

## THE INVENTOR AND THE NATIONAL CRISIS.

In the depths of the troubles into which the most formidable rebellion upon record has plunged the country—amid the moral, social and physical sufferings which have of late days been brought home to every American household—there are few more discernible evidences of national hope than those afforded by the constancy and courage with which the Genius of Invention has pursued her laborious and beneficent mission among us. We are aware that inventive talent abounds in the United States. We know to what an extent the world at large is indebted to our country for the innumerable improvements in all the everyday requirements of life. These achievements, however, were the work of peaceful and unexcited times. What must awaken admiration in every reflective mind is the fact that amid the distraction of that worst of all national scourges—a civil war—such a number of men could devote themselves to invention—could have calmly kept their souls, and given themselves up so effectually to the practical application of scientific and mechanical principles in the discovery and development of such a mass of the most delicate and complicated machinery. Indeed in this respect, all things considered, we can hardly doubt that 1861 will be regarded as the *annus mirabilis* of modern times. In other nations war times will permit the popular mind to entertain but a single idea, and we have excellent authority that in ancient times even laws were silent in the midst of wars—

*Inter arma silent leges.*

But in making up his account of the events of the present times the historian faithfully performing his duty, and consulting the *SCIENTIFIC AMERICAN*, must do justice to our inventors and give them a prominent place in the national record. He must tell how American inventors preserved amid national disaster, the fierce conflict begotten of fraternal misunderstandings—the musterings and marchings of armies upon a scale unparalleled in modern times—how amid all these unprecedented circumstances so unfavorable to the calm pursuits of Science and her handmaids, American inventors preserved the balance of their mental forces, and not only sustained their old prestige in continuing to offer to the world's treasury so many novel inventions to subserve all the utilities of life, but have also contributed, with almost the roar of battle in their ears, the most effective agencies to preserve the country from destruction.

For ourselves we can say that both philosophically and with a view to the utilities of daily life, we regard the inventor as a man to whom honor and reward are largely due. To no class of the men who labor for the public good is mankind so much indebted. The votary of literature or of abstruse science may and does deserve our best sympathies; but the silent, thoughtful, persevering and courageous mind struggling, as it were, within the toils of invention, battling with numerous difficulties, perhaps borne down with poverty, as many a fine inventive genius has been, wrestling with some grand idea, to develop which he has given days and nights of study, anxiety and labor, and which may ultimately prove a blessing to the human race—such a man not only deserves our respect, but stands in a position to command our homage.

We cannot look upon all that the inventor has done in the past as the be-all and end-all of invention. On the contrary, we regard the past achievements of invention as a forerunner of what can be accomplished in the future. Solomon, in his day, said there was nothing new under the sun. Had the sage lived in our day, we believe he would be inclined to modify his opinion, and admit that there were more things in heaven and earth than were dreamt of in his philosophy. Every new triumph in science and art serves to open up others to the vision of the true and faithful laborer, and the inventor's achievements partake of the same fruitful and creative nature. They point to new fields of labor where fresh triumphs can be won.

Of this fact the weekly issue of this journal bears ample testimony, especially since the commencement of the present year. The new year has opened auspiciously, and as it advances new and fertile fields of invention will develop themselves, and brighter prospects of rewards will burst upon our inventors.

We would, at the same time, advise our inventors, that notwithstanding the unhappy circumstances in which our country has been—let us hope temporarily—placed, they should continue their labors without abatement, hopeful and heartfelt as ever. Those who have not been hitherto over successful should gird up their loins for a year's struggle is before them in which they may win fame and fortune. While to the veterans who have long since won their spurs in the field of invention, we would say, "go in once more and show the young ones how to win."

## OUR IRON-CLAD RIVER BOATS IN BATTLE.

We have now some reliable information respecting the efficiency of iron plates of moderate thickness in resisting shot during an engagement. The fleet of gunboats covered with 2½ inch rolled iron plates constructed for the purpose of attacking forts and batteries on the Western rivers, has been in action, and the results are favorable to the sagacity which projected these vessels. Some of them were entirely new boats, built for the purpose of war, with the boilers and machinery under the waterline, while others were simply old river boats covered with plates in such a manner as to have deck and machinery boxed in. Their frames are timber very strongly braced, and the plating is angled from the waterline to make the shot glance off.

Fort Henry was defended with thirty-five guns, namely, one 128-pounder, one 24-pounder and five 6-pounders, rifled; and two 42-pounders, ten 32-pounders, one 24 pounder, two 12-pounders and three 6-pounders, smooth bores. It was attacked by four of the iron-clad vessels, three of which were built purposely for the war, but the fourth—the *Essex*—was an old vessel plated around the boilers and machinery, but with its bow unprotected. At six hundred yards distance this vessel received eleven shots, most of which struck the plates and were deflected, doing no injury, but one from the 128-pounder entered a larboard port, passed through the boilers and scattered destruction around. The other three steamers were repeatedly hit at three hundred yards distance, but no material injury was done to them, and had the boilers of the *Essex* been placed below the waterline she would not have been disabled.

In the attack on Fort Donelson we have still more useful information respecting these iron-clad boats. Commodore A. H. Foote made the attack on this fort on the 14th of February with four iron-clad boats, namely, the *St. Louis*, *Louisville*, *Pittsburgh* and *Carondelet*, and two unplated ones—the *Tyler* and *Conestoga*. The two latter kept at long range and were soon disabled, and it may truly be said they were worse than useless. On the other hand, the four iron-clad boats advanced within four hundred yards of the fort, and engaged it for an hour and a quarter under a terrific fire of twenty guns (seventeen of large caliber) from the fort, while the vessels could only use twelve guns. The wheel of the *St. Louis* and the tiller of the *Louisville*, were shot away and these vessels became unmanageable and drifted down the river; the other two were greatly damaged between wind and water and also withdrew. There were 54 killed on board of the vessels, when they were compelled to give up the contest.

Although the gunboat attack on this fort was repulsed, it unquestionably proved the efficiency of the iron plating. The two unplated vessels had to take up a position at such a distance that they could do no harm to the enemy, and a shell from the *Tyler* was actually the cause of disabling the *Louisville*, as it burst over its tiller gear, and destroyed it. The four plated vessels proved to be proof against shells, as we understand from reports, and these are really the most destructive war missiles. Without the plating they would all have been sunk in ten minutes by engaging the fort at such short range. We therefore conclude that the iron plating has been practically successful in affording very great security in actual warfare.

## AGASSIZ ON THE EXISTENCE OF GOD.

Agassiz's work on fossil fishes is in five volumes, with a folio atlas containing 400 plates. About 1,000 species are described and figured in the natural size, and about 700 more are mentioned. In this great work the chapter on classification closes in these words:—"An invisible thread, in all ages, runs

through this immense diversity, exhibiting, as a general result, the fact that there is a continual progress in development, ending in man, the four classes of vertebrates presenting the intermediate steps, and the invertebrates the constant accessory accompaniment. Have we not here the manifestation of a mind as powerful as prolific? the acts of an intelligence as sublime as provident? the marks of goodness as infinite as wise? the most palpable demonstration of the existence of a personal God, author of all things, ruler of the universe, and dispenser of all good? This, at least, is what I read in the works of creation."

## HOURS OF STUDY.

A very remarkable pamphlet has recently made its appearance in England, containing statements of facts that ought to command the attention of the civilized world. The pamphlet is written by E. Chadwick, Esq., C. B., and published pursuant to an address of the House of Lords. The subject of this pamphlet is education, and it is devoted to the discussion of three matters—the organization of schools, the hours of study, and physical training. Our attention has been arrested by Mr. Chadwick's statement of facts in connection with the second of these three subjects—the hours of study:—

"Struck by the frightful disproportion between the powers of childish attention and the length of school hours, he has directed questions to many distinguished teachers. Mr. Donaldson, head master of the Training College of Glasgow, states that the limits of voluntary and intelligent attention are, with children of from 5 to 7 years of age, about 15 minutes; from 7 to 10 years of age, about 20 minutes; from 10 to 12 years of age, about 55 minutes; from 12 to 16 or 18 years of age, about 30 minutes;" and continues, "I have repeatedly obtained a bright voluntary attention from each of these classes, for 5 or 10 or 15 minutes more, but I observed it was always at the expense of the succeeding lesson."

The Rev. J. A. Morrison, Rector of the same College, speaking on the same subject, says:—

"I will undertake to teach one hundred children, in three hours a day, as much as they can by possibility receive; and I hold it to be an axiom in education, that no lesson has been given until it has been received; as soon, therefore, as the receiving power of the children is exhausted, anything given is useless; nay, injurious, inasmuch as you thereby weaken instead of strengthening the receiving power. This ought to be a first principle in education. I doubt it is seldom acted on."

The truth of these pregnant remarks is made more and more evident by the testimony of all competent witnesses. We respectfully submit to all school commissioners, teachers and parents who may read these statements, that they are not of a character to be glanced at and tossed aside, but are worthy of being thought of and acted upon. From Carlyle's pictures of German schools, and from all descriptions of the English schools, there is no doubt that in both those countries there is a lamentable want of understanding on the part of scholars of the subjects which they attempt to learn. The matter is still worse in France and Austria, and it is the prominent vice which pervades the whole American system of education.

Our failure to secure an understanding of the things which we try to teach is, doubtless, in part owing to the fact that we endeavor to teach too much in a given time, but it is also in part attributable to the circumstances that we waste more than three-fourths of the time trying to impart ideas when the mind of the pupil is not in a condition to receive them.

This journal has heretofore advocated the practice of having recesses in schools of ten or fifteen minutes every hour, but from the experience of the oldest and ablest teachers in Great Britain, it seems that the recesses ought to be granted even to the oldest scholars, as often as once in half an hour. A teacher might as well expend his efforts upon carved wooden images of children as upon scholars after their minds are tired out.

SEVENTEEN private soldiers of the French army, in Bonaparte's time, by their bravery and talents, raised themselves to the following distinguished stations:—Two became kings, two princes, nine dukes, two field marshals and two generals.