WAR AND SCIENCE.

In reading the histories of wars in other countries we are apt to get the impression that any war during its continuance was the sole, or at least the principal business of the community. Especially is this the case with civil wars. During the wars of Cromwell, when one half of the people of England were contending against the other half, when powerful armies were marching all over the kingdom and bloody battles were succeeding each other in rapid succession, when the monarch's sacred head was cut from his shoulders, and the ancient constitution of the realm was overthrown and a new form of government established, it is difficult for us to realize that but a very small fraction of the community was diverted in the least from their ordinary pursuits, and that the industry of the people was so little disturbed that the wealth of the nation increased during these years of civil war more rapidly than it ever had before. And yet there is no doubt that this was the case.

The civil war now in progress in this country is of larger dimensions than any other of which history has preserved the record. In the wars between the generals of Alexander which took place after his death; in the struggle between Octavius and Brutus after the death of Julius Caeser, in the extermination of the Vendeeans during the French revolution, or in the great civil war now raging in China, the armies have never equaled in mere numbers those which have been mustered and are now being drilled for the great struggle which is to decide the fate of this nation. As our hosts are furthermore amply supplied with the most approved implements of modern warfare, and as they are organized and guided by men educated in every department of military science, our armies are several times more powerful than any which have ever been drawn from opposing factions in any other country. To an extent unprecedented in the history of the world, this nation has devoted itself at the present time to the work of war.

And yet how steady is the progress of knowledge and science in the midst of this mustering of armies! Throughout at least all the Northern States, almost all of the children take their way daily to the public schools, where they are securing our democratic institutions for the generations to come upon the broad and stable foundation of popular education. The directors of our colleges and seminaries are surprised at the large numbers of their pupils, and publications devoted to science and arts are steadily sustained by the community.

The most sublime scene ever witnessed by man is a storm at sea. The largest ship, so enormous in proportion to the size of the men who have built her, appears in the boiling ocean like a drop of the brine or a bubble of the foam. And when from the decks another vessel is espied amidst the storm, at one moment tossed to the sky, and at the next buried out of sight in the valleys between the billows, and yet holding steadily on her way, the spectator who witnesses the scene for the first time always regards it as the grandest and most impressive of all possible exhibitions of human constancy and resolution.

Similar emotions are excited by the unwavering progress of science in seasons of political and social confusion. Amid the waltz of navies to the music of cannonades, amid the gathering of hosts, the tramp of armies, the burning of cities, the shouts, screams and thunder of battle, Science, like a brave ship in the gales of the Atlantic, or like a divine angel, serene amid the storm, moves calmly onward in her beneficent labors, her course obstructed, indeed, but undiverted by the turmoil around her.

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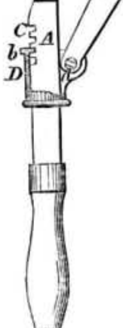
SPHERICAL SHOT vs. ELONGATED PROJECTILES.

In another part of this paper will be found an account of some experiments in England with the *Prince Alfred* gun, a wrought iron cannon of 10-inch caliber throwing a spherical shot. It will be observed that the statement is made that the most effective projectile previously employed, was a 68-pound shot from the old service smooth-bore cannon. This shot proved more destructive to iron-plated targets than any of the elongated 100-pound projectiles from the Armstrong or other rifled cannon. We have copied the same statement from other English papers, and it accords with the conclusions long since arrived at by the ordnance officers of our army and navy. It is rather surprising to see the English and French—so much in advance of us as they are in the size of their navies, and in many military matters—so far behind this country in the construction of heavy ordnance. While our ships and forts have long been armed with 8, 9, 10, and 11-inch guns, and while we have demonstrated the practical success of one 15 inches in diameter, throwing a shell weighing ing 420 pounds, the English are slowly experimenting with a gun of 10 inches bore, throwing a 140-pound shot.

It will be observed that in this, as in other experiments, the cast-iron ball was broken in pieces by striking against the wrought-iron plate. Captain Rodman thinks that large balls cast solid, are not as strong as if cast with a small cavity in the center. When cast solid, as the outside cools first it forms a rigid shell which cannot contract, and then as the interior cools, it shrinks into a porous mass which is very weak. Why could not the balls be cast hollow, and the cavity be then filled with type metal or some other alloy of antimony that would not shrink in cooling?

ADJUSTABLE PIPE WRENCH.

A common square wrench is unfit for screwing up round pipes that fit into one another with screw joints; and the common wrenches for round pipe are generally adapted for only one size of pipe. The accompanying engraving ~~represents a wrench~~ which can be adjusted with facility to suit pipes of different sizes, so as to grasp and turn each without slipping. On the shank, A, is a small rack, C, and also upon it a sliding sleeve, D, which has a tooth, *b*, and a wrench jaw, E, the latter having an eccentric, *d*, on its inner end. The tooth, *b*, holds the sleeve, D, in any of the teeth in the rack, so as to expand or contract the jaw, E, relatively with the jaw of the shank, A, and turn the pipe, *a*. In this manner the wrench can be readily adjusted for operating on different pipes. Patented by J. H. Doolittle, Ansonia, Conn., March 27, 1860.



Russian Sheet Iron---A Field for a Fortune.

The Philadelphia *Gazette* says:—"Few persons are aware of the enormous expense and difficulties attending the importation of Russia Sheet iron into this country, and the quantity consumed. The uses to which this iron is applied are mainly in the manufacture of stoves, the difference in its favor, in point of durability, being very great. The imitations that have been attempted in this country have been hitherto so unsuccessful that a field of discovery lies still open in this department, in which some future inventor will yet, doubtless, realize a princely fortune. That much of *American* Russian Iron is sold for the genuine is true enough, the imitation in outward appearance being so close almost as to defy detection by any other than an experienced judge. The imitation in this respect has been very complete; but the art of making it wear and not oxidize from exposure to dampness is still to American manufacturers a hidden secret. The indestructible quality of the Russia-made sheet iron is really extraordinary. We have seen stoves manufactured of it which had been in use for a period of thirty years with the sheets almost imperceptibly reduced in thickness. From these facts it is obvious that stoves made of the genuine Russia iron are vastly cheaper, at almost any cost, than those manufactured of the imitations, which burn out in a season or two and give less heat."

Great Waste of Coal---New Machines Wanted.

In a communication to the *United States Gazette* (Philadelphia), P. W. Sheafer, engineer of mines, directs public attention to the great waste of coal caused by common coal breaking machines. He states that a series of experiments, costing one thousand dollars, were made at the Lehigh Company's mines, to obtain reliable data, and Mr. Winterstein, who conducted the experiments, says, respecting them:—

I passed through a clear vein coal, which is hard coal—the best we have. Before we commenced the experiment we had the dust all swept away from the breakers and screens; we selected only large coal, so that every piece would have to be operated upon before it could pass through the breaker. The dust was swept down after every experiment. In some of the experiments we put through 40,000 pounds, some 20,000, some 8,000, and the smallest was 2,000 pounds of coal. The screen which selected this coal after it had passed through the breaker was about 27 feet long, and of a diameter of five feet. The broken coal is carried throughout the entire screen, and is deposited from its outer end. The egg coal passes through a section of the screen six or seven feet long, having a mesh 2¼ inches square. The stove coal passes through a section eight or nine feet long, having a mesh 1¾ inches square. The nut coal passes through a section ten feet long, having a mesh 1 1-16 inches square. The waste passes through a ½-inch square counter mesh.

No less than thirteen different machines—coal breakers—were tried, and the smallest loss on the best two was 17·6 per cent of waste, beside 10·84 per cent of fine chestnut coal; the waste with the six next best breakers was 24·07 per cent and 17·75 per cent of chestnut coal; with the five other machines the waste was 26·24 per cent and 14·82 of chestnut coal. Respecting this great loss, caused by coal-breaking machines, Mr. Sheafer says:—

For every 1,000 tuns mined the operator and landlord lose, in waste, 264.04 tuns, or in every 100,000 tuns 26,-240 tuns.

Taking a year's business in Schuylkill county, say the year 1859, and there were shipped 3,048,615 tuns; loss at the breakers, 26.24 per cent, 799,956 tuns, giving us as the total product of the mines in Schuylkill in 1859, 3,848,751.

We are warranted in adding this loss to all the coals mined in the first district of the anthracite coal fields, embracing Schuylkill, Pinegrove, and the Lower Lehigh, as well as those of the second district, viz., Upper Lehigh, Mahanoy, Shamokin and Trevorton, from which were shipped in 1859, 5,107.203 tuns; loss at the breaker, 26·24 per cent. 1,340,130 tuns, and yielding as the total product of the mines in the first and second anthracite coal districts of Pennsylvania, 6,447,333 tuns.

It may be confidently said that this enormous loss is not exaggerated.

Were I to estimate the loss on our total shipments of anthracite from the three districts, from 1820 up to January 1, 1860—say on 83,791,279 tuns—at but 20 per cent—say 16,758,255 tuns—the total product being 100,549,533, it shows an enormous loss to landowner, operator and transporter. It is more than a total loss of so much carbon, as it encumbers our working ground, obstructs our highways, fills up our canals, and spreads in all the streams, from the mines to the bays of the Delaware and Chesapeake.

These 16,000,000 tuns of coal lost is more than so many dollars lost.

To the landholders	$ 4,000,000
The operators also lose	8,000,000
And the transporters	12,000,000
Total loss	$24,000,000

This waste by breakers, crushers or destroyers began in 1844, when Mr. Gideon Bast erected the first breaker of the Battin pattern at his Wolf creek colliery. Previously to this time breaking coal by use of rolls was practically unknown in Schuylkill county. It was broken by hand, upon platforms, generally having openings through which the coal passed to the screens, or shipped to market in the respective sizes in which it was taken from the mine. By these primitive means, up to the year 1844, no less than 1,607,109 tuns were sent to market from the anthracite districts. A certain amount of waste is unavoidable. But the question of importance in this matter is, can this great loss of coal be avoided, and if so, by what means?

The ingenuity of practical machinists has been brought into requisition, and the above table demonstrates the fact that great waste attends their best efforts.

Here we have a challenge, as it were, given to all our inventors to invent an improved coal breaker that shall reduce the enormous waste caused by the machines at present in use.

Exhibition of Corn Bread.

An exhibition of 200 loaves of corn bread was held during the latter part of last and the beginning of this week, at the office of the *Agriculturist*, 41 Park Row, in this city. Each loaf was accompanied with a statement of its ingredients, the mode of mixing them, and the manner of baking. These loaves were made by nearly as many different persons, who were candidates for prizes of ten, five, four and two dollars, for the four best loaves. A large number of persons visited the exhibition which was of a very interesting and novel character