STEAM RAMS AND THEIR QUALITIES.

During the Crimean war, J. Nasmyth, the inventor of the steam hammer, proposed to build an iron marine steam ram for the British government, and had his proposal been accepted he would have produced a truly infernal battery. This vessel was to consist of a powerful iron steamer, having a strong iron bow, with a huge gun in it. It was designed to be capable of moving under water, for the purpose of dashing its prow into the side of an enemy's ship, and then discharging a great shell into it under her waterline, thus opening a huge rent for the sea to enter and sink her. Several months since Charles Ellett, C. E., directed the attention of our naval authorities to the formidable character of steam rams, and on page 121, present volume of the SCIENTIFIC AMERICAN, we described the qualities of such vessels, and said :—"We believe that all iron war steamers should be built with strong iron bows, to employ them, when proper opportunities may occur, for running down other vessels." In that article we described the conditions of efficiency which should be embraced in all such vessels, and our views have been copied by a number of our cotemporaries. The terrific and successful attack of the *Merrimac* upon the *Cumberland*, by crushing in the sides of the latter with her iron prow, has excited much public attention, and a number of scientific men and others have expressed their opinions upon the subject through the daily papers ; but many of their views do not appear to be sound. They may be briefly presented as follows :—

A common river steamboat may be converted into a powerful steam ram by strengthening her bow. Such a steam ram would crush through the *Merrimac* or any other iron-clad steamer, by striking her when moving at full speed. A cotemporary presents the science of the question as follows :—"A tallow candle from a musket, by its velocity, will go through a pine board, and upon the North river an accident occurred in a river steamboat of great speed, striking against the wharf, penetrating twenty-seven feet through timbers, stone, earth, &c."

Mr. A. W. Craven, C. E., of this city takes nearly the same views of the question in two communications to the New York *Times*, and cites the following cases as proof :—

"The river steamer *Isaac Newton*, while under but little headway, was attempting to make her berth at the wharf in Albany. The engineer, mistaking a signal, ran her forward instead of backward. She struck the wharf with comparatively but slight velocity, but her bow cut through the timber bulkhead, and penetrated fully six feet into the rock and earth filling behind it.

"When the *Adriatic* was launched she crossed the East river, and struck the pier on the opposite side, cutting through the timber, and into the wharf, between six and seven feet.

"In neither of these cases was there any material injury sustained by the vessels.

"In East Boston, about two years since, a merchant vessel of about 1,400 tuns burden was launched, and owing to the failure of the appliances for checking her way, she crossed to the other side of the channel. With only the speed she acquired from the launching ways, her stern penetrated into the wharf some eleven feet. This wharf had a front of one hundred feet—it was built of masonry on its face and side, and was backed up with rock and ballast running off at an angle of 45°, and with earth closely compacted by years of wear. The vessel was not perceptibly injured."

Neither the shooting of a tallow candle through a pine board (a feat which we have failed to perform, after repeated trials), nor the crushing of a river steamer several feet into a dock, are proofs of much value respecting the employment of river boats as steam rams. We are well aware of the penetrating power of bodies moving at high velocities, but we have never seen a target made of boiler plate penetrated by a leaden bullet, and eight-inch cast-iron shot have been shattered to pieces when fired against iron plates four and a half inches in thickness. The efficiency of a steam ram will be just in proportion to its mass, the strength of its frame and the power of its engines. The Naval Committee of the Senate has taken a proper view of this question at last. Senator Hale, from the Committee of Naval Affairs, has introduced a bill which provides for the construction, under the direction of the Secretary of the Navy, of an iron-clad steam vessel, of not less than five or six thousand tuns burden, and of great speed and strength to be used only as a ram, for which purpose $1,000,000 be appropriated. Also, $13,000,000 for the construction of iron-clad gun boats, $783,000 for the completion of Stevens's battery and $500,000 for extending the facilities of the Washington navy yard, so as to roll and forge plates for the armored ships.

A steam ram to be really efficient must be built for the very purpose. An iron-clad frigate like the *Warrior*, with engines of 2,500 nominal horse power, could crush through a dozen river steamboats fitted up as steam rams. To meet other steam rams upon superior terms we must build superior vessels. Our opinions are fully confirmed by the result of the encounter between the *Merrimac* and the *Monitor*. The former ran against the latter at a considerable speed and struck with her bow, which was fitted with an iron horn, but she fared worst in the conflict, although she is three times larger and has engines of twice the power. Had the *Monitor* been a patched-up river steamboat she would have gone to the bottom in five seconds. Her greater strength of hull enabled her to resist the blow of her huge adversary. Let us have no mantraps converted into steam rams.—We have no objections to urge against the employment of strong river steamers for war purposes in cases of emergency. Some of them may be plated with two-inch plates, and do good service against foes and forts, but we wish to guard the public against an overestimate of their efficiency.

ARTILLERY MATCHES AND SIGNALS.

The portfire used for firing artillery is made of three parts of niter, two of sulphur and one of gunpowder well mixed and rammed in cases. An inextinguishable match is made of four parts of saltpeter, two parts gunpowder, two parts charcoal, one part sulphur, all mixed dry. The mixture is then put into paper cases nine inches long and about the thickness of a common quill. These cases are prepared by rolling thick hard paper pasted on one side, round a glass rod. When this composition is ignited neither wind nor rain will extinguish it. The only way to stop its progress, when found leading to a mine, is to cut off the burning end.

Signal lights are in general composed of sulphur and niter with a small quantity of some sulphuret, such as that of arsenic or antimony. Mix 600 grains of niter, 200 of sulphur and 100 of the yellow sulphuret of arsenic, and place them in a paper case, and when ignited a brilliant white light will be emitted. If the sulphuret of antimony is used in place of the arsenic, it will give a vivid light of a blueish tinge.

"Indian white fire for signals" is made of dry saltpeter twenty-four parts, sulphur seven parts, charcoal one part and the sulphuret of arsenic two parts. These substances are intimately mixed and dried slowly in an iron vessel, then rammed into paper cases three inches long and one inch and a half in diameter. These cases are inclosed and kept in a dry place for use. A piece of red-hot charcoal, or a red-hot iron may be used to ignite these signal lights.

THE NAVY DEPARTMENT AND IRON-CLAD WAR STEAMERS.

The proposals issued by the Navy Department for the construction of new iron-clad war vessels, which we published on page 166 of our present volume, deserve the candid criticism of all who are interested in naval engineering. It appears to us the Navy Department has advertised for impossibilities. Thus, let us take the class of steamers advertised for coast defence. The proposals say that such vessels must "have sides and decks protected with iron armature sufficient to resist the heaviest shot and shells ;" and "are not to draw more than twenty feet of water when fully equipped and armed, at which draft they are to be able to maintain a *permanent* speed of *fifteen knots* per hour at sea, and carry sufficient coal in the bunkers for twelve days steaming at that speed. Their armament will consist of one or two 15-inch or 20-inch guns."

It is our opinion that there is not a respectable engineering firm in our country, or the whole world, that will undertake to build vessels to fulfill such conditions. The speed required is one knot per hour at sea greater than that of the *Warrior* in smooth water. It is higher than that of the *Vanderbilt*, *Adriatic* or the *Persia*—the swiftest merchant vessels in the world, and they were built as light as possible, and with very limited breadth in proportion to their length, for the purpose of attaining high speed. The speed required for this class of iron-clad government steamers is equal to that of a steamer which could cross the Atlantic from New York to Liverpool in a little over seven days, or about two days less than the best passages made by our fastest Atlantic steamers. And all this is required to be accomplished by a vessel loaded with thick iron armor, and she is to draw but twenty feet of water. We question if a steamer can be built to resist the largest shot, such as that of a 15-inch or 20-inch gun. The engineering world, at least, has no experience of the kind, and these naval proposals, therefore, make demands of an unwarrantable nature. Such proposals appear as if they were intended to prevent respectable engineering firms from offering to make contracts with the government. If they do not they certainly require some explanations from those who have put them forth.

NEW STEAM FLOATING BATTERY.

We understand that Messrs. Stevens, of Hoboken, will soon place in the possession of our government a small iron clad gunboat, which had originally been a canal boat, and which has been fitted up at Bordentown, N. J., with a screw propeller, water tight partitions, and all the contrivances for sinking her to a fighting depth which have been introduced in Messrs. Stevens' great battery. She is, in fact, designed to illustrate, on a small scale, the principal novelties and merits of that mammoth concern ; and they are now prepared to turn her over to the government, free of expense, for active service. Her name is the *Naugatuck* Her dimensions are those of an ordinary canal boat. Her speed, when submerged to the depth of 7½ feet, about seven knots per hour. She can carry coal for twelve days, and a crew large enough to work the vessels and handle her armament. The latter consists of a single one hundred pounder of the Parrott pattern, which experiments have proved to be perhaps the most formidable rifled gun in the world. When the *Naugatuck* is sunk to her fighting depth by the admission of water to the chambers in her bow and stern, her entire machinery, steering apparatus and vulnerable parts will be below the water line ; and nothing will be exposed to the enemy's shots but a narrow strip constituting the gunwale, and the gun.

EXCITEMENT ON HOSE COUPLINGS.

Under the claim of patent No. 34,476, in our issue of March 15th, page 172, reference is made to the invention as having been adopted in Brooklyn, and recommended by the Chief Engineer of the Fire Department for adoption in New York. The owner of another patent hose coupling denies that Bliss's has been adopted, and to substantiate his statement produces a report from Chief Engineer Decker to our Common Council, which reads as follows :—

Among the various improvements of late introduced, and which I consider proper to refer to your honorable body as being beneficial, and having a tendency in a short time to lessen the expenses of the Department, I recommend your favorable consideration to the adoption of the efficient, durable and simply-constructed hose and hydrant coupling now in use in the City of Brooklyn, and patented by Mr. Emerson Gaylord.

As near as we can ascertain of the facts in the case both Mr. Bliss and the owners of the Gaylord patent construct their couplings in nearly the same manner, each claiming that the other infringes his patent The court has been, or will be, called upon to settle the controversy, we are informed.

Chief-Engineer Stimers.

We publish on another page a letter written by Chief-Engineer Alban C. Stimers, of the U. S. Navy, who had charge of the construction of the *Monitor* after Capt. Ericsson's designs. Mr. Stimers was on board of her at the time of her engagement with the *Merrimac* and conducted himself gallantly. He is an accomplished engineer, which means that he understands his business, and is not wedded to old naval tread-mill notions.