THE MAIDEN'S LAST FAREWELL.

IN THE DAY OF CREMATION.

Then the night wore on, and we know the worst,
That the end of it all was nigh:
Three doctors they had from the very first—
And what could one do but die?

"Oh William!" she cried, "strew no blossoms of spring,
For the new 'apparatus' might rust;
But say that a handful of shavings you'll bring,
And linger to see me combust.

"Oh, promise me, love, by the fire-hole you'll watch,
And when mourners and stokers convene,
You will see that they light me some solemn, slow match,
And warn them against kerosene.

"It would cheer me to know, ere these rude breezes waft
My essence far to the pole,
That one whom I love will look to the draught,
And have a fond eye on the coal.

"Then promise me, love"—and her vice fainter grew—
"When this body of mine calcifies,
You will stand just as near as you can to the flue,
And gaze while my gases arise.

"For Thompson—Sir Henry—has found out a way
(Of his 'process' you've surely heard tell)
And you burn like a parlour-match gently away,
Nor even offend by a smell.

So none of the dainty need sniff in disdain
When my carbon floats up to the sky;
And I'm sure, love, that *you* will never complain,
Though an ash should blow into your eye.

"Now promise me, love"—and she murmured low—
"When the calcification is o'er,
You will sit by my grave in the twilight glow—
I mean by my furnace door.

"Yes, promise me, love, while the seasons revolve
On their noiseless axles, the years,
You will visit the kiln where you saw me 'resolve,'
And leach my pale ashes with tears."

Heavy Rifled Guns.

It is not many years since Engineers and Ordnance officers, held the opinion that smooth bore guns were fully equal to all the requirements in the way of Artillery for iron-clad fighting; nay more, they thought, as we did, that the heavy smooth bores, such as the 15 and 20 inch guns projecting spherical shot, with enormous charges of powder, and very high initial velocities, were not only amply powerful to penetrate the armor of any armored vessel that was likely to be constructed for many years, but that this system would also be superior to its competitor, the rifle, both on account of the more serious nature of the hole made in armor by a round shot when it does penetrate, as well as the greater simplicity of the gun and its projectile. The last few years have changed all this. A 20 inch round shot weighing upwards of 1,000 lbs., fired from a 51 ton gun and exerting, when fired with full charge, the enormous dynamic energy of no less than 37,732,000 foot pounds, is not capable of penetrating the armor of such ironclads as have been laid down for more than one European Navy. We need scarcely tell our military readers that this revolution has been brought about by the adoption of the Monitor system. Monitors are already in commission in foreign waters which carry some 14 inches of solid armor, and others are in course of construction that will carry a protection of no less than 24 inches of solid iron! In a word, the Naval architects have succeeded in building Monitors that are shielded by a cuirass of so great strength that the smooth bore, for iron clad fighting, has been driven out of the field, and the rifle is now the only species of ordnance thought of for this sort of Naval work. We may add, by way of parenthesis, that the rapid advances made by our mechanical Engineers in submarine engines—attack below the armor—or rather submarine defence, will put it out of the power of a fleet of iron-clads, be they armored with even more than 24 inches of iron, armed with "80 ton" rifles, and with their hulls divided up into hundreds of "cellular" compartments, to seriously attempt to invade the precincts of any important harbor or roadstead, without being destroyed. One can scarcely take up a foreign mechanical Journal without reading of torpepo experiments carried on in England, France, Germany, Russia, Egypt, Swedan, or Holland. The entire Naval world is spending money liberally and devoting she best talent to the development of this system—the great peacemaker, we may add. Every one will remember that the rude submarine appliances used by the Germans, completely neutralized the power of the French iron-clad Navy—a Navy but slightly, if at all, inferior to that of England at the time of the war. It seems to us, that the striking significance of this fact is not appreciated as it should be by Military Engineers and Naval men, we readily understand that for the latter it is a very unwelcome fact regarded from a professional stand point. To return to the subject in hand; The chief advantage of rifle as compared with smooth bore Artillery for Naval warfare and coast defence, consists for the most part in its greater penetrative power; as well as the increased distance that the elongated projectile will maintain sufficient *vis viva* to pierce armor. For instance, if the 1,000 lb 20 inch ball was cast into an elongated shot of the same weight, of say 15 inches in diameter, and discharged from a rifle with the same dynamic energy, its penetrative power would exceed the former nearly proportionally to its diminished circumference, about 33 per cent., while, owing to the less resistance which the atmosphere would present to its progress, it would maintain penetrative power at a vastly greater distance than would be the case with the spherical shot.

From what has been said, nothing can be more clear than that our Service, if we are to have any guns at all, should be provided with heavy rifles, at least equal in power to those which now form the chief armament of foreign Navies. If we can utilize our stock of heavy cast iron smooth bores by converting them into heavy rifles, (as Captain Butler thinks we can), possessing adequate endurance under heavy charges, it will be an immense saving in expenditure; whether we can or cannot make efficient rifles for iron-clad warfare by altering the heavy smooth bores, the decision ought to be reached with as little delay as possible. Captain Butler is of opinion, as is seen by his discussion of the subject in his work just published,* that our cast-iron smooth bores can be changed into rifles adequate for the requirements of iron-clad warfare. Many of the experiments he records, go far to sustain this view, and we hope that future trials will give additional weight to it In any rifle gun, particulary in one where so treacherous a material as cast-iron enters largely into its structure, it is of the first importance to have a projectile that will be uniform in its action, and not put any more strain on the gun than is absolutely necessary to give the shot the necessary rotative velocity. Perusal of the work before us, shows that Captain Butler has given careful study to these points, and we think the experiments which he produces warrant the conclusion that he has produced the best rifle projectile of the expansive system, of which we have any knowledge.

To make this point clear, it will be well to briefly recapitulate the different systems of projectiles used in rifle guns. Generally speaking, these may be comprised under the following heads, viz.: 1. The expansive. 2. The compressive. 3. Those which have "buttons" "flanges" or any other form of projection arranged so as to take the rifling. The first and last of these systems are used altogether for muzzle loading guns, the second, the compressive system, is used only in breechloading ordnance, such as Krupp's and the reinforced cast iron rifles of the French and Swedes. The flanged or "button" system is now, we believe, used only in England, where it has caused great injury to nearly every heavy rifle from which many rounds have been fired. This method originated in France, where it was soon cast aside only to be taken up in England and made the standard system for all heavy guns.

We have not the space to follow Captain Butler in his interesting discussion of these systems. He begins with the expansive projectile, which, to us, is perhaps the most important of all, and after showing the defects in those which existed before he took up the subject, he describes an expansive rifle shot, which we have already said, has given by far the best result of any that have been tested. The experiments with this are very numerous and they seem to be conclusive as to its superiority; on pages 25 and 47 of the work, full description and drawings of this improved projectile will be found.

In Part II of his work, Captain Butler treats of the "compressive," or breech loading system. This is discussed at length; but it is to our Service, at the present time, of the least importance of any, as we believe no suggestions have yet been entertained to convert any of our heavy smooth bores into breech-loading rifles. It should not be forgotten in speaking of this system, that it was the one used by the splendid Artillery of the Germans during the war of 1870, and also in the heavy Naval breech-loaders of the French which played so important a part during the siege of Paris, Part III., describes in detail the flanged or "button" system adopted by the English for all the rifles made at the Government gun factory at Woolwich. Captain Butler calls attention to what has long been generally believed, even by a large proportion of English officers themselves, that this is by far the least efficient of all the leading systems: it is full of defects, it has ruined scores of guns, and caused no end of trouble. There can be but little doubt that the use of Butler's projectile in the heavy Woolwich rifles, would be a marked improvement.

The data given in this report respecting the use of the Rodman pressure instrument are very instructive. The variation in the pressure of the powder gas in the same gun, with the same quantity and quality of charge, and with projectiles of the same weight and construction, as well as other inconsistencies noticeable in the pressures calculated from the dent made in a piece of copper by the Rodman pressure plug, makes the inference inevitable to a practical man that the results recorded are not altogether reliable. For instance, we find that with the 100lbs. of hexagonal F.P. powder and a projectile of 600 lbs. the pressure per square

* Systems of projectiles and rifling with practical suggestions for the improvement as embraced in a report of the Chief of Ordnance, U. S. A., by Captain John G. Butler, Ordance Corps, U. S. A. Illustrated by thirty-six illustrated plates. New York: D. Van Nostrand publisher.