Steel Cannons---Composite Guns.

On page 48 of our present volume we presented an illustration of a breech-loading steel cannon, made for the Russian government by Mr. Clay, of the Mersey Steel Works, Liverpool, England. The material of which it was made is known by the name of "puddled steel." It has been proposed to manufacture light rifled field pieces of this material for our army; and as "puddled steel" of a superior quality is made at the works of Messrs. Corning & Winslow, near Troy, N. Y., we are not required to send to England for a supply. It is four times stronger than cast iron, and it is capable of being both cast and hammered, so as to give it great crushing and tensile strength. It seems to us to be the best material that can be employed for making strong light cannon.

L. G. Sturdevant, of Talledega, proposes through the *Watch Tower*, the following method of constructing built-up cannon. Make first the interior cylinder of wrought iron, then coil iron wire around it until it is sufficiently strengthened. After which immerse the gun in a bath of molten brass to braze the coils together. Excepting the method proposed of brazing the coils, this system is similar to that of Captain Blakely's, described on page 341 of our present volume. Unless the surface of iron is perfectly free from oxyd, brass solder will not adhere to it. It would be very difficult to carry out this system into practice although it possesses novelty and ingenuity.

New Blue Color.

In a late number of *Comptes Rendus* a new color, called Paris Blue, is described. It states that 9 grammes of the bichloride of tin and 16 grammes of aniline, heated for 30 hours in a sealed tube at 180°, yield a very bright and pure blue color, which requires only to be treated with water to dye animal fibers beautiful bright tints. This blue resists acids; is deepened in tone with feeble alkalies, but becomes a purple with concentrated alkalies. This is a most important discovery, and is another addition to the remarkable series of rich colors derived from the products of coal tar. We would not be much surprised if all the colors and shades of colors—reds, blues, yellows, drabs, &c.—were yet to be produced on textile fabrics by the products obtained from our oil wells and coal mines. This new blue dye is also called azuline, and is now manufactured and sold in Paris and London in the same manner as Magenta coloring matter.

Cotton in England.

The Manchester *Examiner*, of the 11th of May, has the following:—

The question, "Where is the cotton to come from to keep the mills at work?" is now seriously engaging the attention of the manufacturers and operatives of North Lancashire; and a petition to Parliament is now lying at the mills and manufactories in Preston and other towns for signature only by the employer and the male portion of their hands. Meetings are also to be called to further the object of the petition, which says: "Your petitioners are greatly alarmed at the prospect of a serious diminution in the future supply of cotton in this country, in consequence of the civil war now raging between the Northern and Southern States of America. That your petitioners therefore believe it to be the duty of your honorable House, in this great emergency, at once to adopt the most prompt and effective measures for rendering India capable of furnishing an ample supply of improved cotton, your petitioners believing that India possesses the capability of meeting the requirements of this country, not only as a source for the supply of cotton, but also as affording a market for the products of their industry. Your petitioners, therefore, pray your honorable House to adopt such measures as will contribute to the development of the agricultural and commercial resources of India, so as to enable that country to compete, on equal terms, with the United States of America, especially in the production of cotton."

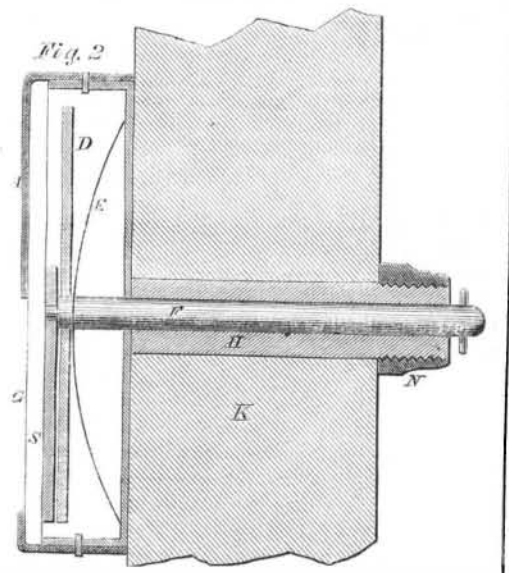
A Great Steamer.—Messrs. R. Napier & Sons, of Glasgow, are now building the steamer *Scotia*, which is intended to be a consort for the *Persia*, and will, when finished, be the largest merchant steamship, next to the *Great Eastern*, in the world. Her length is 396 feet; breadth of beam, 47½ feet; depth, 33½ feet; tuns burden, 4,050. The engine will be nominally 883 horsepower, but actually a great deal more. Her hull is of iron like the *Persia*, which vessel she will exceed in capacity by 500 tuns.

Rodman's Mammoth Cannon Mounted.—The 15-inch gun, of which we gave an illustration on page 305 of this volume, has been mounted at Fortress Monroe ready for service, and a number of shell, weighing 315 lbs. each, have been cast at Pittsburghand forwarded for its use.

AMES'S PATENT INDEX DOOR-PLATE.

The accompanying engravings represent an article which every professional and business man, as well as every occupant of a house or room has often felt the need of having on his door. It is appropriately denominated by the inventor an "Index Door-Plate," which is described as follows:—

Fig. 1 is a front view, and Fig. 2 is a section through the plate and door, and fully explains the nature of the invention. A is the frame, of any suitable metal or material, on which the name is engraved, etched or stamped. G is a plate of glass; S, the removable plate for writing upon, of slate, porcelain or ivory; D, a circular card or dial attached to spindle, F, which passes through the door, K, and E is a spring for forcing the end of the spindle, F, into a



hole in the slate, so that the latter cannot be removed outside of the door without first withdrawing the spindle a little from the inside. N is a nut screwed to the end of the hollow shank H, by means of which the plate is confined to the door. For residences, if dasired, the dial may be omitted, the spring and spindle only being retained for confining the slate. Or a dial only, without a slate, may be employed if required. Thus if an individual, on leaving his office, studio, place of business, room, or house, desires to have it known at what time he will return, he has only to turn, by means of spindle, F, the dial, D, so that the hour required will be seen through a hole in the slate, as shown in Fig 1, the words "In at," being marked on the frame. Or if a person wishes to inform his callers where he has gone, where he may be found, or to leave, for any length of time, a notice or message of any kind, he can write it on the slate, S, and as the slate is protected by glass, G, and cannot be withdrawn by any one outside of the door, the writing can neither be altered, defaced, or taken away. The utility and convenience of the index door-plate is obvious to any one.

The patent was granted July 31, 1860; and for the purchase of rights, or further information address N. Ames & E. M. Montague, 17 State street, Boston, Mass.; or Harvey Brown, 21 Nassau street, New York city.

Americans in England.

Loyal Americans resident in England are making important donations to our government at the present time. A number of gentlemen in London, have notified the Secretary of War that they are about to ship three batteries of Armstrong rifled cannon—six, twelve and twenty-four pounders—with all equipments complete, of which they beg the acceptance of government. This princely gift could not have cost the donors less than $200,000. Other Americans, living in Manchester, have forwarded a battery of Whitworth guns—twelve-pounders—each of which bears the following inscription:—

"From loyal Americans in Europe to the United States government, 1861."

A large commercial house in this city have also offered to furnish, at their own expense, a battery of four rifled cannon—six, twelve, twenty-four and forty-two pounders.—*New York Tribune.*

Tenacitv of Metals.

Guyton Morveau has carefully determined the weight which can be supported by wires of a uniform diameter of 0.787 of an English line without fracture.

Metals.	Pounds.
Iron	549.250
Copper	302.278
Platinum	274.320
Silver	187.137
Gold	150.753
Zinc	109.540
Tin	34.630
Lead	27.621

Galvanizing Iron.—Sheet iron, iron castings, and other objects in iron, chains, nails, &c., are first cleansed in an acid bath, the water of which is so rendered by the addition of sulphuric and muriatic acids. They are then put into an alkaline bath, the effect being produced by the addition of a little soda to the water. After this they are taken, one at a time, and scoured with sand, emery, and water, using a piece of cork or cocoa-nut husk as a brush, and again thrown into a bath of very weak acid and water. Pure zinc when melted is covered at the time of the operation with a thick layer of muriate of ammonia (sal ammoniac) in an iron boiler or open vessel. The iron goods to be galvanized are now to be dipped into the fluid zinc, slowly raising them from the metal, so that the superfluous zinc may drain off. They are then thrown into cold water, on removal from which they are wiped dry, and the operation is finished. Thick, heavy pieces of iron require to be heated before dipping into the zinc, in order to avoid cooling it below the degree of fluidity.—*Septimus Piesse.*

Condensing Engines for Gunboats.—Several, if not all, of the gunboats built hurriedly for the British navy during the Crimean war, were fitted with high pressure engines. It seems that in every instance these engines were failures, being very liable to get out of order, thus involving great expenses for frequent repairs. This has led to the conversion of some of these engines from high pressure to condensing, and in every case, we believe, with satisfaction. A saving both of fuel and wear of machinery has been effected by the change.

Science Aiding the Union.—The government has arranged to use the Calcium light at Fortress Monroe, and the apparatus will be set up on the parapets in a few days. One of the reflectors of this light, which was once placed on the Latting Observatory, in New York, cast a distinct shadow at Tarrytown, thirty miles distant. By the aid of this light the garrison at Fortress Monroe will be able to detect any vessels that may attempt to pass the fortress at night, and give its artillery a distinct object on which to be effective no matter how great the surrounding darkness.

A small iron steamer of 73 tuns burden, the plates of which were only one-eighth of an inch in thickness, was fired at in 1841 with Paixhan 10-inch guns, having 12-pound charges of powder, at 450 yards distance. Although 40 of the shot went through the hull of this small, thin-sided vessel, yet she was not sunk, owing to her being divided into several watertight compartments.

White Metal and Plated Ware.

Our cotemporary, the London *Ironmonger*, contains an interesting article on this subject, being a description of the operations conducted at the celebrated works of John Yates & Sons, Birmingham. We condense the main features of it for our columns.

Copper, zinc and nickel, combined, in different proportions form an important series of alloys, known by the names of German silver, Albata, Argentine, Virginian plate, &c., &c. These alloys are generally hard, and white in proportion to the amount of nickel which they contain. They are employed for making drawing instruments, spoons, tea pots, &c.

Common German silver is composed of 8 parts copper, 3 of zinc, and 2 of nickel. The best quality of German silver is formed of 8 parts copper, 6 of nickel, and 5 of zinc.

Albata is composed of 8 parts copper, 4 of nickel, and 3 of zinc; argentine, 8 parts copper, 3 of zinc, and 3 of nickel. These two are most commonly used for the imitation of silver articles. Virginian plate contains two parts more of nickel than albata, and is therefore superior to it.

The processes of making the alloys, working them into articles, and then plating them, are as follows:—

The foreman gives out to the casters the proper quantities of the copper, zinc and nickel; a proportion of scrap metal is added, and the whole then melted in furnaces in pots of Stourbridge fireclay. When the metallic mixture is in proper flow, the crucible is grasped between the jaws of a pair of tongs, lifted out of the furnace, and, after stirring and skimming, cast into ingots, weighing from eighteen pounds upward.

The ingots are heated to a bright red in annealing furnaces, then allowed to cool, and when cold passed through iron rollers. The action of the rollers reduces them between Nos. 3 and 20, Birmingham wire gage (0.259 and 0.035 of an inch); as a general rule, however, at least in this establishment, the strongest metal used is No. 7 = 0.180 of an inch thick. When this part of the process is completed the strips are re-annealed, then clipt by a machine, cut out in disks, or other shapes, or slit up into strips of greater or less width, for spoons and forks.

The strips intended to be made into spoons or forks are again annealed, and then once more submitted to the action of the rollers at the ends, leaving the central part untouched. This operation has for its object to leave the central part thicker and stronger than the ends, and to widen the latter. The strips so prepared are now taken to the press shop, where the exact shape of the blank is cut out by fly presses. The prongs of the forks are pierced by a similar process. The cut spoon or fork, after being once more annealed, is then submitted to the action of the stamping machine, to receive the impression of the pattern. This is effected by several distinct operations with different dies. The articles are afterward examined and filed down so as to remove all the ragged edges, if they have any. Many articles, especially those which are quite thin, are spun in a lathe into the proper shape.

Beads and moldings are also generally formed upon the edges of vessels, &c., not merely for the purpose of ornamenting them, but also to give additional strength and stiffness. Such beads and moldings are now mostly produced by the action of rollers, the lower one with the beading and an upper one with the groove corresponding. When designed to be electro-plated with silver, the articles are boiled in solution of potash in water, to free them from grease; they are then quickly dipped in red nitrous acid, to remove any oxyd that may have formed on the surface, and after this twice washed in different tanks of water, to remove every trace of the acid. After carefully weighing them, they are suspended from a number of copper wires, and dipped into solution of quicksilver in cyanide of potassium, then again twice washed in different tanks of water, when they are ready for being plated.

The electro-plating bath consists of two distinct parts, viz., the voltaic apparatus, from which the electric current is obtained, and the vat in which the silvering or gilding is brought about. According to the quantity of electricity to be generated, and the intensity of the current required, the battery consists of one, two, three, or more cells. The vats, or plating vessels, are generally from four to seven feet long, by three feet broad; the larger size holding from 200 to 250 gallons of liquid—solution of cyanide of potassium in water is used. In large establishments, the cyanide is made on the premises, by fusing prussiate of potash (eight parts) with salt of tartar (three parts), in an iron pot. The fused mass is gradually transferred, with a ladle, to a large, shallow, brass basin standing in another basin containing a little water, to accelerate the cooling of the fused cyanide. Extreme caution must be observed in this to guard against the least drop of water finding its way into the brass basin, as the contact of the hot cyanide with however so small a quantity of water is sure to give rise to dangerous explosions.

Plates of silver are placed at intervals in the vats, corresponding in size to the surface of the articles to be plated, and facing them on both sides. Two brass rods are laid lengthwise over the vat, one on each side. These serve to support the copper wires by which the articles to be coated are suspended; the zinc pole of the battery is connected with them in the usual way, the copper pole being connected with the metallic sheets in the solution by means of a copper slip. As soon as the silver plates and the articles to be coated are both immersed in the solution, the voltaic current is completed.

When the operator has reason to believe that nearly a sufficient amount of silver has been deposited on the article, he removes this rod from the solution, and weighs the article, to ascertain whether the process is completed, or how much longer it will take to complete it. Any thickness of silver may, of course, be given to an article, by continuing the operation sufficiently long, but from three to six hours may suffice to give a proper coating of silver; 1½ ounces of silver to the square foot of surface is considered to form an excellent plate. The process of gilding is nearly the same as that of silvering, plates of gold being of course suspended in the cyanide of potassium solution, insted of silver plates. The old zinc plates are broken up, to get back the quicksilver with which they were coated. The last finish is given to the article by the operations of polishing and burnishing.

Articles of albata or Virginian plate, which it is not intended to electro-plate, are polished on buff wheels. Sheffield lime, sifted as fine as possible, is used for the finishing.

Electro-plated articles are first polished on revolving brushes or lathes, with rottenstone; then by hand with a buff stick (a strip of leather glued on wood), rouge being generally used in this second operation, instead of rottenstone. The finish is given with the naked hand, the finest rouge being used for the purpose.

Tea pots, candlesticks, and articles with fluted, chased and ornamented surfaces, are also burnished. The burnisher is a piece of very highly polished hardened steel (sometimes also of bloodstone, flint or agate), fitted up with a handle, which, when judiciously applied to the smooth surfaces of metals, imparts to them, by friction, a very high polish. The articles submitted to the action of the burnisher must previously be carefully smoothed, and all file marks or scratches removed from the surface. The burnishing is also done by women and girls, who generally possess a numerous set of burnishing tools of their own, which constitute their stock in trade, and, by rendering them in some measure independent of the manufacturer, enables them to command very fair wages.

After polishing, the articles are wiped with wash leather and wrapped in paper.

SHINPLASTERS.—The people of Savannah, owing to the scarcity of small change, have adopted twenty-five cent bills, issued by the Mechanics' Saving and Loan Association. They are made payable in current bank bills. The system of shinplasters is becoming very general in the seceded States, owing to the scarcity of money. Governor Ellis, of North Carolina, declared in a recent official message that gold and silver were not to be had in that State. Farmers are obliged to take these worthless shinplasters in exchange for their produce. Secession, however, is so excellent a remedy to them, for all their past sufferings under the Federal government, that they feel willing to part with their corn, beef, and bacon, for anything that will promote secession, and the peculiar blessings that follow in its train.

Casting and Gaging Bullets.

There is some little art in casting bullets properly, even in holding the mold at a proper angle to the lip of the ladle. In the system of running them into brass or gun-metal molds the lead should not be overheated, and yet, if not sufficiently hot, the ball will be irregular and full of cavities. There is a particular temperature, only to be ascertained after a little experience, at which the lead flows freely. It is well, when casting a quantity, to have a ladle containing ten or fourteen pounds kept at this heat, using a much smaller one to fill the molds, which should be provided with a long jet or channel for the lead to run through, and the molds should invariably be made to fill from the bottom. When a number of bullets have been cast, they should each be successively swedged in a steel die, so as to compress the metal and render each bullet perfectly solid and homogeneous. The least defect in a bullet fired from a smooth bore fire-arm causes great deviation in its flight. Rifling remedies this defect in a great measure, but not perfectly. For accurate shooting, as much depends upon the bullet as upon the fire-arm.

Temperance among Soldiers.

Our article upon this subject, on page 310, has been copied, with credit, by several of our cotemporaries. This is a question of great importance to the commanders of armies. It is not bulldog courage in soldiers which makes them efficient in war, but moral courage, intelligence and bodily capacity. Mere animal courage is a cheap commodity. The British legion in Garibaldi's army, in Naples, exhibited the most recklessdaring, but it became completely demoralized on account of wine drunkenness. Good behavior is the first essential quality of soldiers, and unless they are temperate they will not be well behaved. Dissipated men are never reliable, and they cannot endure the fatigue like sober men. Drunkenness in an army can be prevented by the commanders; they can prohibit the sale and use of whisky in camps, and it is their duty to do so. Those parents whose sons have gone forth to defend the liberties and laws of their country dread the demoralizing influence of camp life upon them more than the weapons of the enemy, and intemperance is the polluted fountain of demoralization in most armies.

Drinking and Head Protection in Warm Weather.

On page 325 of our present volume some very useful advice was given to prevent sunstroke, and avoid undue indulgence in drinking water during hot weather. A letter to us from a correspondent—A. C. Titus—corroborates the correctness of the advice therein given. He states that he has used green leaves in his hat during warm weather for several years, and has found the practice very beneficial. To those who have a strong desire to drink great quantities of water in summer he gives the following advice:—"Take the twig of a birch, elm or other tree having a pleasant taste, and cut it into several pieces about half an inch in length each. Keep one of these in the mouth while traveling or working in the sun for about an hour, throw it away and supply its place with another, and thus continue during the warmest hours of the day. By following this advice, a person will feel no more desire to drink in warm than cool weather."

French Muskets.

A letter from Toulon, France, says:—

The civil war which seems on the point of breaking out between the disunited States of America is about to open for the French arsenals a market for exportation which certainly was not foreseen. It is stated that American agents have come to France to purchase arms and military equipments, which the storehouses of the State will be only too glad to get rid of.

It seems that our distinguished fellow citizen, Geo. Law, is not the only one who has been anxious to sell muskets. Such arms as the French are anxious to get rid of will not exactly suit the military tastes of our brave soldiers. They would prefer not to commit suicide. A report says that Law's old muskets, which have gone the rounds since the Hungarian rebellion, have at last fetched up in Montgomery, and met the approbation of Jeff. Davis. Nine out of every twelve kicked the gunner over on the first fire.