BRITISH WAR MATERIAL AT THE EXHIBITION.

From the Illustrated London News, Aug. 31.

The exhibits of British war material afford a clear and comprehensive view of the stage at which our armaments have arrived. Those of the Secretary of State for War are arranged, not in the interior of the main building, but in a large annexe entirely devoted to them, and situated near the English lighthouse. It is only just to acknowledge the care which has been taken to contribute everything which could give an insight into our resources for the manufacture of munitions of war, and the good taste shown in refraining from exhibiting all that the progress of science has rendered useless or out of date.

Each step in the construction of the rifle is presented for study; the shell, chilled projectiles, fuses and rockets, are not merely to be seen as they would be in an arsenal or battery, but are shown in most beautifully prepared sections, which not only facilitate the task of comprehension, but cunningly draw the eye of the observer to their essential and characteristic features. The weight of the more important parts is labelled over each article; the guns and carriages are accompanied by drawings which fully explain how they have been built; and clever series of photographs detail what has been the past, and what will, probably, be the future history of attack by our ordnance upon masonry and iron plating. No warlike display in the Exhibition can compare with this, and England has certainly given other nations lessons from which they ought derive considerable profit. The annexe is generally well filled with visitors, who seem to take a far greater amount of interest in what it contains than it is the lot of more peaceful wares to attract.

To give even a curtailed description of all exhibited would be to attempt a resume of what has been done in the past ten years for our arms, a task which we certainly will not commence, but, at the risk of repeating much that is known, some few points must be noticed.

Enfield sends specimens of the wood and iron from which our small-arms are made, and shows, by an elaborate sequence of specimens, how the slab of metal and the block of walnut are developed into the lock, stock, barrel, and bayonet of the rifle; then, having put together the various parts, she teaches, by similar skillfully arranged examples. what changes must be made in the old muzzle loader, and what fresh pieces must be added in order to convert it into the Snider. The necessary alterations are less than one might be disposed to fancy; a small portion of the hammer is dispensed with, a short portion of the barrel is taken off, and a screw cut upon the outside of the breech; to this the breech closing arrangement is screwed on, and the rifle is ready to take the new cartridge.

Below the Sniders themselves are the guages by which the exact dimensions of its different constituent parts are tested; and here a remarkable feature of the rifle should be noticed: all its portions, with one exception, are made so exactly alike that any part, say the trigger, of one rifle is fit to take its place without alteration in any other; thus, if all the muskets of a battalion were taken to pieces and put into a bag, fresh rifles might be immediately constructed by putting together the portions first coming to hand. With the exception of the United States, we believe the arms of no other nation possess this advantage.

In a glass case are Boxer's cartridges for the Snider. These are central fire cartridges, with a strong base. The powder is held by a thin roll of copper, the bullet is hollowed out in front as well as in rear, so as to throw the centre of gravity back, and also to bring the weight, or, to speak technically, the radius of gyration, near the rim of the projectile—changes which add so much to its stability and accuracy of flight that the accuracy of such a bullet has often been expressly covenanted against in rifle matches.

The essential difference between cartridges for needle guns, including the Chassepot, and our own is that the case of the former are made very slight, so as to be consumed by the heat generated in each discharge, while ours are constructed of solid material; and the old case, as in fowling-pieces, has to be pulled out before a fresh charge can be inserted. The bore of our present Snider is too large; the twist of its rifling is too slow; perhaps the side pin is rather weak; still it looks and has proved a good breech loader, and for a patchwork—that is, a converted arm—is a decided success.

Our light artillery is represented by a 12-pounder Armstrong gun. Compared with the field pieces of other countries, its shapely lines, its delicate grooving, its highly finished sights, and its screws for adjusting vertically and laterally, give it the appearance of a racer among cab horses. As a foil to its beauty, the woodwork of the carriage gives an impression of heaviness and old fashioned coarseness.

Underneath the 12-pounder are its three projectiles—case, to disperse a number of hardened lead bullets amongst an enemy not more than three or four hundred yards distant; common shell, containing 11 oz. of powder, to burn villages or to level an opponent's defences; and a somewhat shorter shell, the interior of which, built up of little segments of cylinders, holds only an ounce of powder, just sufficient to open the shell at the right moment, and to allow of the segments continuing their onward flight against a hostile column. A section of this shell shows two fuses fixed in it—the upper to scatter the segments three, four, or any assigned number of seconds after the firing of the gun; the lower, a percussion one, to fulfil the same office upon the projectile touching the ground.

Directly opposite the field-piece, which it closely resembles, is a 40-pounder gun of position. There are besides three or four other guns, averaging about five tons in weight, and apparently sent to show the different ways in which we have constructed our 64-pounders and our lighter 7-inch guns. Two are breech loaders—one on the original Armstrong plan, the other on Sir William's wedge system; a third is on the now abandoned shunt system of rifling. These represent our failures rather than our successes; for Sir W. Armstrong's original system of breech loading, though answering fairly in small pieces, has been found to require the lifting of too great weights to be used in guns of even medium size. His wedge system has also been considered open to objection. As to his shunt plan of rifling there was never any harm in it; but it was found that the shunt gun rifled without the shunt did quite as well as with. The form of rifling which we have now adopted, and which is shown in the two largest guns we exhibit, is the so-called Woolwich system, really as palpable an adaptation from the French as any English comedy imported from the Vaudeville or Gymnase.

Both these guns resemble the French, not only in the shape of the grooves, but in having an increasing twist—that is the rifling twists very little at the breech and a good deal at the muzzle, so that the strain of spinning round the projectile comes gradually, and not all at once, upon the grooves and gun.

The advocates of this system were a long time stopped by the difficulty of making the buttons of the projectile take or fit into the different curves at breech and muzzle. The objection has been overcome by making one button smaller than the other. Major Palliser and the French artillery both claim priority in this invention.

The smaller of the two large pieces is a 9-inch, and is probably capable of piercing any armor afloat. It is mounted on a wrought iron naval carriage and slide, and is provided with very complete fittings, both for checking the recoil and for running forward the gun after loading.

Our show article is a 12-inch, 23-ton muzzle loader, mounted as the 9-inch. In point of size it is only the third largest in the Exhibition, the French gun being 13 and the Prussian (Krupp's) 24 tons heavier. It must be remembered, however, that no piece of the same class as the largest French has ever been tried; that the one tried is the first-born of its race, and is made of very inferior material. The material of Krupp's gun is indeed excellent, but only two of this class have ever been constructed, and probably they have never been fired. On the other hand, we have made between Elswick and Woolwich at least eight or ten of our large cannon, and three of them have undergone a very fair amount of proof, one with great success; so that, though our 12-inch or 600-pounder is not yet quite a market article, it is years nearer to being produced on a large scale than any French or Prussian monster.

Before this piece stand two huge coils—one finished, the other in the rough. These represent the Fraser system of making Armstrong guns. All Armstrong guns are made from bars of iron, which are rolled while hot round a cylinder, as a piece of string is round the finger. Until lately the bar was only rolled once round; and as the coil thus formed was not nearly as thick as a gun, four or five had to be shrunk on, one over another. This necessitated an enormous amount of highly skilled labor in turning and boring, to ensure exact fits.

Mr. Fraser discovered that two or three bars might be coiled one over the other, as a coil can be wouud round a cylinder in ten minutes, while it takes eight days to bore it out and to turn it down to proper dimensions. This improvement is attended with an enormous saving of labor. He also advocated the employment of a class of iron cheaper than the first used, and possessing better welding qualities. These, and some minor alterations, have effected a revolution in the system upon which heavy guns are now made in Woolwich Arsenal. From a military point of view the Fraser method is very important, as it facilitates production; and in economy, it should be remembered that in this year's estimate, it has already saved the country £130,000.

In a large glass case are exhibited our projectiles; besides the segment there are Boxer's shrapnell for rifled ordnance. These have the head made very light, to keep the centre of gravity of of the projectile towards