

THE DEPARTED.

Oh, the merry days of childhood,
When we wandered glad and free,
In the dim shades of the wildwood—
How this dream comes back to me!

And I seem to view the tresses
Of long, sunny golden hair,
And again I feel the kisses
Of the lips so free from care.

And I see deep blue eyes gleaming,
Sparkling in their wanton glee;
And I see the ringle's streaming,
Back from faces dear to me.

How they played low in the wildwood,
Building up bright dreams of joy!
Happy in fast fleeting childhood;
Happy, gay, without alloy.

But those faces sweet have perished,
Gone the forms so fair to view;
And the friends—those friends I cherished—
Now are sleeping 'neath the yew.

They are resting 'neath the daisies,
Where the glad some flowers peep,
And they've left life's solemn mazes
For a long and dreamless sleep.

But the friends I loved in childhood—
Oh, those friends! I miss them so;
For they're absent from the wildwood—
Absent from the valley low.

And I long for those I cherished,
Mourn for faces young and fair;
But the one's I loved have perished,
Oh! I miss them everywhere.

M. O.

THE GUNPOWDER PROBLEM.

(From the N.Y. Mining and Engineering Journal)

It has long been known that the chief difficulty to be overcome in the construction of large cannon results from the fact that the destructive effect of gunpowder increases, when we enlarge the calibre, much more rapidly than the restraining power of the gun. An enlargement of the calibre implies an addition to the weight of the projectiles and of the charges of powder; and not only is the total effect increased, but also its relative intensity; that is to say, not only is the number of square inches increased upon which the expanding gases act, but the intensity of the pressure per square inch is also augmented. When the necessity for larger guns became imperative, European constructors supplanted cast iron with wrought iron and steel, and thus succeeded in increasing the strength of their guns to the required degree. But when the progress of naval construction called for still greater ballistic power, even this resource began to show signs of inadequacy. In the meantime, the same problem had to be solved by American constructors, who approached it in a different manner. As this country possessed no workshops or machinery adequate to the forging of very large cannon, instead of endeavoring to build guns which powder could not destroy, our officers endeavored to obtain a powder which would give the necessary velocity to the projectiles without destroying the gun. This course was first marked out by Rodman, when he built his famous 15 inch gun. Foreseeing that unless he could maintain the velocity of the projectiles, the increased size would be of insufficient advantages to compensate its inconvenience, he applied himself to the study of the action of gunpowder. His first result was the establishment of "mammoth" or large grained powder for the service of large guns. He demonstrated that by this device the velocity of large projectiles could be maintained with a great reduction in the destructive effects of the powder. This identical device has, within the last three years, been adopted by the English for all

their large guns, under the name of "pebble powder." Although this powder was introduced into our service prior to 1860, the English appear to regard it as an innovation originating in their own country. The value of priority in the matter is, however, much diminished by the fact that the effect of varying the size of the grain has been known in a general way, in all countries, for many years, and perhaps for centuries; and the mammoth powder is merely an extreme case in the application of an old principle. But the first accurate and available determinations and measurement of these effects are due entirely to Rodman.

This distinguished officer made a number of brilliant inventions, in which he displayed the rare and double merit of elucidating principles and originating ingenious devices for making them available. A striking illustration of this invention of perforated powder, which was made by pressing the materials, in a moist and adhesive condition, into the form of hexagonal prisms, with perforations parallel to the axis. While experiments were progressing with this powder, an eminent Russian officer, Majors (now Major General) Gadolin, being in this country, and taking much interest in the subject, recommended its trial in Russia, and the result was its adoption, first, by the Russian, and afterwards by the Prussian government, in whose heavy guns it is now used exclusively. The principle involved may be briefly stated. While the shot is moving from its seat to the muzzle, and acquiring its velocity, the force of the powder is undergoing great and rapid changes of intensity. This intensity is known to reach its maximum, with ordinary powders, before the shot has moved a foot from its original seat. The pressure then falls off rapidly as the shot moves towards the muzzle. It is these earlier pressures which are so dangerous, while the later ones are far within the limit of pressure which the gun is capable of enduring with safety.

Now, if it were practicable to manage the powder in such a manner that the earlier pressures would be reduced, and the later ones increased, the total force would be the same, while the dangerous pressure would be avoided. Rodman sought to attain this action by the following means. It is clear that the pressure at any moment has a direct relation to the quantity of gas developed by the powder in its progressive combustion; and again the quantity of gas developed at any moment has a direct relation to the quantity of powder surface undergoing combustion at any moment. Hence, if the surface of a given weight of powder be small, the quantity of gas at first developed, and the consequent early pressure will also be small. If the powder, in other words, can be made to burn less rapidly at first, and more rapidly afterwards, the desired end may be reached. Since large grained powder presents less original surface than an equal weight of small grain, this object is in some degree approached by mammoth powder. A further approximation is obtained by the prismatic form; for the large, symmetrical grains present, at first a comparatively small surface, while the perforations are constantly increasing their diameters and surfaces, as the grain is consumed.

Recent experiments with the thirty-five ton gun Woolwich gun have shown, that even mammoth powder is too violent for guns of this size. This conclusion was reached in this country several years ago, after the bursting of several large rifles firing this grade of powder. Within the last two years

the Ordnance Bureaux both of the Army and Navy have recognized, that it is indispensable to further progress to gain a more thorough control over the energy of gunpowder that has been yet reached by other nations, and with this view have applied themselves vigorously to the problem. The results thus far attained have not been made public, but are said by those who know to be peculiarly gratifying.

The Navy Bureau is experimenting upon powder for the fifteen inch gun, while the Army Bureau is firing heavy rifles, and have succeeded in obtaining high velocities with unprecedentedly low pressures. We understand that some new and important features have been introduced, but we are not informed as to their character. The experimental powder has been manufactured by Messrs. Dupont & Co., of Wilmington, who are entitled to the highest credit for their intelligence and zeal, as well as for the excellence of their products. The important nature of these investigations may be inferred from the remark recently made to us by a distinguished officer engaged in them who said that if the results continue to be what they have been, we shall be able to obtain, with perfect safety, from cast-iron guns of the largest calibre, higher velocities than have ever yet been reached with similar calibres elsewhere. During the coming year these experiments will be diligently prosecuted.

THAT gallant soldier, true patriot, and venerable Bishop of the Methodist Episcopal Church, the Rev. Dr. RICHARDSON, during the course of a lecture delivered at Brighton on the following interesting incidents in the early history of Canada, illustrating the manner in which this country has been added to the British Empire by bravery and self-denial of those gallant souls that first won it from the savage Indian; next from the wild wood; finally defending it against treason and diplomatic plundering, imbecility and treachery, is represented as follows:

The Bishop said:—"I do not expect to give a Lecture, as the few thoughts I may be able to give you this evening, may be better called a rambling address. When I first began to speak upon the early history of Canada, I considered it only an address, but some of my warm friends have magnified my rambling remarks into a "Grand Lecture on Canada." Time would not suffice to-night to make any lengthened remarks, so I will confine myself to that which more particularly relates to Upper Canada. But the question may be asked, How do you know anything of Canada? In reply, I will have to give you a few jottings of my own life. I was born in the good old town of Kingston, in the year 1791. My father was an officer of the King's Navy, and came to Canada at the close of the American war. He served on the Lakes from 1785. I became early acquainted with the stirring events of the old French, Indian and Revolutionary wars from narratives furnished me by my mother, the family with whom she had lived being engaged in the two latter wars. I was in the King's service in the Kingston Navy, which was quite formidable, being composed of many vessels, some of them of large size, during the wars 1813-14, and 1815. The war of 1812 had many distressing episodes, especially on our borders, in which those who had previously been friends, became deadly enemies. I suffered the loss of my arm in this