THE TRIAL OF THE HUNDRED-TON GUN.

The 100-ton gun, built by Sir William Armstrong for the Italian Government, was, as we have already noted, transported to Spezzia, Italy, and there was fired fifty times, this being the proof test called for by the contract with the maker. The results of the trials show that, with a projectile weighing 1,997·6 lbs., and charges of powder varying between 299·6 and 373·5, the pressures at the bottom of the bore ranged between 16 and 21·4 tons per square inch. The velocities obtained were between 1,337·6 and 1,504 feet per second.

The four targets, against which the shots were directed, varied both in general construction and in the nature of the plates with which they were covered. Target No. 1 was composed of two plates of forged soft steel from the Creuzot foundry. Their dimensions were 32·8 inches long by 56·5 broad by 21·8 inches thick. They were backed by two layers of wood measuring 25·1 inches in thickness, and supported by a heavy iron framework that rested at an acute angle on the earth. In target No. 2, there was the same general construction, with the exception, however, that the plates were of forged iron, partly of English and partly of French manufacture. Target No. 3 had two plates of iron, separated by wood on its upper half. The outer plate was 11·8 inches, and the inner one 9·9 inches, in thickness. The lower half of the target had an outer plate of 9·9 inches backed by a hard cast iron plate 14·8 inches thick. The wooden portions were the same as those already described. Target No. 4 closely resembled No. 3, so that it will be seen that all were constructed with a thickness of 21·8 inches of metal, besides sufficient wooden backing to aggregate a total thickness of about 51 inches.

Fig. 1.

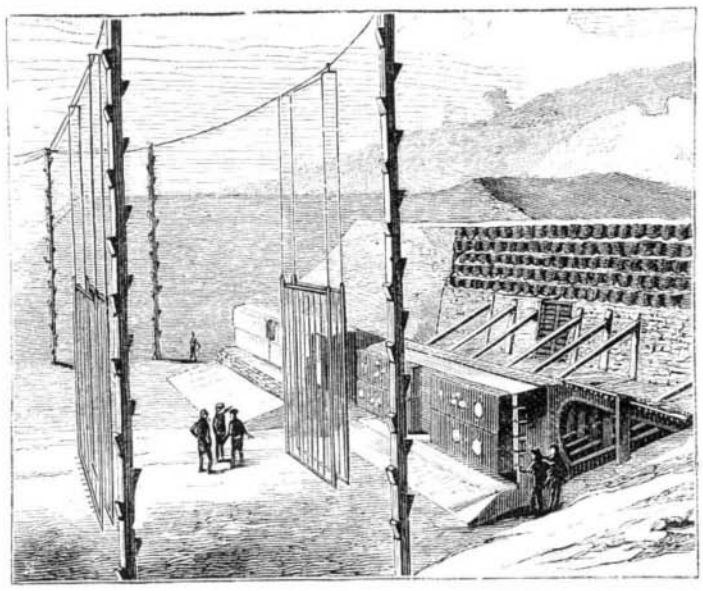
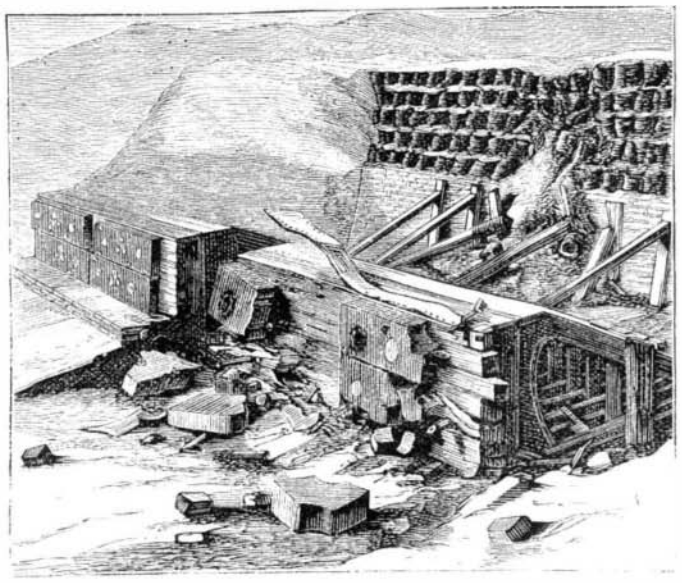


Fig. 2.



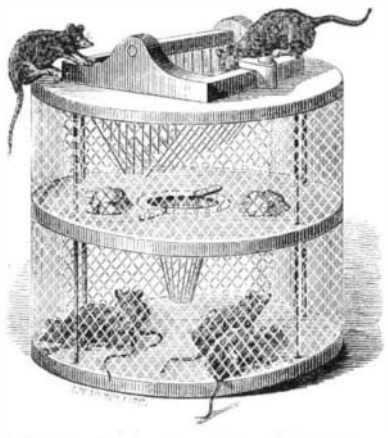
THE TARGETS FOR THE TRIAL OF THE HUNDRED-TON GUN.

The firing ground was located in a ravine near the coast, where a butt was erected of sandbags and gabions filled with earth. The cost of targets and earthwork was about $125,000, each armor plate being worth about $4,000. The effects of the shot—to enter into the detailed consideration of which here would occupy too much space—fully realized all anticipation. The terrible destructiveness of the enormous projectile is, besides, well exhibited in the annexed engravings representing one of the targets before (Fig. 1) and after (Fig. 2) being struck. Although the projectile failed to traverse entirely the steel plate, it was considered to have dealt the armor a shock which would have irremediably damaged the same had the plating been upon a vessel.

As might be expected, the tidings of these results have created considerable excitement in England, as they show that such vessels as the Inflexible, hitherto deemed impregnable to modern artillery, are no longer so. The British Admiralty has already ordered the construction of several plates 24 inches thick, or some three inches thicker than those used at Spezzia. Plans for a still larger gun are also under consideration; and the London *Times* announces the speedy construction of a 200-ton Fraser gun, capable of throwing a 3,995 lb. shot.

A SELF-SETTING RAT TRAP.

The annexed engraving represents a very ingenious rat trap, simply constructed in a manner calculated to allay the



suspicions of the wisest rat, as, after catching its victims, it displays them so that they serve as decoys for others. It consists of a drum-shaped cage of wire divided by a horizontal partition into two compartments. In the head there is a square hole into which is secured, by buttons, a frame carrying a number of downwardly projecting wires. In bearings in this frame is also a shaft, having upon it two diverging rows of wires, which form a swinging gate, suspended centrally between the wires of the inlet. This gate the rat can easily push aside, so as to gain access to the interior; but he cannot return, because the gate at once swings back into place. The bait is placed in the upper compartment, and thither the rat makes his way. As soon as it dawns upon him that he is caged, he loses his presence of mind; and in his desire to depart, he dives into the first opening that presents itself. That opening is in the partition, and it leads him into the lower compartment. He cannot return, because the aperture encloses another frame, which is surrounded by converging sharp wires. There he stays, and by his presence deludes his friends into the belief that everything is all right, and that they can step right in and carry off the bait. When they try to do it, they join him. After a sufficient number of rats are collected, they may be removed by taking out the wire frames. Their subsequent disposal may be left to the consideration of a Scotch terrier.

Patented through the Scientific American Patent Agency, December 5, 1876. For further particulars relative to sale of State and county rights, etc., address the proprietors and manufacturers, J. T. Wilhide & Brother, York Road, Carroll county, Md.

More Blue Glass Skeptics.

Mr. Thomas Gaffield, of Boston, who for very many years has given much attention to the action of sunlight on glass, and the action of colored glass upon transmitted sunlight, makes the following statements, which would be damaging to the nonsensical blue glass theory of Pleasonton if that statement had any foundation to rest upon. Mr. Gaffield says: "The poorest kinds of colorless glass, and even those kinds which have been changed to a yellowish or purple tinge by exposure of years to sunlight, will transmit a much larger amount of the chemical rays than the most actinic of the really colored glasses, the blue and violet." He adds that, in a series of photometrical experiments made by Professor Stimpson and himself in 1867, they found purple or violet glass to cut off about 90 per cent. of the light rays; and he estimates that the same glass transmits from 20 to 30 per cent. less chemical influence than any colorless glass.

It has been suggested to us, by a skeptic in patent blue glass science, that it is difficult to perceive how the blue violet rays, which were already in the sunlight before it was filtered by the glass, can be augmented in their influence by such filtration. If they are thus augmented, as is claimed, then it logically follows that the present compound of sunlight is a very inferior production, in which certain ingredients serve to diminish the value of the others, and that the Creator has blundered badly in its manufacture.

Hard Times for Ironworkers in Germany.

In Krupp's works there were 12,100 hands employed in the spring of 1875; in September, 1876, there were 9,000. The wages for 12 hours were $1; now they are 80 cents. In the works of Horde in 1875, 2,800 men were employed, who worked six double shifts every week; in 1876 there were 1,500 men working five double shifts. The Gute-Hoffnung-Hutte, at Oberhausen, employed in March, 1873, 7,175; in October, 1874, 5,876; in January, 1876, 4,142 hands. In the Bochum Steel works 4,600 men were employed in 1873, while in the first two months of 1876 the number was 2,250.

Remarkable Glassware.

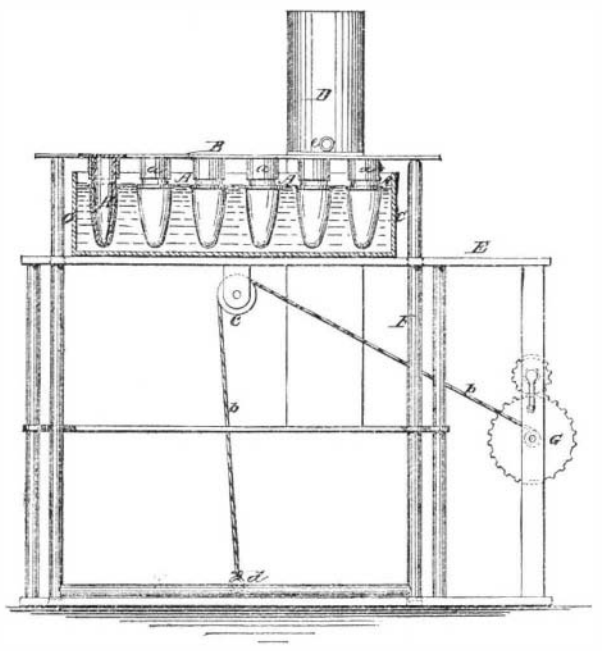
A number of prominent citizens of New York and Brooklyn, including William Cullen Bryant, Erastus Brooks, Chief Engineer Nevins, Secretary Edward A. Kollmeyer, of the Brooklyn Fire Department, and others, paid a visit on Tuesday to the La Bastie Glass Works of South Brooklyn to witness the manufacture of glassware under the process patented by M. de la Bastie, of Paris, in 1875. This process seems to differ from the manufacture of other glassware only in the component parts of material used, as oxide of lead, soda ash, acid, broken glass, sand, etc. After the ware has passed from the workmen's hands it undergoes the annealing process by being thrown into a bath of tallow. The visitors were conducted through the works and the process of manufacture was explained. They were then conducted into the storeroom, where lamp chimneys, tumblers, plates, globes, etc., were subjected to a test by throwing them carelessly around the floor, driving nails into boards with a lamp chimney, and pitching the plates 15 or 20 feet on a hard floor. One small plate was thrown into the air about 25 feet and allowed to fall upon a brick floor, without breaking. Lamp chimneys were placed on lamps and heated, and cold water was sprinkled upon them, but these severe tests did not affect the ware in the least. The works employ about 150 persons, mostly boys and girls, and turn out about 1,000 dozen lamp chimneys daily.—*Tribune.*

NEW MANUFACTURE OF RUBBER ARTICLES.

Mr. Charles E. Longden, of Naugatuck, Conn., has patented through the Scientific American Patent Agency (January 2, 1877), a new process and apparatus for forming rubber articles, which consists in dissolving the india rubber in naphtha or other suitable solvent, and dipping the moulds or forms upon which the articles are vulcanized into the solution of rubber a number of times, allowing sufficient time after each dipping for the naphtha to evaporate more or less. When the mould or form becomes sufficiently coated with rubber, the articles are allowed to dry on the mould, and are afterwards vulcanized in the ordinary way.

The apparatus used is represented in the annexed engraving, C being the vat for containing a solution of rubber or other vulcanizable substance. F is a movable frame, that is capable of sliding vertically through the table, E. A support, B, rests upon the frame, F, and has the socket, *a*, attached to its under side. In the socket, *a*, the moulds, A, are placed, so that the moulds project downwards into the rubber solution. The frame, F, is raised or lowered by means of the windlass, G, which is arranged in the frame of the table. A cord, *b*, running from the said windlass over the pulley, *c*, attached to the under surface of the table, is connected with a crossbar, *d*, in the lower part of the frame, F. D is a reservoir for containing a supply of the rubber solution, which is delivered through the pipe, *e*, to the vat, C, as the rubber solution in the vat becomes exhausted by dipping the moulds. The moulds or forms, A, are made from glass. They are first dipped, then raised out of the said solution and allowed to stand for a short time; and if the coating is not of the required thickness, the operation is repeated. After removal the forms are placed in a vulcanizer, and the rubber is vulcanized in the usual way.

The advantages claimed for this method of working rubber are that articles are seamless, and have a finished exterior and interior surface. They can also be made much more rapidly than by the ordinary process. The glass form permits of readily removing the rubber after it is vulcanized, and it gives the surface of the rubber, which is in contact with the glass during the process of vulcanizing, a



smooth and finished appearance. A further advantage consists in dispensing with moulds for the outside of the article.

CRAB ORCHARD SALTS contain lime, magnesia, potash, soda, sulphuric acid, and a trace of hydrochloric, carbonic, and silicic acids.