Correspondence

Hot Water as a Means of Defense.

Messrs. Editors :—I have often wondered why the use of hot water has not received the attention of military engineers to a greater degree than it has. My proposition in regard to fortifications, is the extending of a line of cast-iron pipes between four and six inches in diameter protected, along the outside of the ramparts, with shot tubes like unto enlarged gas burners placed seven or eight inches apart, and screwed into the main pipes with apertures similar to fish-tail burners, so as to throw the streams in opposite directions, each stream crossing the other, care being taken that the tubes be turned slightly from the ramparts, so as to eject the streams outwardly. In this manner a constant sheet of scalding water could be poured into the ranks of the enemy. At certain distances, say thirty or forty feet, valves should be inserted, which, by a simple movement, would turn on or off the water, according to the section of pipe at which the attack would be made. In reference to vessels-of-war, particularly steamers, it could be most easily and successfully employed. I would, in that case, propose the extension of a belt, as it were, of pipe, from three to four inches in diameter, around the entire hull, outside, at a proper distance from the water, fitted with short tubes, as in the case of the fortification, the supply operated upon by means of stop-valves from the inside, at the spot or section it should be required. Walter P. Burrow.

Norfolk, Va., March 18, 1861.

[We presume the objection to the use of hot water in warfare, here proposed, is that the opportunities for using it are so few. In a fort it could not be used during a siege, only during an assault, and might be waited for, with steam up, for months. In a war steamer the extra weight of larger boilers, and their contained water and increased consumption of fuel, would be an objection; for water could not well be spared from the boilers commonly used, as steam must be kept up to enable them to manœuver.

We recollect reading, some years ago, of an instance in which such use of hot water and steam, made incidentally and without special appliances, was signally effective. A small British war steamer, cruising in the China seas, was attacked by a whole fleet of the pirates who infest those waters in such great numbers, and, notwithstanding the best defense that could be made with the guns and small arms, they were commencing to board in swarms, when the engineer, without orders, brought out a hose from the boiler to the deck, and by a little well directed squirting, in a very few seconds drove them all overboard into their boats or into the sea, and many who escaped scalding were drowned.

In the year 1813, the greatly distinguished Robert Fulton proposed to the President of the United States the building of a great war steamer, to be called *Demologas*, and he executed drawings and specifications for her entire construction and armament. She was to carry a great battery, furnaces for red hot shot, submarine guns to discharge hundred pound balls into an enemy's vessel below her water line, and, in addition to this, her engine was to discharge an immense column of hot water upon the decks and through the port holes, thus making her the most tremendous war vessel ever suggested by human ingenuity. The cost of the *Demologas* was estimated at $320,000. In the subsequent year, March 1814, Congress made an appropriation for building this vessel, its chief object being that of a floating battery for coast defense. Fulton was appointed chief engineer, and Adam and Noah Brown, of New York, received the contract for the hull, and in the month of October following, these enterprising shipbuilders had her safely launched in the presence of a vast multitude of people who lined the shores of the East river. In length she was 156 feet; breadth, 56 feet; depth, 20 feet; and her wheels were 16 feet in diameter. In May, 1815, her engine was fitted up; the cylinder was 48-inch bore; stroke, 60 inches; and her capacity 2,475 tuns. The trial trip was made on the first of June, and was considered very successful, the speed attained being 6¾ miles per hour. Flaming reports of this "devil of a war ship" soon reached Europe, and in a treatise on steam vessels, which was published in Glasgow, Scotland, about that time, the author of the work, giving a full and accurate account, as he stated, of the *Demologas*, described her as being "300 feet in length; breadth, 200 feet; thickness of her sides, 13 feet—alternate oak plank and cork-wood—carries 40 guns, four of which are 100 pounders, can discharge 100 gallons of boiling water per minute, and by ingenious mechanism, brandishes 300 cutlasses with the utmost regularity over her gunwales, and works an equal number of heavy iron pikes of great length, darting them from her sides with prodigious force."

As this vessel was built during the excitement of the last war with England, the forgoing description shows that she was reviewed from the shores of Scotland with a telescope, far surpassing in its magnifying powers the great instrument of Lord Rosse. Under its focus, the *Demologas* swelled into proportions, beside which the *La Gloire*, the *Black Prince*, and all the recent great floating batteries of England and France are mere pigmies. Great Britain was in commotion by the news of the *Demologas* being launched, but peace being declared soon afterward, her scalding water, flashing cutlasses and thrusting pikes, never had a chance of cooking an Englishman, spiking a Scot, or decapitating an Irishman.

The *Demologas* was used as a receiving ship at the Brooklyn Navy Yard, from 1815 until the night of June 4, 1829, when she blew up, killing 24 men and wounding 19. The cause of this unfortunate accident has never been satisfactorily ascertained. The *Demologas* was the first steam vessel of war ever built.—Eds.]

A Curious Experiment.

Messrs. Editors :—Why is it? Take a round piece of pasteboard (or any other shape) and insert it in a quill open at both ends, as in the drawing, and lay this on another piece of pasteboard of the same shape, in which is stuck a pin, so that the pin will enter the quill. Blow through the quill as hard as you may, but the lower piece cannot be blown off. G. B. D.

Marion, Ohio, March 14, 1861.

[A common spool, such as is used for sewing cotton, forms a suitable apparatus for trying this wonderful experiment. Take a bit of smooth writing paper a little larger than the head of the spool, and run a pin through the paper and into the bore of the spool. Now, by blowing down, as represented in the cut, it will be found impossible to blow the paper off. By observing closely, it will be seen that the paper does not quite touch the head of the spool. It is, of course, necessary to hold the paper up with the hand until you begin to blow.

The explanation is this :—When the currents of air are established radiating from the central tube horizontally between the disk and the paper, the greater area of the disk as compared with that of the tube, causes the air above the paper to be rarified, when the pressure of the air below, not being fully counterbalanced, holds the paper up. The pin acts as an anchor to prevent the paper from being blown away horizontally.—Eds.]

Closing the Vent in Firing Cannon.

Messrs. Editors:—Why does a premature discharge take place in loading a cannon, if the vent be not closed? An answer through your paper will oblige

C. F. C.

Lowell, Mass., March 28, 1861.

[There are always left in a cannon, after a discharge, pieces of the cartridge bag on fire, and if the sponge be passed down the bore without closing the vent, a draft of air is created which fans the flame; but if the vent be closed, the smoke is compressed around the burning cloths, and the fire is smothered. Sometimes, when firing in the dark, a man cannot find the vent until the sponge is put in; then the flame will stream from the vent as if the gun was quite full of fire.

Palace of Westminster.—Marcus B. Monck, publisher of the *Builder*, No. 89 Nassau-street, is presenting to his subscribers a beautiful steel plate engraving of the British Houses of Parliament.

First Locomotives in America.

Messrs. Editors :—Was not the first locomotive run upon an American railway (the Schenectady) constructed in England, with brass flues, and, in consequenceof the different degrees of contraction between brass and iron, did the flues not rupture, and were not copperflues put in afterward? And did not John Hampson, who was sent to England to procure this engine, fail for some time to discover the cause? This information I received from himself. I inclose you an article from the Scranton *Herald* in relation thereto.

George Merrick.

Northumberland, Pa., March 15, 1861.

[Our cotemporary—the Scranton *Herald*—publishes an account obtained from Major Allen of the Novelty Works, this city, of the first locomotive trial trip made in America. This took place, it is stated, on the Deleware and Hudson Canal Railroad; Mr. Allen was the engineer on the occasion; the engine was purchased in England, but was soon abandoned on account of the feeble character of the bridges on the road—they could not bear its load. The date when this trial took place is not given. We have always entertained the opinion, perhaps without good reason, that the first locomotive run in America was called the *John Bull*, was obtained from England for the Albany and Schenectady Railroad, and that it did good service for several years, after being altered for burning wood fuel. Mr. D. Matthews, engineer, Philadelphia, or Mr. Walter McQueen, Superintendent of the Schenectady Locomotive Works, can, we presume, furnish accurate information on the subject. —Eds.]

Cutters of Planing Machines Should Have a Soft Temper.

Messrs. Editors:—Last winter, while planing a large lot of oak plank and timber with a Daniels' machine, I learned something in regard to tempering the cutting knives, which was new to me at least, and may be of service to some of your readers. When I first began, I tempered the knives as hard as they would stand without breaking. By accident, I made one quite soft, and found that it would last nearly twice as long as the hard ones. I afterward tempered it as soft as I could and not have the edges roll or turn, and not only found much less work in grinding, but much more durability.

Why would not the same rule apply to the Woodworth planer? I know the knives of those machines used to be tempered very hard, and may be now.

O. Guthrie.

Chicago, Ill., March 20, 1861.

Diaphanie, or the Art of Imitatin Stained Glass.

Our readers will remember the popularity of potichomanie. Potichomanie is now adopted for decorating many articles not thought of on its first introduction. The potichomanie process is adopted for ornamenting opaque glass only, such as vases, epergnes, spillholders, &c., and thus differs from diaphanie, which is fortransparent glass, such as windows, lampshades, conservatories, screens, &c.

The materials requisite for the process consist of printed designs, brushes, transparent varnishes, and colors. Almost any picture, printed either in colors or plain, will become transparent if brushed over with a bright clear varnish, such as sandrach varnish (gum sandrach in spirit), or Canada balsam in turpentine.

The method of proceeding is as follows. Suppose it is intended to ornament a staircase window: first obtain squares of glass of the proper size to fit the sash, then lay down one of the squares on a flat board, having a groove so as to prevent it moving during the operation, the first of which is to polish it quite clean and bright; this being done, coat it over with a thin film of transparent varnish, and then allow it to partially dry. While this is doing, arrange the design of colored papers, or employ an engraving, lithograph, or photograph on paper.

In making a design of colored papers attention must be paid to the harmonious distribution of the colors; thus the complimentary color of purple is yellow, that of blue is orange, the best contrast to red is green; with a red ground blue and yellow borders are required; with a blue ground yellow and red edges are most suitable. Green, orange, and purple may be used more freely than red. Red and yellow are best suited for windows of a northern aspect, while blue, purple, aud green are most appropriate where there is an excess of light. Besides plain colored grounds

diaphanie is capable of imitating works of art, such as historical subjects, both sacred and profane; portraits and animals; landscapes and flowers; armorial and mediæval devices, &c.

Presuming now that the varnish with which the glass has been coated is sufficiently dry to act as a cement for the paper, engraving, or photograph, brush over the face of the design a coat of the transparent varnish, and then proceed to lay it down on the glass in such a manner as not to require shifting. If only slightly out of place it can be rectified, but if very crooked the design must be lifted and again laid down more carefully. If there are any air-bubbles under the pattern they can be removed by scraping a stiff card over the picture, drawing the air from the center to the side. The design can also be flattened down on the glass by placing a sheet of paper upon it, and rubbing it with a soft duster.

The patterns are now left to dry for twenty-four hours, and if then the whole adheres perfectly to the glass, they must be brushed over with a coat of transparent liquid, and then left to dry, and finally varnished, when the diaphanied squares of glass may be said to be complete, and have then only to be placed into their position to show their exquisite effect, and being already cut of the size to correspond with the panes of glass in the window, they are easily held in the sash by a few small pins, or brass brads; the picture side of the glass is to be placed next to the window-pane, so that the unprepared side can be cleaned as other windows are.

In large towns there are always back windows, with anything but a "bright prospect." Now, ladies with taste can make these "look-outs" objects of admiration and elegance.

Diaphanie has the merit of combining moderate cost with durability and beauty; and there are few people but love the labor of their own hands, or of those who are bound to them by ties of love and affection. When the worker shall have passed away, these memorials of her taste and industry will still remain, and when the first grief of the mourner has become but a pleasurable recollection of the past, they will be treasured as household gods. An old map, worked in silk, hangs in our library; it is a sampler of—never mind of whom—of somebody, when she was a little girl at school. I would not change it for a work of Raphael or Hogarth. Future generations will say the same of those who now work at diaphanie!—*Septimus Piesse.*

An American Invention in England—Feed for Locomotives while Running.

At a recent meeting of the Institution of Mechanical Engineers, at Birmingham, England, a paper was read by Mr. John Ramsbottom, describing a method of feeding locomotive engines while running. The invention consists of a scoop or curved pipe attached on the bottom of the tender, which dips down into an open trough of water, and delivers it into the tank of the engine whilst running along. The scoop is carried on a center bearing, and when not used it is tilted up clear of the ground by a balance weight. The trough extends the length of a quarter of a mile along the line, and the hight of the water is maintained a little above the rails. The results were given of filling the tender, while running at different speeds. It was found that the delivery of water into the tender was effected when the engine was passing at the rate of 15 miles per hour, at 22 miles per hour, and at 50 miles per hour; and the quantity scooped up in each case was 1,100 gallons in passing. This mode of feeding the boiler while running was designed to carry out the quick working of the Irish mail, which is required to make a clear run of 84¾ miles without stopping—from Chester to Holyhead. The water trough is fixed half-way on the road. This plan is also designed for feeding heavy freight engines, to avoid the necessity of stopping for water; and it also renders available, without halting, good water on any part of a line, where there is no station.

This method of feeding locomotives, while on the run, with water, deserves attention. It is described as being in practical use in both the London *Engineer* and *Mechanics' Magazine.* We claim the invention as an American production, and secured by patent to Angus W. McDonald, of New Creek Depot, Va., 28th Nov., 1854. It was illustrated on page 137, Vol. X. (old series), SCIENTIFIC AMERICAN; but so far as we have been able to learn, it has never been used on any of our railroads. Our railroad companies ought to be ashamed of themselves for thus allowing English engineers to carry out a somewhat old American invention into successful practice before them.

UNDER the old tariff, wool worth 20 cents per lb. or under was free from duty, and wool worth over 20 cents, had to pay 24 per cent. The way to avoid paying this duty was as follows: The agent of the importer in this country bought a quantity of wool in France. He explained to the seller how matters stood, and he asked him to let him have the wool, which was, perhaps, worth 25 cents per lb., for 20 cents. "I will give you exchange on London for 96 in payment therefor. It is true, I could sell this exchange at 108, but I will make the sacrifice because it is for you." After the sale was complete, they went to the nearest American consul and made an affidavit that the wool had been bought and sold for 20 cents per pound, and it was imported duty free.

THE difference between long and short staple cotton to the uninitiated, would seem to be but little, but that little has cost inventors of cotton gins a great deal of study. The short staple can be rapidly ginned by the Whitney or saw gin, but this device breaks and destroys the fiber of the long staple. The latter is therefore ginned by rollers, a comparatively slow and tedious process. An almost endless variety of plans have been prepared to expediate the working of the roller gin, and in this effort McCarthy and others stand preëminent. The original roller gin, through their exertions, has been much improved, and it is not improbable that eventually the long staple will be ginned as rapidly as the short staple.

IN the British Provinces in the East Indies, they have an easy way of settling differences between the custom-house officers and the importers. If the custom-house officers consider the price named for a certain quantity of goods in the invoice too low, they have a right to buy the goods at the price named in the invoice, and the merchant is obliged to sell at that price. In this country importers have to submit to the opinion of the appraisers, and the only alternative left to them is to pay the duty and sue for it afterward.

RIVED shingles are superior to sawed ones, on account of the former having the grain of the wood, or rather the cells, protected from the weather, the latter not being cut or ruptured as is the case with sawed shingles. This rupturing or cutting of the cells admits of the absorption of moisture, and the consequent warping and twisting of the shingles. The planing of rived shingles improves their appearance, but does not add to their durability, as in the process of planing the cells are more or less severed.

STEAM boilers, iron bridges and iron ships are rated in strength only about one-fourth and one-sixth that of the iron as tested by experiment. This is for the purpose of making allowance for flaws that may be in the metal, and which cannot be detected by simple inspection. There is also such a great difference in the quality of iron plates turned out in the same establishment that it is prudent to make allowance for all defects.

FARADAY has shown that it takes a current of electricity, of sufficient power to keep a platinum wire $\frac{1}{104}$ of an inch in diameter red hot, $3\frac{3}{4}$ minutes to decompose one grain of water. The quantity of frictional electricity required to produce the same effect, would be that furnished by 800,000 discharges of a battery of Leyden jars, exposing 3,500 square inches of surface.

DISCOVERY OF NEW METALS.—The first result of the new method of analysis by the lines of the spectrum was to inform us what substances exist in the sun; the next result is the discovery of two new metals on the earth. One of these has been named cæsium, from the color of the peculiar lines in the spectrum of its light; the other is not yet named. Cæsium resembles potassium in its properties, and exists only in exceedingly minute quantities.

New York holds the first rank not only as the chief shipping port on our continent, but the first port for shipbuilding also. Most of these vessels are steamers; the cost of building averages about $60 per tun.

Column of Varieties.

The *Gazette Medicale* states that charcoal has been discovered to be an excellent remedy for relieving the pain of burns and healing them.

The iron ore in the Lake Superior country is almost a pure oxyd. About one tun of metal may be obtained from one and a half tuns of ore.

It is said that the Austrian government has just made a contract with a firm at Trieste for the construction of two iron-plated steam frigates.

Wrinkled silk may be rendered nearly as beautiful as when new by sponging it on the surface with a weak solution of gum arabic or white glue, then ironing it on the wrong side.

A new paper mill has lately gone into operation at Santa Cruz, California, in which about one half of the wrapping paper consumed in that State can be manufactured.

The English nation is the most powerful one that ever existed; the area of England is only 50,387 square miles. The State of New York contains 47,000 square miles and the total area of the *free* States and territories of this country is over 2,000,000 square miles.

Water is composed of two gases, oxygen and hydrogen, united chemically in definite quantities. Every nine pounds of water contains one pound of hydrogen and eight of oxygen.

The *Presse Scientifique des Deux Mondes* states that the commission appointed by the Diet of Frankfort to consider the subject of a reform in the weights and measures of Germany, have just voted to adopt the French system.

The cheap moldings commonly termed "gilt," and which are employed in interior architectural decorations, railway cars, and for common mirror and picture frames, are not covered with gold leaf. Metallic leaf is used instead, and lacquered over in imitation of gilt. These frames can be made at a small cost.

A correspondent of the *Western Railroad Gazette* advocates the kyanizing of railroad sleepers to render them more enduring. He shows that a net annual saving of $1.70 per mile may be effected by thus treating railroad timber. We are glad to find an assistant advocate of this system in our cotemporary.

A valuable mine of opals has been discovered on the Snowy Range of mountains in California. Some of these gems have arrived in this city. There are several varieties of opal; the first qualities of this stone have hitherto been very rare. One weighing 17 oz. belongs to the Emperor of Austria.

Nothing surprises a visitor from New York to Havana, Cuba, more than the fish which he sees exposed for sale. Instead of the dull and drab colors which are common to the fish in northern latitudes, they exhibit the most brilliant hues. Some are striped with bands of gold and silver, the luster of which is like that of the polished metals. The very eels are covered with shining blue, white and yellow streaked.

Dr. C. T. Jackson, of Boston, Mass., has recently contributed an article to the *Medical and Surgical Journal* on a number of cases of poisoning lately brought under his notice from green-colored wall paper. Dr. F. S. Ainsworth, of Boston, also reports a case of child poisoning from sucking the surface of a green concert ticket.

On all the French and German railroads steel tyres are employed on the driving wheels of locomotives. All these are manufactured by Krupp, of Prussia. They endure so much longer than iron tyres that, although dearer at first, they are cheaper in the end.

Mitchell's *Steamshipping Journal* (British) advocates the exclusive use of iron for hooping cotton bales. Eighty bales of cotton rope bound were lately burned on the Manchester Railroad. Had these been bound with iron hoops, probably one half of them would have been saved. "In a few years," says this journal, "only the most old-fashioned houses will think of sending their cotton to sea in any other than iron-bound bales."

A railroad train ran off the track into the open draw of the bridge over the Hackensack river last week. The train consisted of a locomotive and one iron passenger car, the latter built by Cundell, of Paterson, N. J. It was filled with passengers, but not a life was lost, as the car was but slightly injured. Had it been made of wood, probably one half of the passengers would have been killed by splinters.