can, without difficulty, depress the scraper and hold it, or he can raise it and hold it, or manipulate it in any desired way without a great deal of exertion.

Fig. 2 shows the details of the mechanism for operating the scraper. Fig. 3 shows the roller guide for the frame, A, and Fig. 4 shows a plow attachment that may be used in place of the scraper for loosening the soil preparatory to removal by the scraper. One of the plows is secured directly to the pivoted bar, and the other is secured to a short beam extending backward. These plows are raised, lowered, and tipped in one direction or the other by the levers used to operate the scraper. If desired, a single plow may be attached to the center of the pivoted bar.

The merits of this device will be appreciated by any one having had much experience with ordinary scrapers.

Further information may be obtained by addressing the inventor, Mr. G. S. Agee, Mint Hill, Osage county, Mo.

Elasticity Viewed as Possibly a Mode of Motion.

At a recent meeting of the Royal Institution, Sir Willim Thomson, LL.D., F.R.S., etc., said, with reference to the title of his discourse: "The mere title of Dr. Tyndall's beautiful book, 'Heat a Mode of Motion,' is a lesson of truth which has manifested far and wide through the world one of the greatest discoveries of modern philosophy. I have always admired it; I have long coveted it for elasticity; and now, by kind permission of its inventor, I have borrowed it for this evening's discourse.

"A century and a half ago, Daniel Bernouilli shadowed forth the kinetic theory of the elasticity of gases, which has been accepted as truth by Joule, splendidly developed by Clausius and Maxwell, raised from statistics of the swayings of a crowd to observation and measurement of the free path of an individual atom in Tait and Dewar's explanation of Crookes' grand discovery of the radiometer, and in the vivid realization of the old Lucretian torrents with which Crookes himself has followed up their explanation of his own earlier experiments; by which, less than two hundred years after its first discovery by Robert Boyle, 'the Spring of Air' is ascertained to be a mere statistical resultant of myriads of molecular collisions.

"But the molecules or atoms must have elasticity, and *this* elasticity must be explained by motion before the uncertain sound given forth in the title of the discourse, 'Elasticity Viewed as Possibly a Mode of Motion,' can be raised to the glorious certainty of 'Heat a Mode of Motion.'"

The speaker referred to spinning tops, the child's rolling hoop, and the bicycle in rapid motion as cases of stiff, elastic-like firmness produced by motion, and showed experiments with gyrostats in which upright positions, utterly unstable without rotation, were maintained with a firmness, strength, and elasticity as might be produced by bands of steel. A flexible endless chain seemed rigid when caused to run rapidly round a pulley, and when caused to jump off the pulley, and let fall to the floor, stood stiffly upright for a time till its motion was lost by impact and friction of its links on the floor. A limp disk of India-rubber caused to rotate rapidly, seemed to acquire the stiffness of a gigantic Rubens' hat brim. A little wooden ball, which, when thrust down under still water, jumped up again in a moment, remained down as if embedded in jelly when the water was caused to rotate rapidly, and sprang back as if the water had elasticity like that of jelly when it was struck by a stiff wire pushed down through the center of the cork by which the glass vessel containing the water was filled. Lastly, large smoke rings, discharged from a circular or elliptic aperture in a box, were shown, by aid of the electric light, in their progress through the air of the theater when undisturbed. Each ring was circular, and its motion was steady when the aperture from which it proceeded was circular, and when it was not disturbed by another ring. When one ring was sent obliquely after another, the collision or approach to collision sent the two away in greatly changed directions, and each vibrating seemingly like an India-rubber band. When the aperture was elliptic, each undisturbed ring was seen to be in a state of regular vibration from the beginning, and to continue so throughout its course across the lecture room. Here, then, in water and air was elasticity as of an elastic solid, developed by mere motion. May not the elasticity of every ultimate atom of matter be thus explained? But this kinetic theory of matter is a dream, and can be nothing else, until it can explain chemical affinity, electricity, magnetism, gravitation, and the inertia of masses (that is, crowds of vortices).

Le Sage's theory might easily give an explanation of gravity and of its relation *to inertia of masses*, on the vortex theory, were it not for the essential allotropy of crystals, and the seemingly perfect isotropy of gravity. No finger post pointing toward a way that can possibly lead to a surmounting of this difficulty, or a turning of its flank, has been discovered, or imagined as discoverable. Belief that no other theory of matter is possible is the only ground for anticipating that there is in store for the world another beautiful book to be called "Elasticity a Mode of Motion."

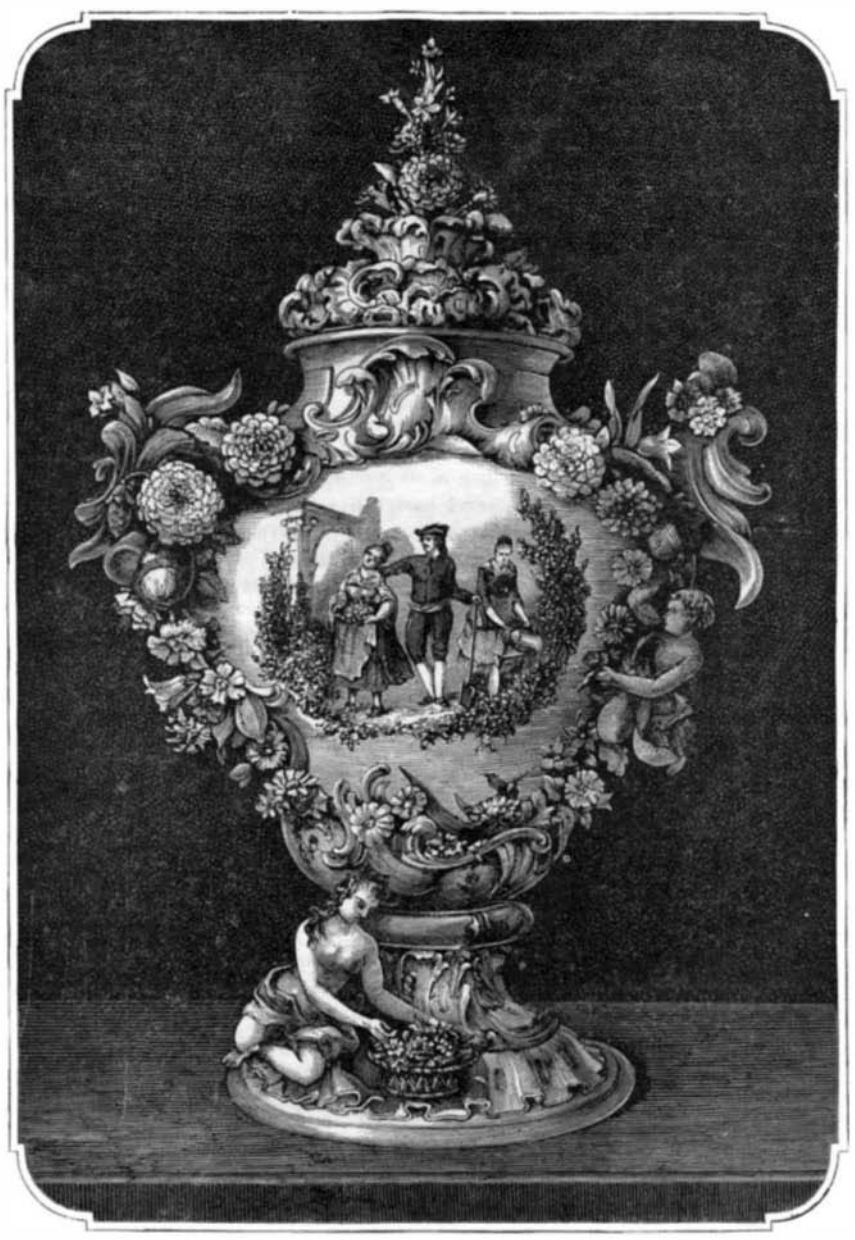
Drawings of Washington Monument Memorials.

A series of drawings of the various memorial stones contributed to the Washington Monument at Washington, was made thirty-one years ago, during leisure intervals, by Roger Williams Wilcox, then a young patent-model draughtsman. He died the following year; but his sketches were carefully treasured by his mother; and now in her old age they have been purchased by the Monument Association.

The stones form the inner walls of the memorial chamber in the base of the great monument. Many of the stones are of costly character, with highly wrought emblems and inscriptions upon them. The drawings are of especial value, because they represent the individual stones as they appeared soon after arrival in Washington, and before they were set up within the monument.

PORCELAIN URN.

Nothing is more beautiful than some of the richly ornamented pieces of pottery turned out of the factory at Sevres. The engraving shows a fine specimen of Sevres porcelain



PORCELAIN URN FROM KENSINGTON MUSEUM.

preserved at the Kensington Museum. It is remarkable for the elaborateness of its design and the delicacy with which it is treated in every part.

Stress and Strain.

At a recent meeting of the Royal Society, a paper on "The Influence of Stress and Strain on the Action of Physical Forces," was read by Prof. W. Grylls Adams, M.A., F.R.S. It was Part I., and related to elasticity: "Young's Modulus." A large number of experiments with different loads were made, and after many unsuccessful attempts to account for certain discrepancies which could not be explained away as errors of observation, the following facts were elicited:

1. After a wire has suffered permanent extension, the temporary elongation which can be produced by any load becomes less as the interval between the period of permanent extension and that of applying the load becomes greater.

2. This increase of elasticity is greater in proportion for large loads than for small ones.

3. The increase of elasticity takes place whether the wire be allowed to remain loaded or unloaded between the period of permanent extension and that of the testing for the elasticity.

4. The rate of increase of elasticity varies considerably with different metals; with some the maximum elasticity is apparently attained in a few minutes and with others not till some days have elapsed, iron and steel being in this last respect very remarkable.

5. The elasticity can also be increased by heavily loading and unloading several times, the rate of increase diminishing with each loading and unloading.

6. A departure from "Hooke's law" more or less decided always attends recent permanent extension, even when the weights employed to test the elasticity do not exceed one-tenth of the breaking weight.

7. This departure is diminished very noticeably in the case of iron, and much less so in the case of other metals, by allowing the wire to rest for some time either loaded or unloaded; it is also diminished by repeated loading and unloading.

The effect of permanent extension on the value of "Young's modulus" was tried according to the direct method for iron and copper, and indirectly for most of the metals.

Steam Whistles in a Fog—Curious Phenomena.

Captain Shirley, of the steamer City of Lawrence, of the Norwich and New York Transportation Company's line, reports a strange phenomenon on the Sound during foggy nights, which is worthy the investigation of scientific men. He says that when the steamer City of Lawrence was three or four miles east of Stratford Shoals light, on the night of the 12th May, he heard a whistle which sounded off the starboard bow. He blew the whistle of his boat several times, giving two blasts each time, but could get no reply. He stopped his boat, blew three whistles, and was delayed some three minutes, when the steamer State of New York suddenly appeared, blew two whistles, and passed him on the left. On the same night, when near Faulkner's Island, the State of New York whistled to the north of the Lawrence. She blew two whistles, and the New York returned one blast, and she passed to the southward. Capt. Shirley did not hear her whistle from the time that he heard her first blast until she passed him. Whistles were heard to the eastward, but not to the westward that night.

Sunday night, when the Lawrence was two miles from Bartlett Reef lifeboat, the bell was heard plainly, but when the Lawrence had got within a mile of the lifeboat they lost the sound until within an eighth of a mile of it, when they saw the glimmer of the light. The same phenomenon occurred off the Cornfield light.

The water was calm, and a light northeasterly breeze was blowing. When off Huntington, on the same night, Captain Shirley heard a whistle blow four or five times. It then grew fainter and fainter, until it could be no longer heard. He thought that it was a steamer going away from him. After running for two or three minutes, he heard a whistle close ahead on the starboard bow. The Lawrence blew three whistles and backed, and had to hail a large tug with barges in tow to leave their helm to their starboard to prevent a collision. The tug passed the Lawrence with but ten feet of lee room. Capt. Mott, an old Sound navigator, remembers the occurrence of similar phenomena on the night of the collision between the steamers Stonington and Narragansett, in June, 1880.

Why the sound of whistles is not conveyed as well on a foggy night as on a clear one is a problem to be solved. It cannot be attributed to head winds or heavy seas, for the sea was calm and the air almost motionless. The signals at Huntington and Execution lights have been heard over fifteen miles against a northeast gale. The navigators of the Sound are anxious to have the phenomena explained.—*Norwich (Conn.) Bulletin.*

Elevated Railroads.

Elevated railroads are now entitled to rank among American institutions, and in the future will call for a large consumption of iron. There are, according to the *Iron Age*, three schemes of this character under discussion in St. Louis, and the only question is which shall be adopted. Philadelphia is making good progress in following the example of New York. Brooklyn encounters an obstacle, partly arising from the configuration of the surface, which favors the construction of tunnels, but the city is in desperate need of some form of rapid transportation. Boston hesitates, apparently on account of objections to architectural disfigurement. But elevated railroads in all our large cities is only a question of time for while individual pieces of property may be injured by their propinquity, millions are added to the aggregate assessable value, and their convenience is beyond calculation.

The latest phase in New York is the employment of elevated roads for the transportation of freight. By no other method yet contrived can the jam of vehicles on our water front be relieved.