ders, B B, at the points, *c c c*. The cloth passes into the machine in the direction indicated by the arrow, and it is pressed against the teasel cylinders by the rollers which surround them in such manner that it is brought in contact with the surface of each cylinder at four parts of its periphery, thus being subjected to the action of the teasels eight times in its passage through the machine.

The rollers, *d d*, and *e e*, which press the cloth against the teasel cylinders, are so supported that their positions may be varied to press the cloth more or less firmly against the teasels. To this end the journals of these rollers rest in a V-shaped frame pivoted at the apex so that the distance apart of the rollers may be varied at will by means of a rack on each limb of the frame meshing into a pinion which is geared to a worm screw, as shown.

In order to present a perfectly plain surface to the action of the teasels, it is necessary to subject the cloth to tension laterally as well as lengthwise and the novel and ingenious device by which this is effected is illustrated in Fig. 2. The roller, F, Fig. 1, over which the cloth passes before it first comes in contact with the teasel cylinder, B, is formed as shown in perspective in Fig. 2. The central core, *g*, is stationary, and the sheath of slats, *h h*, is caused to revolve around it by the cloth operating as a belt. The engraving represents a portion of the slats removed to show the central core or cylinder. This cylinder is surrounded by rings, *i i*, secured rigidly to its surface, not at right angles to its axis but at an inclination of some 70° and each slat has pins, *j j*, projecting from its inner side and resting against the sides of the rings, *i i*. Hence when the sheath of slats revolves around the stationary cylinder, the slats, besides their revolving motion, receive a reciprocating motion back and forth along the cylinder in a direction parallel with its axis. The slats are formed in two sets, one upon each end of the cylinder, and the cylinder is so adjusted upon the machine that the slats may be moving apart endwise on that side of the roller on which the cloth bears, and returning to their position more closely together on the opposite side. In other words the surface of the roller is constantly stretching lengthwise on that side of the cylinder which is in contact with the cloth, and contracting in length on the opposite side. It is plain that this action operates to extend the cloth sideways or increase its breadth. The slats are held upon the roller by elastic india-rubber bands.

A considerable number of these gigs have been sold in this country. The price is $700 and the inventor claims that a machine for narrow goods will pay for itself in one year, and a machine for broad cloths in from one and a half to two years. He says that a machine for narrow goods will do as much work as six machines of the old style, and a machine for broad goods three and a half times as much as the old style gig. He also says that this gig makes better work with a saving of room, power and teasels. Certificates from the principal manufacturers of woolen cloths in this country as well as in Europe seem fully to sustain these claims.

The American agent for these gigs is Henry Kayser, who may be addressed at the Union Steam Works, corner of Second avenue and Twenty-second street, New York; where the machines are manufactured.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE BATTLES OF JUNE 26TH AND 27TH BEFORE RICHMOND.

Two of the severest fights that have yet taken place occurred in the neighborhood of Richmond on Thursday the 26th and Friday the 27th of June. They accompanied—either accidentally or with forethought on the part of the enemy—a change in the position of our army, and a few words in relation to this position will make all the operations intelligible.

Richmond, the old and beautiful capital of the State of Virginia, and at present the capital of the so-called Confederate States, is situated on the north bank of James River, a navigable stream which flows in a southeasterly direction, and empties into the mouth of Chesepeake Bay. At the distance of some 20 or 30 miles to the north east of James River is York River, flowing also southeasterly and emptying into Chesapeake Bay. Nearly midway between these two rivers is a much smaller stream, the Chickahominy, running in the same direction as the other two, but about 40 miles below Richmond turning South and emptying into James River.

In the spring Gen. McClellan landed his army at the southeast end of the peninsula, or strip of land lying between the James and York rivers, and marched up toward Richmond, driving the enemy before him. He kept on the northeast side of the Chickahominy till he arrived within 8 or 10 miles of Richmond, when he threw a portion of his army across that stream. When he had got one division (Gen. Casey's) across, the enemy thought that they could overwhelm that division before the rest of the army could come to its rescue; the Chickahominy flowing at this place through a broad swamp and being crossed by only a few bridges. The attack was made with all of the enemy's force on the 31st of May and 1st of June, but our great superiority in artillery, combined with the steady valor of our troops, enabled Gen. Casey to maintain his position until reinforcements were sent to his aid, and the attack was repulsed.

Since that bloody battle, the principal portion of the army has been moved across the Chickahominy, and sometime since Gen. McClellan intimated an intention to take the remainder across, and abandon the ground on the north side of the Chickahominy altogether. In this case he would have to receive his supplies by the way of James River instead of the York as heretofore. Immense stores of ammunition and supplies had been carried up York River, and up one of its Southern branches, the Pamunkey, and landed at White House, from which place a railroad led right into McClellan's camp.

On Tuesday the 24th of June, McClellan ordered the stores at White House to be reshipped on board of the transports, of which some 700 of all sizes were lying in the Pamunkey, ready to be sent round up James River, to the new base of operations.

While this operation was in progress, the enemy, either wishing to take advantage of it, or else moving at the same time by a strange coincidence, marched out of their camp before Richmond in great force, crossed the Chickahominy above or at the west of our army, and attacked the portion of our forces still remaining at the north of the stream. These forces consisted of one corps only, that of General Fitz John Porter, comprising the divisions of McCall, Morrill and Sykes. General McCall's division was stationed at the extreme right and of course received the first attack. The attack was fully anticipated, and our men were all ready to receive it. The first Pennsylvania Rifles were on picket duty in the advance, and at about two o'clock in the afternoon of Thursday, June 26th, they found themselves suddenly enveloped by hosts of the enemy. They cut their way back to the army with the exception of company K, which was nearly all captured. McCall drew his men boldly out in the open field, and awaited the attack which was delivered by the enemy with not less boldness. At about six o'clock General McCall was reinforced by General Morrill's division, and the fight continued to rage till half past nine at night. It was one of the longest and fiercest battles that has yet occurred. General Porter and General McClellan were both on the field, and they saw our volunteers display the firm courage of veteran troops. It was the business of our troops simply to hold their position, which they stubbornly did till darkness put an end to the contest.

General McClellan gave orders that early the next morning the right wing should draw back toward the crossing of the Chickahominy, in accordance with the prearranged programme; his plans apparently not being diverted nor even checked by this furious onslaught of the enemy. His order directed that the corps should march to a certain position near Dr. Gains's mill, about six miles to the east, then not to yield this position on any condition.

At three o'clock in the morning of Friday, June 27th, the army took up its slow and orderly march to its designated position, which it reached at about 11 o'clock, A. M., fighting the pursuing enemy all the way. Arrived at the ground, the arms were stacked and the men threw themselves down to rest, many of them getting a short nap, a most valuable preparation for the terrible struggle that was yet to come.

The field of battle is a large one. Like Virginia land of similar area in this vicinity, it is made up diversely of level meadows, undulating grain fields, woods, thick with underbrush and clear of it, and marshes and ravines. There are three large farm houses, each in sight of the other, each on a shaded hill, and each got up in the inevitable Virginia style of huge outdoor chimneys at either end. These were first used as headquarters by Generals Porter, McCall and Morrill, but afterward converted into hospitals. The open country, longitudinal in shape, is enveloped with woods.

By 11 A. M. each division and brigade, and regiment and gun was in its place. Some were in the broad, open field, and some under cover of the woods and hillsides. The whole presented an animated spectacle—the glorious Stars and Stripes floating in every direction; bright howitzers and bayonets glistening in the sunlight; batteries in readiness for action; cavalry companies eager for dashing charges; generals and their staffs in full uniform on their caparisoned horses, unmindful of the dangerous targets for the enemy's rifles their showy uniforms and equine decorations made them, and regiments of infantry with their arms stacked to be grasped and used at a moment's notice. It was intensely hot. If men suffered then, what must they have suffered when the contest for life and victory waxed hot and hotter a short time afterward, and when to the discomforts of heat were added those of dust and smoke?

A full hour was thus passed before the enemy made his appearance. At about noon the attack commenced, and again through all the afternoon and till half-past nine at night, these thousands of Americans were busy in the awful labor of slaughtering each other. During the battle reinforcements were sent for, and General Slocum's division, with Genera's Palmer, French and Meagher's brigades, recrossed the Chickahominy to the aid of our troops. As on the evening before, night put an end to the contest, with our soldiers all in the positions to which they had been assigned.

In the meantime, the other portions of McClellan's great operation of changing his base had been moving foward with energy and regularity. Gen. Casey superintended the shipment of the stores at White House, on board of the immense fleet prepared to receive them, and as fast as a squadron was laden, it was taken in tow by a steamer and moved down the river. A large number of the runaway slaves of rebel owners were employed in this labor of shipping the stores, and Gen. Casey assured them that not one should be left behind to the vengeance of their masters. The shipment was guarded by gunboats and by a squadron of cavalry detailed for the purpose. The last of the transports was loaded at about 4 o'clock Saturday afternoon, and moved down the stream; a quantity of damaged hay and other worthless matter being set on fire. Nothing of any value, and not even a contraband was left behind. The protecting cavalry moved off to join Stoneman's division to which they belonged, and at about 7 o'clock in the evening the enemy made his appearance, but did not find the rich stores to capture which is supposed to have been the object of his two bloody but bootless battles.

A paymaster, who came from headquarters on Saturday, says that the last of our troops crossed the Chickahominy on Friday night, thus bringing to a successful conclusion the great movement of changing the base of operations.

EVACUATION OF JAMES ISLAND.

The engagement on James Island, near Charleston, mentioned by us some time since, proves to have been a decided and bloody repulse of our forces from an attack which they made on the enemy's intrenchments. General Benham, who led the attack, has been sent home by General Hunter, and the island has been evacuated; thus abandoning for the present the attack on Charleston.

VICKSBURG BOMBARDED.

The whole of the Mississippi River is now in our possession, with the exception of about four miles opposite the city of Vicksburg, in Mississippi. Commodore Davis has descended the stream to a point just above the city, and Commodore Farragut is just below with his fleet, including the bomb flotilla. The two commanders are in communication, and we have reports that the bombardment has commenced.

MORE TROOPS CALLED OUT.

The governors of eighteen States addressed a com-

munication to President Lincoln on the 28th of June, urging him to call out enough troops at once to end the war, and the President has replied, acceding to the request and calling out 300,000 additional soldiers.

The French Merchant Navy.

The head of a large commercial house at Havre has addressed the following letter to the *Avenir Commercial*, which explains some of the causes of the inferiority of the French Merchant Navy as compared with that of other countries :—

The inquiry respecting the merchant navy, of which you have inserted the programme in your estimable journal, appears to me to be destined to experience a great delay in its conclusions in consequence of the too great number of objects it embraces. Permit me, without waiting for the result, to communicate to you my personal knowledge on the subject. It will explain to you the cause of the inferiority of our merchant navy as compared with that of foreigners. We do not possess in France the timber and the masts necessary for building ships of a heavy tunnage, and we must, consequently, import both at a great expense from foreign countries—either from England or from the American States. I purchased in America at the close of December last a ship then on the stocks, which was declared French by the French Consul after she was launched in January last, having first received the name of *Prince Imperial*. She was sold to me, as is the custom in the United States, according to the builder's measurement, as a vessel of 950 tuns, at so many dollars a tun. Being sold according to that calculation, it was the builder's interest to increase rather than diminish the tunnage. Having been launched, and measured by the American customs, the official measurement was declared to be 898 tuns, but on its arrival at Havre the French official tunnage was raised to 1,002 tuns, being 104 tuns more than that of the American customs, and 52 tuns more than that of the builder. I had, therefore, to pay for the making her French at the rate of 25f. the tun on 104 tuns extra, amounting to 2,600f. which was a dead loss to me. Two ships of the same build—the one American and the other French—will not be on an equal footing. The American coming to France will pay customs and other dues which are calculated at so much a tun on its official tunnage of 898 tuns, while the French ship going to the United States will pay so much a tun on 1,002 tuns. This will make a difference of some thousand francs against the French flag every time it enters an American port, solely through the fault of the French custom house. And, moreover, I must in France pay all the dues and other expenses, calculated at so much a tun, on a tunnage of 1,002 tuns, while my American competitor will pay off only 898 tuns. The *Prince Imperial* had, when she arrived at Havre, furniture, linen, china and glass barely sufficient for the use of the officers. The customs found means to make me pay a duty of 15 per cent on these articles, which form part of the ship, are never to quit it, and are as indepensable to the officers as the sails are to the ship. Is that just? The captains and shipowners ought to be the only competent judges of what is necessary for the safety of the crew and of the ship. All that is useless takes up the place of freight, and is a loss to the shipowner. Let the Government free us from the impediments and extra expenses which its administration imposes on our shipping, and it will double their number. The administration in America imposes no impediment on its shipping, and it owes its great extension to that fact. Notwithstanding the extensive trade we carry on in time of peace with the United States, both in imports and exports, in raw and manufactured articles, we do not possess a single ship in France which, by its construction, can compete with their ships for the conveyance of their produce, such as cotton, tobacco, corn, &c. I conceived the first idea of being the pioneer; but I cannot continue to be so except at a loss. I proved by the name I gave my ship that I am not a railer. I desire to enlighten the Government as to the causes of our maritime inferiority, and that in its inquiry it may seek for information from competent persons, such as shipbrokers, captains and shipowners.

A Giffard's injector is now used at the Pewabec copper mine, Lake Superior.

New System of Iron Steamship Building.

A new system of constructing iron screw steamers to obtain lighter draft and increased speed, was lately described before the United Service Institution, London, by Capt. Simmonds, a joint inventor with Wm. Roberts, engineer, Manchester. It consists in using cellular beams or girders along and across the deck and at the bottom; and, to avoid the waste of space which this plan would otherwise occasion, the spaces of the cells are to be used as cabins, stables (in troop ships), and coal bunkers. By the adoption of this system of construction it is expected that much greater stability will be given to that part of steamships which requires it most, but which, according to the usual mode of construction, is generally the weakest. The form of ships is also proposed to be altered by making them much broader and more flat bottomed, by which means the draft will be greatly diminished; and to avoid the inconvenience which such a form might occasion, it is proposed to have two cellular keels, by which means ships so constructed would make quite as little leeway as those that are much deeper in the water with a single keel, and they would be stronger and more steady in a rough sea. For propelling such vessels two small screws are to be employed, fixed to parallel shafts near the bottom, the shafts being turned with increased velocity by gearing, and the blades of the screws being so placed as to produce forward motion when turning in different directions. There are to be four engines, situated as close as possible to the bottom of the ship. By these arrangements it is expected that the propellers will be less liable to foul, that they will be less exposed to injury from accidents or from shot, and that, by having two independent means of propulsion, if either of them should be disabled, the ship might still be propelled, though at a slower rate. To facilitate the steerage there are to be two rudders fixed below the screws, the whole of the "dead wood" being removed, and the action of the two propellers may also be brought to bear in steering; therefore, Captain Simonds anticipates that a large ship may be turned round within its own length.

To Make Stilton Cheese.

As the time is at hand for making cheese, the following method, described in "Morton's (British) Cyclopedia," for making the celebrated Stilton English cheese, may be useful to a large number of our readers :—

The night's milk is set aside to cream, and in the morning it is skimmed, and the cream added to the new milk. The whole is now made of a proper temperature (84°) and the rennet then added. The curd should be fully formed in one hour and a half; if formed more quickly it will be poor and tough; and if much longer it requires to be warmed, which is also injurious. The curd is not broken up in the common way, but is carefully removed in slices by the skimming dish, and placed upon a canvas strainer or sieve. When the curd has been placed on the strainer, the ends are tied up, and the whey pressed out by gently twisting round the whole mass—the ends being stationary, and suspended on a stick laid across the cheese tub. It is allowed to drain until next morning, unless the weather is very warm, when the curd should be removed from the strainer, and placed in a clean dish in a cool place, where it is cut into thin slices, and put into a hoop made of tin, perforated with holes, and rather larger than the intended cheese. A clean strainer or cloth is put between the hoop and curd; and, as the slices of curd are laid in, a small quantity of salt is sprinkled between every second or third layer. The hoop containing the curd rests on a clean cloth, and is covered with another, but no weight is applied to extract the whey. Next morning the curd is taken out of the hoop, clean strainers and cloths are employed; it is then inverted and placed in the hoop as before, and afterward pricked with iron skewers in the sides, to facilitate the extraction of the whey, and drying of the curd. These processes are repeated for four or five successive mornings, until the curd becomes firm. During this consolidating process, the cheeses are kept in a warm place, and in cold weather they are set in tins before the fire, or in heated ovens constructed for this purpose. It is necessary for the perfect extraction of the whey, that the drying temperature be raised to about 100°. The utmost cleanliness and care are indispensable during the whole process. The whey should have a free run from the curd, and the strainers should be washed and then dried thoroughly in the open air, every time they are taken from the curd.

When the cheese has become sufficiently firm, it is pared and smoothed. The inequalities in the sides where the slices join, are filled up by parings from the projecting parts, and the top and bottom are also smoothed by paring with the knife, and lying alternately on a flat board. A strong fillet of canvas, long enough to encircle the cheese two or three times, is then firmly bound round it, and held tightly by strong pins; a clean, dry cloth is also placed under and above it. The binder and cloths are removed every morning, and all cracks filled up. These operations are continued until the outside becomes hard and wrinkled, or coated, as it is termed. After this, the cheeses are removed to the drying room, where they are regularly turned and cleared from the mites. In warm weather the flies are apt to attack cracks or soft parts of the cheeses; and when this occurs, the best plan is to scoop out the affected part, fill it up again with the soft part of another cheese kept for the purpose, and cover carefully with cloths.

The same method is pursued in making Cheshire and Gloucester cheese. One gallon of milk is allowed for one pound of cheese.

Railroad Building in Pennsylvania.

Something amounting almost to a railroad mania now exists in Pennslyvania. Several new railroads are being constructed, and several established companies are constructing new branch lines. The Atlantic and Great Western is in rapid progress; the Pittsburgh and Erie, intersecting the above-named line at Jamestown, is progressing; and so are the Jamestown and Franklin, under control of the Pennsylvania Railroad Company, to connect with the Sunbury and Erie; also the Corey and Titusville, penetrating the oil region. These railroads, when completed, will develope the great mineral resources of the Northwestern part of Pennsylvania. The Tyrone and Lock Haven Railroad, uniting the Pennsylvania Central with the Sunbury and Erie, it is said, will be finished between those points by the 1st of August, and soon after between Lock Haven and Bellefonte. The Pennsylvania Central is pushing forward branch lines in several directions. One runs from Lewistown through Penn's Valley to Bellefonte; another extends to Ebensburg, and a third to Bedford by the Broad Top Line. In the Eastern part of the State the East Mahanoy Railroad has just been finished, while the Reading and Columbia line is being pushed rapidly to completion.

The great pier at Hilton Head, South Carolina, now completed, is upwards of 1,400 feet in length the width being 40 feet, and the head some times called the T, being 140 feet long. The workmanship throughout is of the most solid kind. To sustain it more than one thousand pine trees have been cut down, their trunks drawn from three to four miles, and driven far down into the sand.

Iron Sleepers.—Iron sleeper's have been laid down on the Madras (Indian) Railroad in place of wooden sleepers. It has been found that wooden sleepers decay so rapidly in tropical climates, that iron has been resorted to as a more economical material. This railroad is 406 miles in length, and stretches across the Indian Peninsula from Madras to Beypoor.

Among the locomotive tires shown at the Great Exhibition in London, is a pair from the North London railway, which have run 78, 000 miles without repair, and another set which have made 66,000 miles. Both are of steel, from the works of H. Krupp in Prussia.

At the Great Exhibition, as a specimen of fine type and printing, there is a copy of the entire New Testament printed upon a single sheet of paper. It was printed by Collins, of Glasgow, the celebrated publisher of rare books and beautiful editions of the classics. Although so small the type is stated to be very clear.

The British iron-clad frigate *Warrior*, has lately made another trip to sea, and it is stated, did not sail so well as on her first voyage.