

fire, and it would then merely burn away with more or less fierceness, according to the amount of gun-cotton in the package. But if the gun-cotton were damp, the impact of the bullet would have no more effect than it would have on wood, earth, or any like inert substance. In the case of nitro-glycerine compounds, however, exposure to musketry fire would be attended by far more serious results. Under these circumstances and at all ordinary infantry ranges, a package of dynamite or lithofracteur will explode with considerable violence.

Some interesting experiments on this point have lately been concluded in Austria, on the practice ground of Semering. The objects were to ascertain at what distance the impact of a rifle bullet would fail to explode dynamite, and to decide what precautions were necessary in the transport of this substance in the field. The rifle used was the Werndl, which fires a bullet of 313 grains with a charge of sixty two grains of powder. The experiments included a trial of dynamite, both in its plastic and frozen state, in comparison with gunpowder. About twenty-four ounces of dynamite were placed in a tin case, which in its turn was put into the centre compartment of a species of wooden limber box, the sides or partitions of which were protected with sheet iron of from  $\frac{1}{2}$  to 3-16ths of an inch in thickness. At the same time, a tin containing about 10lb. of gunpowder was placed in a similar box protected by 1 20 inch iron. In the first trial, the rifle was fired with its full service charge at a distance of sixty paces. The muzzle velocity of the bullet was 1345 feet, which corresponds to that attained by our Martini-Henry rifle.

The results were as follows:—

The bullets perforated the boxes protected with 1-20 inch and  $\frac{1}{2}$  inch iron, and passed through their contents. Neither the gunpowder nor the frozen dynamite was affected, but the plastic dynamite was invariably exploded. The bullets failed to perforate the box protected by the 3-16 inch iron, and when the case which held the dynamite was not in contact with the iron partition complete protection was afforded; when, however, the tin case which contained the dynamite touched the iron against which the bullet impinged, the mere indent or shock of the bullet caused the dynamite to explode.

The result showed that the dynamite could be completely protected provided the cases which contained it were plated with about 1-4 inch sheet iron. As, however, the weight of the transport wagon or cart, under these conditions, would be excessive, it was determined to continue the experiments with the view of ascertaining the destructive effect which might be expected from the accidental explosion of the ordinary field cart in which it was proposed to transport dynamite, and the distance at which a rifle bullet would determine the explosion. The cart was packed, as for service, with detonating caps, hand grenades, about 90lb of dynamite, and 70lb. of powder. As a measure of precaution, the explosion was effected from a distance by electricity. The cart was blown to fragments, and the debris covered a circular area of about 100 paces diameter, some of the pieces being hurled to 300 paces. It appeared, therefore, that this latter interval should extend, in a column on the march, between the rear company and the first wagon. To ascertain the distance at which a rifle bullet would explode dynamite cases containing this substance were fired with a Werndl rifle at 150 paces, but the charges were reduced to represent the velo-

city of the bullet fired with the full charge at distances of 3,000, 2,500, 1,500 and 1,000 paces. The dynamite was exposed to this fire (1) in its ordinary tin case, without other protection, and (2) enclosed as before in a wooden box (unarmoured). The results demonstrated that when the dynamite was simply shut up in tin cases the limit of explosion was between 2000 and 2,500 paces. If the tin cases were placed in wooden boxes the limits were between 1,000 and 1,500 paces. It is thought that the Austrian engineers treat this matter much too lightly:

"On pourra donc exposer, sans danger, la dynamite au feu de l'infanterie quand les distances seront supérieures, dans le premier cas, à 2,500 pas, et dans le deuxième, à 1,500 pas."

Such is the conclusion they have arrived at, while at the same time they look forward to the employment of this explosive agent in great quantities in future wars."

The following has been taken from *Broad Arrow* of 24th January, and exposes the so-called economy of the Gladstone Administration in a striking light:

The following letter appeared in the *Times* yesterday:—

"SIR,—Between one and two o'clock to-day was seen a small military detachment in uniform marching from Cannon Street to the Mansion House. A field officer, three other officers, and about eight non commissioned officers and men, were taking to their final resting place in St. Paul's Cathedral the old colors of the 57th Regiment—the West Middlesex—the 'Diehards.' They were cordially received by the Lord Mayor, and with equal cordiality at the Cathedral, where after a short impressive ceremony, the colours were placed on its walls. They were the colours of the Crimea, and especially of Inkerman. They were accompanied on this their last march by the condition that 'no expense was thereby to be entailed on the public.' As this detachment of honor passed from the Mansion House and along Cheap-side, little did the rich and busy crowd think that the officers' private purses have saved to the country the railway fare from Woolwich, and thus added to our economical, if it had not quite to our military, credit—Your obedient servant,

W. J. CODRINGTON.

"Edin Square, January, 22."

We could not hope to better the comment of the *Pall Mall Gazette* on this incident:—"There is nothing like maintaining amongst our soldiery a sober enthusiasm for Queen and country; and by our own feelings, as we read of this apparently trifling, but truly significant little incident, we may judge of the sentiments which animated that small company of soldiers as they marched to the Cathedral—without parade; without ostentation; indeed, rather sneaking than marching—to place the colours that waved at Inkerman in their final resting place. Every heart beat high with the thought that although the dear flag was being carried through the streets as a pauper corpse is trotted to the grave, the noblest principles of Government were vindicated in an almost pathetic manner; 'no expense was thereby entailed on the public.'"

The use of armor plating in military construction is being nearly as universal as it has been in naval structures. But it would appear to have reached in the latter the stage

corresponding to the armour of the sixteenth century when opposed by the old-fashioned musket and match lock, that is it affords no defence, and is a burden too great to be carried.

The Germans mean to utilize it however, in covering their late acquisitions from France.

"An article in the *Cologne Gazette*, on 'the new iron fortifications of Germany,' says that the drilled cast iron gun stands and iron-clad revolving turrets which have since 1869 been completely tested in a series of experiments on the great artillery shooting grounds at Tegel will now be used for the new works to be begun in the German fortresses. Two of these turrets will maintain a secure communication between the forts of St. Quentin and St. Privat at Metz, and two of the flank works which will be attached to these forts, so as to command the valley of the Moselle and the Saïlle, will probably be made in the form of the gun stands referred to. All the iron for these fortifications can be cast on the spot of any required thickness, in foundries specially erected for the purpose. Each of the works will be constructed with a few huge plates, which will fit into one another by means of joints made in the casting. The gun stands made are each to hold one gun only, but a number of them may, if necessary, be placed side by side, and they may be connected so as to form single work. The embrasures are made so small as to prevent the entrance of any projectile fired at them, and the whole is protected by an earthwork with apertures to carry away the gas and diminish concussion. During the trials of 1869 seven shots from a 300-pounder (the 24 centimetre gun) hit the plate of a gunstand of this kind without disabling it for further use. The writer adds that there is good reason to believe that these iron fortifications would make the land and sea fortifications of Germany far superior to those of any other State."

We insert with pleasure the Report of the Frontier Rifle Association, and are glad to find the military fire is still aglow and burns with as much ardour as ever it did. This fine battalion was always first in the field and the last to leave it, when the enemy showed himself near the Lines. The Battalion turned out 1,700 officers and men, for the Annual Drill last year, viz., 1,500 in Camp, and 200 at Company headquarters;—thus showing that a *bona fide* force can be easily kept together where it is most needed.

And this, we are happy to say, is not the only battalion that have shown creditable numbers during the past year at their annual drill.

And while on this subject, we have received several letters from officers of the Force who entertain the same idea that we do, that a strong force can be easily raised on the Volunteer principle, to meet all the requirements of the Militia Act, without resort to the Ballot. Here is one of them; "There is no doubt room for improvement in our Militia System, and I believe it will be improved by the present Government, but I agree with you, that a compulsory system will not work in this country—we do not need it. Increase the allowance for drill pay, and require a higher grade of efficiency for officers, and a good force can be kept up."