their place for all purposes ; in time the valve may supplant the cock altogether. When the shell of a cock is bored out in the lathe it is not round and can hardly be made so ; because, as the tool crosses the opening, it strikes on the opposite edge and springs; this also occurs in leaving the solid metal so that inaccuracy is inevitable, unless a great expenditure of time be made in running many light cuts through the work. The same observation is true of the key, the thin sides spring under the tool, so that when the plug is put in the shell there is always a great deal of work to be done in making the two fit. Not only this, but even when ground in tightly and put in its place the pressure on the key forces its thin sides in, or springs it enough to allow fluids to find the way past. And it is, therefore, for these reasons that the cock may be considered nearly an obsolete contrivance for the object it is intended to effect. The usual method of grinding in cock plugs is to have them first turned true as possible in the lathe and afterwards scrape and file the parts which bear the hardest, so that a uniform surface is obtained, powdered glass is then applied mixed with oil, which cuts the highest points down and makes the junction of the two perfect. Small faucets are usually tried with the mouth to ascertain if they are air-tight. This is done by simply placing the open side between the lips, exhausting the little air contained within by inhaling the breath and placing the tongue over the orifice before the faucet is taken out of the mouth. If air be admitted by opening the mouth and the faucet still adheres to the tongue it is tight. If it parts readily from the member alluded to, it is leaky. Larger faucets do not admit of this; they must be placed on end, and be tried with water.

CAPT. ERICSSON'S WROUGHT-IRON GUN.

At the works of C. H. Delamater, foot of 13th street, North River, are to be seen the several parts of one of Capt. Ericsson's wrought-iron guns, such as are to be used in arming the *Dictator* and *Puritan*. First is the massive core, forged from the best charcoal iron at Bridgewater, Mass. The diameter of the bore is 13 inches, and the walls of the core are 8 inches thick at the breech; the form being cylindrical about half way up the chase, whence there is a gentle taper to the muzzle.

In another part of the works is a pile of hoops for strengthening the gun at the breech. These are cut from iron plates three-eighths of an inch in thickness, and have a radial depth of 9 inches, giving a total thickness to the walls of 17 inches—4 inches greater than the caliber. The core is to be turned upon the outside, and the hoops are to be forced on by a hydraulic press. These thin hoops will be bounded at the breech and at the upper end of the reinforce on the chase by thick hoops several inches in axial length. The trunnions are forged upon a massive hoop which surrounds the thin hoops of the reinforce. The gun is not to be rifled, but will be used for spherical shot and shell. The solid shot will weigh 276 lbs., and the shell 216 lbs. The gun is expected to bear a regular service charge of at least 50 lbs.

Verification of Olive Oil.

A most interesting paper was recently read at the Society of Arts (London) by Charles Tomlinson, Esq., "On the Verification of Olive Oil by means of its Cohesion Figure." The author of this paper has introduced a new mode of detecting the adulteration of oils, more especially olive oil. It consists simply of depositing a drop of oil on the surface of perfectly clean water, in a chemically clean glass of four inches in diameter at the mouth. Every oil will in the course of half a minute expand, and if pure will, so to speak, write its own name on the water,—that is, it will assume a shape and color that a practical eye could easily detect whether it was pure or a mixture. Mr. Tomlinson stated that "When a drop of pure olive oil is placed on the surface of water, it spreads out slowly into a large disc with a raised edge. The cohesion of the oil soon begins to re-assert itself; the film retreats upon itself; the raised edge at first shows symptoms of the returning force of cohesion; a number of dots appear at the edge, like beads strung upon a thread, the spaces between the beads open, and the edge becomes deeply serrated; separate portions of the film gather themselves up simultaneously, leaving polygonal spaces, bounded by strings of beads or bosses, and filled with an exceedingly minute dew or spray, which requires a sharp eye to detect. All these changes occupy about 35 seconds."

Terrible Calamity at Sheffield.

At a little before midnight, on Friday last, one of those terrific disasters to which nearly all the great towns in the north of England are more or less exposed happened at Sheffield. The great reservoir of the Sheffield Water Company—a reservoir nearly 100 acres in extent, and which held more than a million cubic feet of water—suddenly burst its embankment and swept with the fury of another Deluge down the narrow gorge formed by the Loxley and Stannington hills into Sheffield itself. Almost before warning could be given, the volume of waters began rushing headlong down the valley, sweeping farms and houses, forges and factories, like chaff before it. Never, probably, before has an accident of the same kind occurred so ruinous in its wholesale destruction of property, so lamentably fatal in the loss of human life. Whatever the sudden and tremendous flood could reach it seems to have destroyed, and, calculating only by the number of houses swept away and the persons missing who were known to have been in them on that fatal night, there is every reason to fear that the lives sacrificed by this awful calamity will not be less than 200, if they do not unfortunately exceed even that number. Of the damage done to property it is impossible at this early date to form even a conjecture. The devastation in this respect is unparalleled. A large, populous, and thriving district has been almost obliterated from the earth, scarce more than traces of the houses and factories that once stood there now remaining. The Don, owing to late heavy rains, was unusually high, and the additional water thrown into it has laid hundreds of acres under water, and inflicted incalculable injury to the growing crops. Of the destructive character of the flood there were abundant evidences on every hand. Timber in large quantities, ped-posts, feather-beds, tables, clocks, and various kinds of household furniture passed down, and several carcasses of cattle also.

Large numbers of people have lined the river's banks all the day; but it is now evident that the greatest volume of water has passed by, and further damage here is not apprehended. The water is very thickly impregnated with mud—a proof that it must have swept with terrific violence over the land adjoining the river. Fish—pike in particular—have been left in large quantities on land from which the water has subsided.

Every additional inquiry made into the circumstances of this appalling calamity shows that it has been more disastrous than was at first anticipated. It is now estimated that the loss of life will exceed 250, and that the value of the property destroyed exceeds half a million. From Bradfield, where the reservoir burst, down the course of the rivers for twelve or fourteen miles the country is laid waste. The reservoir covered an area of seventy-six acres, and would hold 114,000,000 cubic feet of water. The embankment, which crossed the end of the valley, was an enormous erection, with an average height of eighty-five feet, and forty feet in thickness. It was three hundred yards long. Between Matlock and Hillsborough, a distance of four miles, the greatest loss of life has been caused. Within this tract, whole rows of houses have been swept entirely away, in three of which alone there were 25 lives lost. In the opposite row the whole of the inhabitants were drowned, and scarcely any of their bodies have been discovered. The flood seems to have swept off everything before it, from the confluence of the Loxley and the Revelin to the Don. Between Wardsend and Sheffield on the Don, the bodies were seen lying in the mills and the mud and ruins. There were fourteen in one place, ten in another, and thirteen in a third. At Neepsend 900 acres of gardens were devastated, and whole families were swept away. An official report just received states that one hundred and fifty-six dead bodies have been already recovered; seventy have been identified. Large numbers are not yet found. Bodies have been discovered as far down the river as Doncaster. Along the banks of the river, between that town and Sheffield, the scene of the inundation was visited by vast crowds on Sunday; the police and a strong military guard acted for the maintenance of order and the security of property. A movement for a general subscription was immediately commenced, and a meeting will be held to-morrow. The inhabitants of the submerged districts have lost everything, and an appeal for instant help will be made; hundreds have nothing left of their property but their night-dresses. The inquests were opened on Saturday night, and then adjourned for ten days. There were then ninety bodies in the workhouse, and the coroner said he had been informed there had been nearly 200 found. He referred to a statement, which is generally made and believed, that in consequence of the dangerous state of the reservoir, warning was sent to the inhabitants of the valley as far as Darnflask, and that only a few lives were lost there, but that the warning was not sent to the thickly peopled districts below.—*London Times, March* 15.

A Blacksmith Outwitted.

An English paper says that while the Danes were making their preparations for the defense of the Dannewerk, they found it advisable to cover the tops of the palisades with *cheveaux-de-frise*, and the work was just completed when they abandoned the position. In the innocence of his heart, the blacksmith who had taken the contract asked for an interview with Field Marshal Van Wrangel, and presented him with his little bill for the work done; imagining that the Prussians, as the present possessors of the Dannewerk, were responsible for all outstanding liabilities, and he was not a little disconcerted to hear the Field Marshal congratulate him on having accomplished his work so well, and expressed his hopes that he would soon receive payment—from the Danes.

The Armory at Trenton.

Some idea of the perfection to which the manufacture of Government arms has attained can be gathered from the annexed account of the Trenton armory, New Jersey:—The machinery cost about $300,000. There are requisite for each musket 15.83-100 pounds of iron, and 2.46-100 pounds of steel and 7 feet of black walnut. So rigid is the Government inspection, that should 1,000 muskets from all the armories in the United States be taken to pieces, and these parts thrown into a promiscuous pile, so that in selecting components to assemble a complete gun no two parts chosen will be from any one gun of the one thousand as they stood, yet they must come together without recourse to file or alteration, and make as perfect an arm as the model musket.

Is Flax Exhaustive?

It is believed by many that flax is an exhaustive crop, but it is to be doubted if it is more so than most of the small grains. All of them are so if the land is continually cropped and nothing returned to the soil. Experiments of Professor Johnson showed that flax is less exhausting than either wheat or oats, judging from the amount of phosphoric acid given by its ash. Dr. Hodges, of Belfast, Ireland, recommends the application of 48 lbs. muriate of potash, 16 lbs. soda ash, 54 lbs. bone dust, 56 lbs. sulphate magnesia, 34 lbs. gypsum, per acre, as a manure for flax land.

SPECIAL NOTICE.

A. S. Macomber, formerly of Bennington, Vt., and now of Hamilton, N. Y., has petitioned for the extension of a patent granted to him on Nov. 5, 1850, for an improvement in straw-cutters.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Oct. 17, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the day of hearing.

Lighthouse illumination produced by a magneto-electric apparatus has been in successful operation at the South Foreland and Dungeness beacon for two years. Currents of air produced by the rotation of masses of iron in the neighborhood of powerful permanent magnets generate the current of electricity, which ignites pieces of carbon intensely, thus producing the light.