied rocks may be loosened by pick and plow at a cost of 20 cents to 30 cents per cubic yard. The quarrying of ordinary hard rock requires from ¼ pound to ⅓ pound, and sometimes ½ pound, of powder per cubic yard. Drilling with a churn driller costs from 12 to 18 cents per foot of hole bored. Upon these data Mr. Rigly estimates the total cost per cubic yard of rock in place, for loosening and removing by wheelbarrow (labor assumed at $1 per day of 10 hours), as follows: When distance removed is 25 feet total cost=$0 537, when 50 feet $0·549, when 100 feet $0.573, when 200 feet $0·622, when 500 feet $0·768, when 1,000 feet $1·011, and when 1,800 feet $1·401. This is exclusive of contractor's profit.

When labor is $1.25 per day, add 25 per cent to the cost prices given; when $1.50 per day, add 50 per cent, and so on. In hauling by cart, the cost of loading, which will be about 8 cents per cubic yard of rock in place, and the additional expense of maintaining the road, must be added. Allowing, then, 851 pounds as a cart load, the total cost per cubic yard is estimated, when removed 25 feet, at $0·596, when 50 feet $0·599, when 100 feet $0·605, when 200 feet $0·617, when 500 feet $0·655, when 1,000 feet $0·717, and when 1,800 feet $0·94.

Crystallized Fruits.

The following is the prize essay on this subject, by J. J. Pratt, superintendent of the Sutter Packing and Canning Company, read at the last meeting of the California State Board of Horticulture:

The process of preserving fruits in a crystallized or glaced form is attracting considerable attention at the present time. This process, though comparatively new in California, has been extensively operated in Southwestern France for years, the United States having been heavy importers, paying fancy prices for the product. The process is quite simple. The theory is to extract the juice from the fruit and replace it with sugar sirup, which, upon hardening, preserves the fruit from decay and at the same time retains the natural shape of the fruit. All kinds of fruit are capable of being preserved under this process. Though the method is very simple, there is a certain skill required that is only acquired by practice. The several successive steps in the process are about as follows: First, the same care in selecting and grading the fruit should be taken as for canning; that is, the fruit should be all of one size and as near the same ripeness as possible. The exact degree of ripeness is of great importance, which is at that stage when fruit is best for canning. Peaches, pears, etc., are pared and cut in halves as for canning; plums, cherries, etc., are pitted. The fruit having thus been carefully prepared is then put in a basket or bucket with a perforated bottom and immersed in boiling water. The object of this is to dilute and extract the juice of the fruit. The length of time the fruit is immersed is the most important part of the process. If left too long, it is overcooked and becomes soft; if not immersed long enough, the juice is not sufficiently extracted, which prevents a perfect absorption of the sugar. After the fruit has been thus scalded and allowed to cool, it can again be assorted as to softness. The next step is the sirup, which is made of white sugar and water. The softer the fruit, the heavier the sirup required. Ordinarily, about 70° Balling's saccharometer is about the proper weight for the sirup. The fruit is then placed in earthen pans and covered with sirup, where it is left to remain about a week. The sugar enters the fruit and displaces what juice remained after the scalding process. The fruit now requires careful watching, as fermentation will soon take place, and when this has reached a certain stage the fruit and sirup is heated to a boiling degree, which checks the fermentation. This heating process should be repeated as often as necessary for about six weeks. The fruit is then taken out of the sirup and washed in clean water, and is then ready to be either glaced or crystallized, as the operator may wish. If glaced, the fruit is dipped in thick sugar sirup and left to harden quickly in open air. If it is to be crystallized, dip in the same kind of sirup, but is made to cool and harden slowly, thus causing the sugar which covers the fruit to crystallize. The fruit is now ready for boxing and shipping. Fruit thus prepared will keep in any climate and stand transportation.

THE New York *Times* says: "The plans for two new harbor defense vessels attributed to the navy department are in some respects the most novel yet attempted in the way of naval construction. The charge of imitating European types cannot certainly be brought against these vessels, since nothing like them is known. It is true that the single-turreted monitor type, which is said to have been adopted, is familiar enough; but such a vessel, of only 3,500 tons, yet able to carry a 16 inch gun in its turret and a dynamite gun in its hold, and developing a speed of 18 knots, must indeed be an original craft. The double-turreted monitors, having a displacement of 3,887 tons, or not far from the one proposed, carry two 10 inch guns in each turret, except the Puritan, which is of 6,000 tons, and is said to be intended to carry 10½ inch guns. The difference between that and a 16 inch gun is enormous."