FELLING A WATER TANK.

BY W. H. LAWTON.

The old water tank that has long stood at the brow of the hill in Vermillion, So. Dak., has been razed. Since the installation of the water works, it has been the most prominent landmark of that region. For a distance of several miles it could be seen lifting its great head, a solitary figure, sharp cut against the sky.

It consisted of a tower 100 feet high, holding aloft the enormous tank that held the supply of water which fed the city mains.

The 6-inch pipe which carried the water from the wells below the hill, was incased in a box of heavy planks. Surrounding this were twelve timbers, each 12 by 12, rising perpendicularly from as many abutments of stone to the tank above.

Outside of these were eight batter posts, each 10 by 12, bracing and strengthening it, connecting near the top with the inner pillars. These timbers were connected by a series of iron rods an inch in diameter at intervals of 10 feet, and, to give still greater stability, a similar rod leading from the center of the tower was securely fastened to a large cottonwood tree near by.

The tank itself was 16 feet high and 20 feet in diameter, with staves 12 inches wide and 3 inches thick surrounded by thirteen 3-inch iron hoops. When it was full the weight was enormous, and more than a year ago it was found to incline slightly from the perpendicular. This inclination increased gradually, for several months, the legs assuming a decided curve, and was plainly a menace to life and property. The city condemned it, and the State fire marshal ordered it down, yet it stayed because no safe method for its destruction could be evolved. Finally, on May 7th, a number of determined citizens met, and resolved in some way to destroy it. The iron rods were cut, and then an attempt was made to destroy the foundation with blasting powder, but without success. Great ropes, with block and tackle attachment, were fastened to the lower ends of the supporting pillars, and the great structure was slowly loosened from its foundation. The work lasted all day, the crowd of onlookers gradually increasing until at least a thousand people saw the final demolition.

The interest was intense; slowly the great timbers lifted, and the curve in the center became more pronounced. Then as the tower suddenly stretched itself in a splintered, broken mass of ruins, the great tank, with its 150 tons of water, separated itself from its support, described an arc of a circle, and precipitated itself, a crushed mass, directly underneath the place where it had stood. The force of the water was terrific. The strong staves were snapped like pipe-stems; portions of the debris were thrown more than a hundred feet, and a 10-pound stone was hurled through a building as far away. A barn near by was completely demolished, and one of the abutments, each of which weighed over a ton, was carried by the giant force a distance of 40 feet. The force of the water dug a hole, 20 feet across and at least 4 feet deep, where it reached the earth.

[With so limited information at our disposal as to the particular nature of the difficulty above described, we do not like to be too critical; but this appears to us to be an excellent illustration of how *not* to do things. A tank 20 feet in diameter and 16 feet high appears to have been full of water when felled from a height of 100 feet, the fall of this great weight having materially added to the local excitement. Whatever the extent of the settlement of the foundation piers or of the curvature of the legs, if that 150 *tons* of water was still supported 100 feet in the air, it is incredible that the tower would not have safely supported the weight of any number of workmen after the water had been withdrawn. The tower and tank must have been built from the bottom upward, and its demolition from the top downward could not have been difficult. The lower portion of the tower with its constantly decreasing load as the upper part was removed must have remained always amply strong to support the workmen and necessary tackle to lower the upper members. One would have supposed that any local contractor would have been glad to undertake the removal of the tower for nothing, and would have made a handsome profit from the materials salved. Instead, the method employed seems to have been the one best adapted for the splintering to matchwood of 15,000 feet of lumber in the form of 12 x 12 alone. If the tower had been burned down, the operation would have been simpler and hardly more wastefully destructive.—ED.]

THE DESTRUCTION OF THE WATER TANK AT VERMILLION, S. D.

A MOTOR PLOW.

BY DR. ALFRED GRADENWITZ.

The use of machine plows, apart from a saving in human and animal labor, affords the advantage of allowing the soil to be broken up more deeply and effectively, thus insuring far better crops.

The Deutz Gas Motor Works of Deutz, near Cologne, have recently achieved a further progress in this direction by substituting liquid-fuel motors for the steam engine usually employed. Whereas steam plows of the compound-engine system (which is the one most generally in use), in addition to teams for supplying coal and water, require for their operation two mechanics and three plowmen, the motor-driven plow is steered and operated by a single driver, the only additional help being a man for shifting the mooring truck. In fact, the daily fuel and water supply is readily carried on this locomotive. Though its fuel—gasoline—is much more expensive than coal, the total fuel expenses are approximately the same, the motor working under fairly uniform loads and with higher economy.

Furthermore, the new motor is so light and substantial as to be able to travel in front of the plow, and to carry it across the field. Steam plows are carried to and fro by a heavy rope between two heavy steam locomotives. The pull of a locomotive is known to depend on the weight supported by the driving wheels; and by designing all the wheels as driving wheels, a maximum of tractive effort is obviously obtained.

Only in the case of exceptionally deep plowing or on slippery ground will the use of a light rope wound over the pulley drums of the locomotive be found of advantage. This rope, according to a patented arrangement, is left lying on the ground as long as the direct pull of the locomotive suffices for its propulsion, in order to be tightened automatically as soon as there is some slip on the driving wheels. As the full plow-resistance is never to be dealt with, a thin, light, and accordingly flexible and easily-handled rope is found sufficient in contrast to the heavy ropes of steam plows. A light mooring truck acts as a trailer to the plow-motor, and can be used also for carrying along material and tools.

The plow locomotive is connected to two multiple-blade plows arranged in front of and behind the motor respectively. This arrangement dispenses with the troublesome turning of the plow. Both in forward and backward traveling (when the front plow in the direction of traveling should obviously be raised) the same pull is exerted. By adjusting the two pairs of wheels simultaneously in a slanting direction, the plow locomotive is shifted through the useful plowing width.

The motor allows any depth of furrow to be plowed without shifting the mooring truck.

The capacity of the motor plow is 12 to 22 acres during 12 hours, according to the weight of the soil and the depth of furrows. As its weight only amounts to one-fifth of that of a steam plow, it is able to travel on any roads and bridges without requiring any special authorization.

Another Daniel Comet.

J. Z. Daniel, the discoverer of the Daniel comet of 1907, announces the discovery of another comet in the northwest corner of the constellation Pisces. At the time of its discovery, June 16th, the comet was moving at the rate of one and one-half degrees per day, and was visible with a three-inch telescope between 2 and 3 o'clock in the morning. Confirmatory dispatches have been received from Europe.

The Publication of the Prize Fourth Dimension Essay.

The essay of Lieut.-Col. Graham Denby Fitch, which won the $500 prize given by a friend of the SCIENTIFIC AMERICAN for the best simple explanation of the term "fourth dimension," will be published in the SCIENTIFIC AMERICAN of July 3rd, 1909. The essays which received honorable mention will be published in the SCIENTIFIC AMERICAN SUPPLEMENT of July 10th, 17th, and 24th.

A NEW GASOLINE MOTOR PLOW.