THE PRUSSIAN NEEDLE GUN.

We have received from an intelligent correspondent at Washington, who is thoroughly informed upon the subject, and has spent considerable time in Europe, the following observations upon the Prus sian needle gun. In our next number we shall give an illustration of the working parts of this arm, to gratify the curiosity which its advertised success has aroused :—

The late European news proves conclusively that a very defective breech-loader, such as the needle gun, is a much more effective weapon in actual war than the best muzzle-loader.

The needle gun is a clumsy, unsightly, heavy, and expensive gun compared to many American breech-loaders, it is complicated in its parts, and delicate in its construction. The breech-piece, which contains the breech-loading mechanism, is enormously long, extending not less than eleven inches to the rear of the cartridge chamber. The bore of this breech-piece is enlarged to receive a hollow cylindrical plunger or breech-closer, about five inches long. The plunger is operated back and forth in order to open and close the breech of the gun, by means of a knobbed handle which slides in a longitudinal slot in the top of the breech-piece; this slot is widened for half its length from the front toward the rear, thus forming a shoulder to receive the knobbed handle and support the breech-closer when the gun is fired. Within the cylindrical breech-closer is a longitudinal steel pin which carries the needle, and is surrounded by a spiral spring. In the bottom of the breech-closer is a narrow longitudinal slot to admit the trigger to take hold of the needle pin. On the front end of the closer is an expanding steel ring or gas check, which performs its functions badly, as there is so much escape of gas that the gun cannot be fired one hundred rounds without being cleaned. There is also considerable escape of gas into the mechanism through the needle hole in the face of the breech-closer. This escape of gas soon fills the chamber in the cylindrical breech-closer, which contains the needle-pin and spiral spring, with a residuum of burned powder, and seriously impedes their action. To open the breech preparatory to loading, strike up with the hand on the knobbed handle of the breech-closer from behind the shoulder, and withdraw it to the rear; but now the soldier must be very careful in inserting his cartridge, lest he injure the delicate needle, which projects its full length into the opening, or lest the needle injure his own hand. To shut the breech the closer is shoved hard forward, and the knobbed handle thereof pressed down in front of the shoulder on the right hand side of the slot.

When the cylindrical breech-closer is shoved forward, the trigger, having taken hold of the needle-pin from below, retains it to the rear, and thus compresses the spiral spring, so that the simple act of closing the breech cocks the piece, and it is only necessary to pull the trigger to fire it. This arrangement is a convenient one for the soldier, and facilitates the firing, but it is an objectionable feature in a military arm, because when loaded it must necessarily remain at full cock. It is true there is a means provided for locking the needle-pin in this position to prevent accident, but if the soldier should forget or neglect to avail himself of it, then serious accident is liable to take place at any time.

The ammunition for the needle gun is complicated, expensive, and difficult to make up, considerable special machinery being required for that purpose. The ball is contained in a small papier-maché cup or sabot, to the base of which is attached the igniting charge, consisting of a friction wafer; the needle must penetrate the whole length of the powder charge before it reaches the fulminate; thus the powder is ignited forward instead of at the rear, as usual. This is believed to be advantageous to the range of the piece. The needle gun cannot be fired more than half as many rounds per minute as most of the American metallic-cartridge guns. There is no denying, however, that the needle gun is proving itself a truly formidable weapon in the hands of the Prussian soldiers, who have been educated to its use for more than twenty years; but its success proves nothing in favor of the needle-gun as a specialty, while it proves everything in favor of breech-loading as a principle. If the Austrians had been armed with good breech-loaders, the results of the conflict would have been very different from what they are. The writer spent seven months in 1859 making trials with a breech-loader before the committee in Vienna. The report strongly urged the adoption of my arm for the cavalry, to be extended to the infantry later. That recommendation was never complied with by the War Department. From that date until this the writer, either in person or by an agent, has never ceased to urge upon the attention of the Austrian authorities the importance of breech-loading arms, both large and small. What must be the present feelings of the Austrian Emperor toward those of his officials to whom he assigned this important subject for examination and decision, and who have thus long neglected to act, wanting either the capacity or courage to arrive at a decision in favor of any one of the many inventions proposed?

It is stated that all the great powers are taking steps to obtain needle guns. This report is totally without foundation; all the great powers, this country included, being thoroughly familiar with the principles of its construction, and having pronounced it totally unfit for military purposes. The needle gun which the Emperor Napoleon is said to have received some years ago, and placed in his cabinet of curiosites, is very properly bestowed, for that is sure to be its final destination. The Prussians adhere to the needle gun only because it is Prussian in its origin, and may continue to do so with impunity until compelled to abandon it by the adoption of a better arm by other governments.

The Prussians are beating the Austrians because of their superior arms, and the Austrions are, at the same time, beating the Italians for precisely the same reason; the No. 1 rifled musket of the Austrians being as much superior to the heterogeneous collection of low-priced guns with which the Italians are armed as the Prussian breech-loader is superior to the Austrian arm. The Italians are brave as any troops in the world, and are now inspired with a degree of patriotic enthusiasm which ought to render them invincible if they were only armed with a good breech-loader. It does not seem to be generally known that all the Prussian field artillery are also breech-loaders. These guns are a combination of the Prussian and the Broadwell systems, consisting of the Kreiner double-wedge for closing the breech and the Broadwell gas-proof principle.

Breech-loading artillery and small-arms having been adopted, it only remains to introduce the Gatling gun to complete the national armament. The Gatling gun is a revolving battery, capable of throwing two thousand missiles per minute when using his compound ammunition, and one hundred half-lb. balls when using simple ammunition. This gun is designed to occupy the middle position between artillery and small-arms; it is destined to supersede the old flank defense howitzers, and to be extensively used in the field for defending fords, bridges, etc.; it will also, no doubt, be used for boat howitzers in the navy. The recent successful trials with this gun at Fortress Monroe astonished and gratified all who witnessed them.

Success in war is no longer a question of numbers, nor of courage and discipline on the part of troops; nor yet of military genius and experience on the part of leaders; but rather one of arms; and this will continue to be the case until equality of armament shall restore the old relations.

INSURANCE AGAINST STEAM BOILER EXPLOSIONS.

We are gratified to learn that this subject is beginning to attract the attention it deserves. In the eleventh Annual Report of the Insurance Companies of Massachusetts, we find the following :—

"Another very important experiment has been conducted to a successful issue in the mother country. Steam boilers have always been a terror to timid fire insurance companies, and the enterprising proprietors of the grand motor of modern civilization have had to pay a very excessive premium for indemnity against its fire damages, while they insured themselves against its hot water.

"In 1850 there was established in Manchester, England, an association for the prevention of boiler explosions. The plan was to employ the best science extant to avoid the causes which lead to these frightful and destructive accidents, and to establish a vigilant supervision.

"Each boiler, we believe, required the payment of one guinea per annum to the fund of the association. A detailed annual report was made of the proceedings of the association, with statistics in regard to the boilers under its charge, and likewise in regard to those not inspected by it. The success of this experiment in diminishing the relative number of those accidents, and bringing steam proprietors better to understand the nature and laws of the force in their employ, soon led to the formation of other associations, not only in Great Britain, but in other countries. It has at last become so decisive that the association now offers for half a guinea per annum, in addition to the guinea already paid, to insure against loss by explosion the boiler itself and surrounding property to the amount of £300. This is less than half the average annual premium of the mutual fire risks in Massachusetts; and in relation to the whole expense of the membership in the association, where it insures, the premium is not half what is charged by stock companies for insuring risks comprising steam boilers.

"The value of this positive discovery to the vast steam interests of this country, if it should ever become generally known, would not be less than that of the discovery of petroleum or a new continent. Men of practical science now believe that boiler explosions, especially those of the most destructive sort, are wholly unnecessary, and easily prevented. What is wanted is a steam boiler insurance company which shall also act as a board of caution and prevention. The experiment of Manchester shows that the principle of mutual insurance is particularly applicable to this specialty, and, encouraged as it might be by a State guaranty, it would result in saving far more than half of what has now to be expended in so imperfectly insuring this most important species of property."

We are very happy to announce that this suggestion is being carried out. Some of the leading engineers of this city have given their support to the formation of a company to insure against accidents and loss occasioned by the explosion of steam boilers, as will be seen by reference to our advertising columns.

An Inefficient Boiler.

A correspondent—H. M. C., of New Jersey—says he has a horizontal cylindrical boiler, two feet in diameter, ten feet long, containing fifteen two-inch flues, which does not draw well, the tubes being of too little capacity. The smoke passes under the boiler and returns through the tubes, being discharged into the smoke stack over the furnace door. He proposes to relieve the tubes by constructing a brick arch from the rear end of the boiler, over its top, to connect with the smoke box at one end and the chimney at the other. It seems to us that it would cost less and be more efficient to turn the boiler end for end, and convey his smoke directly through the tubes without return. The proposed arch would render his tubes useless, and his boiler would be merely a common untubed boiler. The trouble, we think, is that the draught is not sufficient to control the double passage of the smoke. If it passed directly through the tubes, their capacity would probably be found sufficient.

M. GRIPON has presented a note to the Academy of Sciences, "On the Conducting Power of Mercury for Heat." Experiments made after Peclet's method showed that if the conducting power of silver = 100, that of mercury = 3·54. It stands, therefore, the last of the metals, and a little before marble and gas coke. The author mentions that in this case the conducting power for heat and for electricity are very different, the former being 3·54, the latter 1·80.—*Mechanics' Magazine.*

PETROLEUM IN ENGLAND.—There appears to be good reason for supposing that an abundant supply of petroleum exists in the rocks of England. It is stated that the surface indications of various parts of Shropshire lead to this inference. Experimental borings are already in progress. The oil pit which has been sunk at Leeswood Green, in Flintshire, continues in active operation, and is increasing in product.