

THE NEW FRENCH SYSTEM OF MOVABLE BATTERIES.

At a recent session of the chief council of war, the question of the transformation of the frontier fortifications was discussed at length. From the artillery experiments made at the camp of Chalons and at St. Chamond, it has been found that armor-clad batteries are rendered untenable by the penetrative power of the new projectiles of the new siege guns. Conformably to the views of General De la Jaille, president of the artillery committee, it has been decided to substitute, as far as possible, for the iron-clad batteries, movable ones mounted upon carriages running upon a very ingenious system of tracks, which has been recently experimented with at Toul, and which is shown very accurately in our engraving.

Let us imagine an intrenched camp, that is to say, a line of permanent forts provided with a circular railway passing in the rear of each of the forts at a distance of a hundred yards from them and skirted by a parapet of field fortifications *en saucisson* and of earth, high enough to cover the guns without extending above them. Upon this line are distributed the siege guns, each of which is established upon a rolling plat-

same is the case with the railway; if it be partially carried away, the squads of the railway battalions can soon lay it again. At all events, the firing of the movable pieces will not be interrupted.

The system represented in our engraving was constructed in the establishment of St. Chamond (Loire). It does the greatest honor to Commander Mougin, who studied the project of it.—*L'Illustration*.

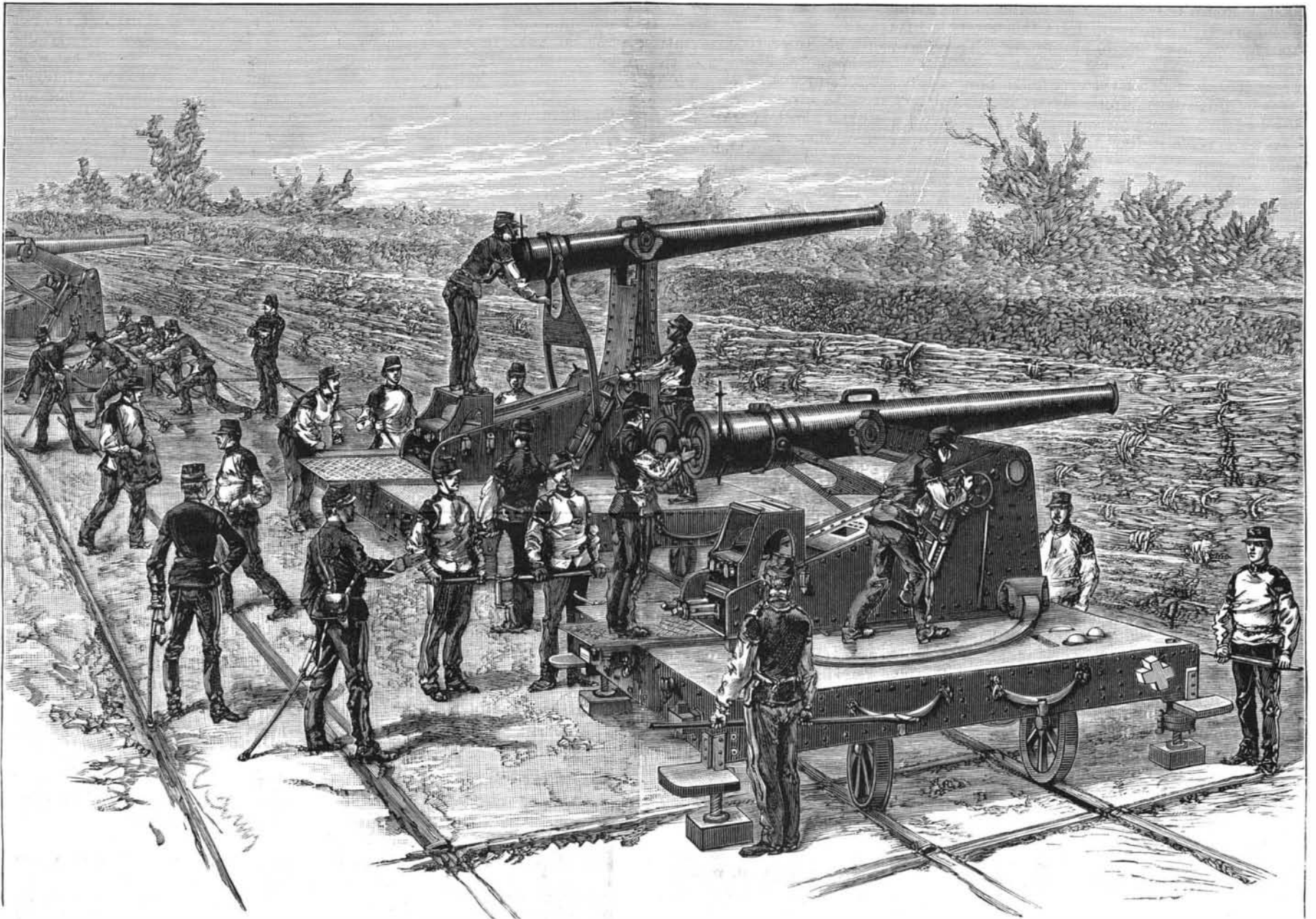
New Electric Lighting Building in Philadelphia.

The Edison Electric Light Company, of Philadelphia, has its central station under roof and the machinery is being put in. The building is put up for solidity and strength rather than for appearance or decoration. It is six stories high. On the first floor will be placed twenty engines of 250 horse power each. On the second floor there will be forty dynamos, with a total capacity of 60,000 lights. The third floor will be used for the workshop. The fourth floor for ten boilers of 500 horse power each. The fifth floor will accommodate 1,000 tons of coal, which will be fed by pipes to the furnace under each boiler. The sixth floor will be devoted to the general offices of the com-

The Pneumatic Torpedo Boat Vesuvius.

Of the Vesuvius the *New York Tribune* says:

One of the old navy officers, who was one of the actors in the notable Monitor-Merrimac fight, who served with distinction in other naval engagements during the civil war, and who has made a careful inspection of the new vessel, said he was much disappointed with her design. No attempt whatever seems to have been made to protect the vital parts of this "infernal triumph" in the slightest. Her boilers and engines are as much above the water line as below, and no protection is given to the boilers except coal, which, of course, will not be there when most needed to protect them from the solid shots of the enemy. Both of her engines are in one compartment, so that if a hole is made in that compartment, or a shot goes through the steam pipes of one engine, it would disable the motive power completely. In fact, a single shot from a revolving cannon of the size which is carried in the tops of vessels of modern build can easily penetrate the main steam pipe and completely disable the boat. It is easy enough to make a vessel go when you are not hampered with the weight of protective decks or



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form with a disappearing carriage, of which our engraving gives an idea. As soon as the enemy, through the opening of his first parallel and the construction of his first siege batteries, has outlined his attack, the carriages bring their guns together on the radiating tracks and carry them to the circular line. This arrangement secures to the firing a mobility that permits of striking the enemy and his batteries in every position. The guns, loaded and pointed in the eclipse position, that is to say, depressed, appear but for a few seconds at the moment of firing. If the enemy's fire becomes too hot for the exposed gun, the latter, without changing its aim, can be shifted to the right or left by the gunners to a distance of 20, 30, or 100 yards, and begin firing again without losing the benefit of its regulation, thanks to a mathematical correction of extreme simplicity.

The besieger, obliged to fire at an object a mile or more in extent, can rely upon chance blows only to dismount here and there one of these movable pieces. Admitting that he succeeds in this, the damaged gun, without disturbing the firing, can be removed from its park by transverse tracks and be easily replaced. The superiority of the besieged over the besieger is therefore overwhelming.

It is true that the projectiles carrying new explosives can make breaches in the railway parapet, but these can be easily repaired or filled in a few hours. The

pany and will be fitted up in a very elaborate manner. The company has already about 28 miles of electrical conductor underground. Its underground system is through metallic tubes, with three copper wires, which are insulated by composition. The tubes have junction boxes at every 20 feet. It has 84 miles of copper wire underground. It considers the station well located, as it is in the geographical center of the district. Already 9,000 lamps are engaged, and expect to have 10,000 when they start up, which will be about the middle of December. The station when completed will be the finest in the world. All the large new buildings for banking institutions and trust companies will be lighted by this company, and the new Bulitt building will have 2,100 lamps. The company will also furnish power for motors, and will not discriminate between any motors for which it serves power.

This is one of the finest electrical buildings ever erected in the United States. It cost \$150,000. The total investment, including wires, will be \$1,000,000. It will be ready for operation inside of a month, at least this is the present anticipation.

Long Range Cannon.

According to a recent statement made by General Maitland a Longridge wire gun made at Woolwich has thrown a shot $12\frac{1}{2}$ miles, with an initial velocity of 2,800 ft. per second.

armor, or obliged to keep the machinery below the water line, but I cannot conceive that such a design for a boat of this character, and for the service for which she is intended, is calculated to do more than to demonstrate whether or not the dynamite gun can be worked from a floating platform. The same thing could have been shown or proved by putting one of the guns on one of our old ships. The Vesuvius could not possibly go into action and fire one of her guns unless she took the enemy by surprise.

Photography of Projectiles.

The well known photographer, Anschuetz, of Lissa, has for some years been experimenting with photographs of the flight of cannon balls from the moment of their projection to their striking the target or object aimed at. Last month, on the trying grounds of the Gruson Works, near Buckau, he demonstrated the perfection of his studies. He succeeded in obtaining remarkable and highly interesting results. His plates were submitted to the expert, Professor Dr. Koenig, of the Berlin University, who was perfectly able to make therefrom the desired practical calculations. He established the fact that the projectile thus photographed had a velocity of over 1,300 feet a second, and that the duration of the light thrown on the photographic plate did not exceed the ten-thousandth part of a second.—*Court Journal*.