NOTES ON MILITARY AND NAVAL AFFAIRS.

THE BATTLES BEFORE RICHMOND.

The events of the past week are large, and our space is small. We shall attempt no more than to give a comprehensive view of the operations, leaving the innumerable details to be gleaned from other sources. It seems that Jefferson Davis has been for several weeks concentrating the whole Southern army at Richmond. Long before the evacuation of Corinth a large portion of Beauregard's army arrived at Richmond, and forces were drawn to the same point from Charleston and other places. Some 200,000 men were thus collected, while McClellan's army had been reduced by sickness to about 95,000. The enemy hoped with his greatly superior force to fall upon McClellan's army and overwhelm it, but the latter had received notice of this intention and was making preparations to baffle it several days before the attack was ordered. The attack commenced on Thursday, June 26th, on that portion of our forces which were north of the Chickahominy, and was followed up on Friday, as we have already stated. Our account of these two battles, being from an eye witness, was substantially correct, but it seems that on Friday our forces did not hold their ground, but were forced back a short distance with the loss of several guns.

On the night of Friday, June 27th, our army crossed to the south side of the Chickahominy. The supplies which could not be moved were destroyed, the cars and engines loaded and blown up or run into the Chickahominy. The sick and wounded, too feeble to walk and not far from one thousand in number, were left at the hospitals, and Dr. Joseph S Smith with assistant surgeons, stewards and nurses were detailed to take care of them. Hospital stores and provisions were also left to supply their wants.

On Saturday morning June 28th, General McClellan found his whole army handsomely concentrated on the South side of the Chickahominy, and promptly organized it for its march over to its new base of operations on James River. The point selected was Turkey Island Bend, nearly due south and about ten miles distant in a straight line. The supply trains were sent in advance, preceded by a protecting corps. General Heintzelman's corps, consisting of Hooker's and Kearney's divisions, and General Smith's division of General Franklin's corps, were directed to protect the rear, while Colonel Averill, with the Third Pennsylvania cavalry and a battery of light artillery, maintained a position in the extreme rear. General Heintzelman took the Charles City road, General Smith the direct Oak Swamp road, and McCall was afterward placed on the extreme right.

The march lasted from Saturday Morning till Monday night, and was one continuous battle all the way. Though the bridges across the Chickahominy had been blown up by our Engineer corps, the enemy quickly constructed others for a passage of a portion of their troops, while the remainder by their knowledge of the country found fords through which they struggled, to follow our retiring columns. At the same time an immense army marched from Richmond down the south side of the Chickahominy, uniting with those who had crossed the stream, and hoping to overwhelm our forces. But the army was bravely and successfully defended by the rear guard. One method of defense was adopted all the way. Batteries were planted in commanding positions, and when the enemy arrived in close range, grape and canister were poured into his com act columns with terrible effect.

THE SATURDAY'S BATTLES.

One of the most desperate engagements took place on Saturday. The rear of our army had proceeded some two miles from the Chickahominy when they were overtaken and attacked by the advancing hosts. A furious onslaught was made on General Sedgwick's division of General Sumner's corps. The division all returned to the fight, and they were aided by Richardson's division. The fight raged fiercely for two hours, and the enemy were driven back over two miles. In this fight Gen. Meagher's Irish brigade made a desperate charge, capturing four of the enemy's guns and two regiments of infantry. The march was then resumed but the rear was constantly skirmishing with the enemy till night.

THE MARCH ON SUNDAY.

All through the Sabbath day our weary and half famished soldiers were toiling onward toward the James River, where they hoped for rest and security. No serious battle took place on this day, and there was not much skirmishing.

THE MARCHING AND FIGHTING ON MONDAY.

On Monday, June 30th, the enemy made a desperate attempt to surround and cut off the rear guard. Sending one powerful force to the right and another to the left and attacking at the same time in the rear. Generals Heintzelman and Smith in the center and the left received the enemy with such vigor that they repulsed the attack in that portion, but on the right General McCall was so completely overwhelmed, that though he fought literally with desperation, his whole division was destroyed with the exception of about 500, and he was himself wounded and taken prisoner. Darkness put an end to the contest, and this night the army reached the river.

THE GREAT BATTLE OF TUESDAY.

Though the army had reached the river, neither their marching nor fighting was yet over. General McClellan decided to continue down the stream a few miles to Harrison's Landing, a convenient point for receiving his supplies. As the enemy was still pressing forward in pursuit, extensive preparations were made to receive him. The command of the rear guard was assigned to General Fitz John Porter, who planted his batteries in successive tiers on the slopes of Malvern Hill, and awaited the onset. At about ten o'clock the enemy appeared. His lines swept round in a semicircle from James River on the left of our troops to their front. The divisions stretched one behind another as far as the eye could reach. Till about one o'clock the firing was confined mostly to the artillery, aided by the *Galena* and our other gun boats in the river; the infantry being held in reserve to drive back the enemy in case he should come so near as to threaten the capture of any of our guns. But the infantry found abundant need of their services. The enemy seemed determined to drive our forces from their position, and the rebel officers led up their men in the range of our batteries in utter recklessness. For a long time the sweep of our artillery broke and hurled back every charge, but the enemy outnumbered our army three to one, and the constant supplies of fresh troops finally brought all of our men to the work. The battle raged with fury till night put an end to the contest. Our lines were no where pierced, and the desperate assault was successfully repulsed.

THE WHOLE MOVEMENT.

Thus from Thursday morning, the 26th of June, till Tuesday night, the first of July, our army had been contending with two-fold odds, while engaged in one of the most delicate and difficult of military maneuvers—changing the base of operations. We suffered a severe loss in life—though we inflicted a far greater one upon the enemy—but the movement was most successfully accomplished, and with a mere trifling loss of material. All of our siege guns were saved, and of our hundreds of field-guns we only lost 25, and those were lost in the heat of battle. The whole operation is creditable in the highest degree to the Commanding General, to all of his subordinates and especially to the rank and file of the army, who have been transformed so quickly from peaceable citizens into steady and disciplined soldiers.

The army is now resting securely on James River, near Harrison's Landing, in communication with Washington, whence supplies and reinforcements are being received, and under the secure protection of the gunboats which the enemy hold in so much dread. On the fourth of July General McClellan issued an address to his troops, in which he says that Richmond shall be entered by the army of the Potomac.

GEN. M'CLELLAN ADVANCING AGAIN.

By accounts from Fortress Monroe on the 6th of July, we learn that Gen. McClellan has advanced up the James River, seven miles above his position on the 4th. It seems too that Gen. Burnside was proceeding to reinforce McClellan, before the recent battles, when he was informed that McClellan was in Richmond, and believing the statement, Burnside returned to Newbern.

THE OPERATIONS AT VICKSBURG.

The bombardment of Vicksburg continued at last accounts, and it was said that Gen. Butler had 5,000 negroes employed in cutting a channel across the bend on which Vicksburg is situated, by which operation the river would be removed some seven miles from the city.

Muscular Labor versus Grain Elevators.

In this city, where large shipments of grain are made to Europe, a great number of laborers have been employed to lift the grain from canal boats and stow it on board of ships. Profiting by the experience of Chicago, Buffalo and Albany, where grain elevators, operated by steam engines, have been so successfully employed as a substitute for severe manual labor, the grain merchants and shippers of New York introduced two grain elevators last year, and five more this year, making seven altogether. These elevators now perform about two-thirds the work for which about 2,000 *strikers*, *shovelers* and *trimmers* were formerly required. These laborers feeling aggrieved by such machine competition have formed a protective society, and its members have resolved not to work for those shippers who use elevators. The grain shovelers, whose labors are still required in stowing grain, have lately refused to work, and they have held meetings to discountenance the use of elevators. On the other hand, the grain shippers have also concluded that they cannot dispense with elevators, and that they will not be dictated to by the shovelers.

All the experience of the past goes to prove that no combination of laborers or mechanics can successfully resist the introduction of labor-saving machinery, and that it is most unwise to attempt it. The first introduction of any machine, to supersede manual labor, generally affects the interests of those operatives who had been engaged in formerly executing the same labor by hand. But this amounts to a mere temporary derangemant of work, and the total result is a general benefit to all; and so it will be with the grain elevators in New York.

Quartz Crushing and Amalgamating Gold.

The Esmeralda California *Star* gives the following description of operating gold quartz at the Pioneer Mills in Esmeralda:—

This mill is run by steam power, using a rotary battery and running eight stamps; its capacity with double screens on is to crush four and a-half tuns per day; without screens, it can crush from five to six. The rock while being crushed is fed with hot water which causes the amalgamation to work more readily. The pumice passes off through a spout into what are called Howland's amalgamating pans; thence into an arastra, and from thence into a precipitating or amalgamating vat, and is then conducted into what are called Varney pans; which act as mullers, and grind the pumice down to a perfect pulp when the final amalgamation is completed; this pulp is now greatly reduced by water, and is carried off by a spout and flows over blankets; these latter catch and retain the sulphurets and the finer particles of metal which the amalgamators fail to gather; the blankets are then washed by hand, and the sediment is reduced by what is termed the "Hatch process," which is extensively used at Virginia and Gold Hill.

This mill is now crushing rock from the "Wide West" ledge, the owners having a contract to crush 1,000 tuns. From a crushing of twenty-seven tuns of rock from this lode, a sum of $3,126 83 or an average of $115 80 per tun was realized; this was independent of the blanket washings which would increase the returns to a fraction more.

Agriculturists' Wages in Great Britan and Ireland.

The subject of wages is of much interest to all classes. A paper was lately read before the Statistical Society, in London, by Mr. F. Purdy, in which he gave an account of the wages paid to agricultural laborers in the three kingdoms. He stated that men's wages in England and Wales averaged 11s. 6d., weekly; in Scotland, 12s. 9.; and in Ireland, 7s. 1d. That in 23 years the rise in the English wages had only been 12 per cent, but that in Scotland, at an interval of twenty years, the rise was 42½ per cent, and in Ireland over 57 per cent. The fact of the low rate of increase in England, as compared with Scotland, was dwelt upon. It was strenuously maintained that "English wages were kept down by two causes, viz., the cruel and impolitic settlement

of lands, and the large expenditure for out door relief.

A shilling sterling is equal to about 24 cents. Two important facts are also elicited by these statistics. First, that wages have advanced in the above-named countries with the extended use of improved machinery. Second, that the most intelligent agricultural laborers are paid the highest wages. Thus in England, Scotland and Ireland steam-engines, reaping machines and improved machines have been very extensively introduced of late years; and in Scotland, where the agricultural laborer's wages are highest, the people generally are the most intelligent, owing to their system of common schools, which has been in existence for nearly three centuries.

Fire-Proof Safes—Clothing, &c.

We have recently devoted some attention to the protecting properties of fire-proof safes, and have assured our readers that too much reliance should not be placed upon them. When properly constructed they afford considerable resistance to the action of fire, but when exposed to great heat they will inevitably give way. Some sensitive safe makers undertook to kick up a row about the matter, but, upon reflection, concluded that discretion would be the better part of valor. In "Chambers' Encyclopedia of Useful Knowledge," now in course of publication, we find the following observations on this subject, which chime in admirably with our position:—

"The modern safe has double walls and doors of stout iron plates, and the space between the plates is filled with some substance that shall resist the transmission of the heat which would be readily conducted through solid iron. The materials used for these linings are very various—sand, dried clay, charcoal, ashes, bone dust, alum, gypsum, &c. The safes of Messrs. S. Mordan & Co., which are largely used by bankers, are lined with a mixture of equal parts of saw dust and alum. Some makers include small vessels containing liquids, the vessels burst when heated, and the liquids exert some cooling effect. Alum acts in nearly the same manner. It contains 24 equivalents of water, or nearly half its weight. At 212°, ten equivalents are driven off in vapor; at 248°, ten more; and at 392°, the four remaining equivalents are volatilised. It is a mistake, however, to suppose that any of these linings can render such a safe really fire proof; and this is admitted by the more scrupulous manufacturers, who carefully abstain from using the designation of 'fire proof,' but apply that of 'fire resisting,' which honestly describes all that they are capable of doing, as they may resist the action of fire for a considerable time; but whether or not their contents may be ultimately preserved from a fire, is simply a question of the duration and intensity of the heat to which they are exposed. Their great weight in some cases assists in preserving them, especially when on an upper floor, as such a safe would be the first thing to break through the burning joists and descend to the lower part of the building, where the fire is usually the most smothered. These safes are sometimes let into recesses of stout masonry, built on purpose, and protected by an additional iron door. This, of course, adds greatly to their security. All such safes should of course be secured by the best locks that can be made, protected by every possible precaution against picking, blowing up by gunpowder, or other violence."

The fire-proof safe needs to be improved, and we think it a good subject for the further development of ingenuity. There are many good safes now in the market, but not one of them can be relied upon as a perfect protection.

Fire Proofing.—Attempts have continually been made to render cotton, linen, and other textile fabrics, timber, &c., incombustible; but at preseut they have been but partially successful. There are many means by which fabrics may be prevented from flaming, their combustion being reduced to a slow smouldering; and the many recent cases of fatal results from the present extravagant dimensions of ladies' dresses have rendered the adoption of some such protection against fire very desirable. By moistening the fabric with a solution of any saline substance, which, upon drying, will leave minute crystals deposited in or between the fibers, its inflammability will be greatly diminished, but the salt imparts a degree of harshness to the fabric, and in many cases weakens the fibers. Alum, sulphate of zinc, and sulphate of soda have been used, and are effectual to prevent flaming, but they weaken the fiber. Common salt does the same. Phosphate and sulphate of ammonia are less objectionable on this account, but the former decomposes by contact with the hot iron in ironing. Tungstate of soda has been proposed, and is said to have no injurious effect on the fiber. Sulphate of ammonia, chloride of ammonium (sal ammoniac), and borax, are among the best fitted for domestic use, though they are not unobjectionable. For made-up clothing, borax is, perhaps, the best, as it is most effectual in its action, and is the least injurious to the appearance of the article, though it is stated to have some weakening effect on the fiber; this, however, is only perceptible in case of a tearing strain, and will not perceptibly damage such articles as ladies' underclothing, or anything else only subject to ordinary wear. Wood has been treated in a similar manner. Milk of lime, alum, sal ammoniac, sulphate of ammonia, chloride and sulphate of zinc, sulphuret of lime and baryta, &c., have been used, and its inflammability but not its combustibility, is destroyed. Like the fabrics, when similarly treated, wood smoulders slowly. The most efficient protection to wood is silicate of soda. If planks of moderate thickness be brushed three or four times over on each side, with a strong solution, they are rendered almost incombustible; they will only burn when very intensely heated. The silicate fuses and forms a glass which envelopes the surface, and even the internal fibers of the wood, if it be sufficiently saturated, and thus seals it from the oxygen of the air.

Pulling Flax.

We have been given to understand that a far greater amount of land than usual has been sown with flax, in expectation of a great demand for it, to be used for manufacturing purposes. We believe there will be such a demand for it, but the profit to the farmer will depend much upon the manner he harvests and takes care of his crop. We will, therefore, give some practical information on this subject. The flax plant is of rapid growth, and it usually commences to flower within two months after its green spears first appear above the ground. It is generally agreed that the fiber is in the highest condition for manufacturing purposes before the seed becomes quite ripe.

But a small quantity of seed can be obtained from the flax that is designed for the finest fiber. When both seed and fiber are required, which will generally be the case with our farmers, the flax should stand until the seed has become plump and shiny. The fiber of ripe flax is not so fine and strong as that of partial green flax, still it is the very kind which may be used for most coarse fabrics, either to mix with cotton or for making mixed linen and woolen cloth.

In Belgium, where fine flax culture has long been practised with distinguished success, a full-grown plant is selected, and the best-matured and ripest capsule is taken. This is cut across with a sharp knife, and the section of the seeds examined. If they have become firm inside, and the outside has assumed a good deep green color, the plant is considered fit for immediate pulling. At this time the entire plant will exhibit signs of its approaching maturity, the bottom of the stalk will be seen to have assumed a yellowish tint, and have become much harder to the touch than it was before—good indications of an interruption to the circulation of the juices of the plant. If this altered condition be allowed to go on by the plant remaining in the ground, the change of color will rapidly make its way up the stem until it reaches the capsules, and then the seeds will be found to be fully matured, quite hard, and to have assumed the dark color with which we are so familiar in the market samples. The next stage of the plant would be the bursting of the seed vessels and disjection of their contents, but to preserve both seed and fiber, the plant should be harvested at the earlier stage, at which time the fiber is at its best condition. If left until the seeds are quite matured, the stems get hard and woody, and the fiber is apt to get much broken in the subsequent process of separation. Long experience has proved that this is the most profitable time to pull flax.

In order to get the greatest length of fiber, which is a matter of great importance, flax is pulled up by the roots. "The flax is pulled by hand, each singly grasping a small handful carefully by the neck, just below the seed vessels, and drawing it up out of the soil, and laying it in rows across one another. These are allowed to remain lying open on the ground for a certain time, generally one or two days; they are then collected together, and bound into small-sized sheaves or bundles, care being taken that the band shall be placed just under the seed heads of the plant, and the bottoms or butts left unconfined and open. If the crop has been irregular in its growth, and the stems are of unequal lengths, it is desirable, as far as it can be managed, to pull them in different bundles, according to their length, as both in steeping and scutching much fiber is otherwise lost. It is also desirable, in binding them, that the butts should be gently pressed on the ground, in order to regulate the length of the different stems. After the sheaves, or "bundles," as they are termed, are bound, they are arranged in small stooks, usually of four, five or six each, placed in a circle, the butts being well spread out, so as to admit the air freely to their centers—the weather, and the condition of the crop when pulled, of course regulating the period they have to remain on the field."

In the Durango lead mine near Dubuque, Iowa, about 12,000,000 lbs. of ore are now exposed in an open lode, ready to be mined.

Polytechnic College of Pennsylvania.

The ninth annual commencement of this institution was held June 26, at Concert Hall, Philadelphia. A large audience was in attendance.

Soon after eight o'clock, the graduates marched into the room and took possession of the front settees, while the invited guests and the faculty occupied seats upon the platform, which was graced with the American flag.

The exercises were opened with an eloquent prayer by the Rev. Mr. Clark, after which a fine band performed a number of operatic selections.

Hon. Thomas H. Burrowes, LL. D., Superintendent of Instruction of the State of Pennsylvania, now addressed the meeting. He spoke of the great want of practical education; there was too much theory and book learning given, and many parents wanted their children to learn that which would bring in money at once. We should so learn all that we do learn that we may understand it, and apply it to the great uses of life; and this, he was glad, had begun to be the system of instruction, and was followed out in the Polytechnic College of the city of Philadelphia.

The list of graduates, with their residences and the subject of thesis of each graduate, is as follows:

Degree of Bachelor of Mechanical Engineering.—William C. Gatzmer, Tacony, Pa.—Subject of thesis: Motion of Steam.

Edward I. H. Howell, Germantown, Pa.—Subject of thesis: The Sewing Machine, Past, Present and Future.

Jerome Keeley, Phœnixville, Pa.—Subject of thesis: Steam Boilers.

Degree of Bachelor of Chemistry.—Campbell Tucker, Philadelphia.—Subject of thesis: Manufacture, Properties and Uses of Soda, its Chlorides, Sulphate and Carbonate.

Degree of Bachelor of Mining Engineering.—Henry R. Clark, Trenton, N. J.—Subject of thesis: Zinc and its Metallurgy.

John Jungerich, Darby, Pa.—Subject of thesis: Copper and Copper Smelting.

Degree of Bachelor of Civil Engineering.—W. G. Neilson, Philadelphia.—Subject of thesis: Tunnelling.

Abner C. Thomas, Philadelphia.—Subject of thesis: Lime Mortar and Calcareous Cements.

James A. Barton, Trenton, N. J.—Subject of thesis: The Theory and Principles of Construction of the Most Economical Wooden Bridges.

Henry N. Harrison, Holmesburg, Pa.—Subject of thesis: Irrigation.

John ap J. Childs, Philadelphia.—Subject of thesis: The Common Roads.

Charles H. Blackwell, Hopewell, N. J.—Subject of thesis: Manufacture of Illuminating Gas.

James R. Maxwell, Newark, Del.—Subject of thesis. Water Works and Their Construction.

George A. Vaillant, Philadelphia.—Subject of thesis: Stone Bridges.

Frog Hunting.

The Auburn N. Y. *Advertiser* says that the catching of frogs at Montezuma, has become quite a considerable trade. It adds:—"For three or four seasons past two men have made the impaling of frogs their business. Every other day they ship from Auburn a barrel of frogs for the New York or Buffalo market. They make very handsome wages. The method of securing these *basso profundos* of the marshes is very similar to spearing for fish. The men paddle off through the marsh in the night with a dark lantern. They approach the haunt of the frog very quietly, and when near enough throw their dart with a certainty acquired by practice, always hitting them back of the head, killing them instantly. The hind quarters are then carefully skinned and cut off, packed in barrels and sent to their destination. They generally secure two or three hundred in a night, and are paid $6 a hundred.

The Syracuse *Journal* says the Salt Company are now shipping more than 20,000 barrels of salt per week, and that this does not nearly supply the demand; but the pressure is now being relieved. Nearly a million and a half of bushels of salt have now been inspected and shipped, and the production is increasing The dry weather has been very favorable to saline fields.

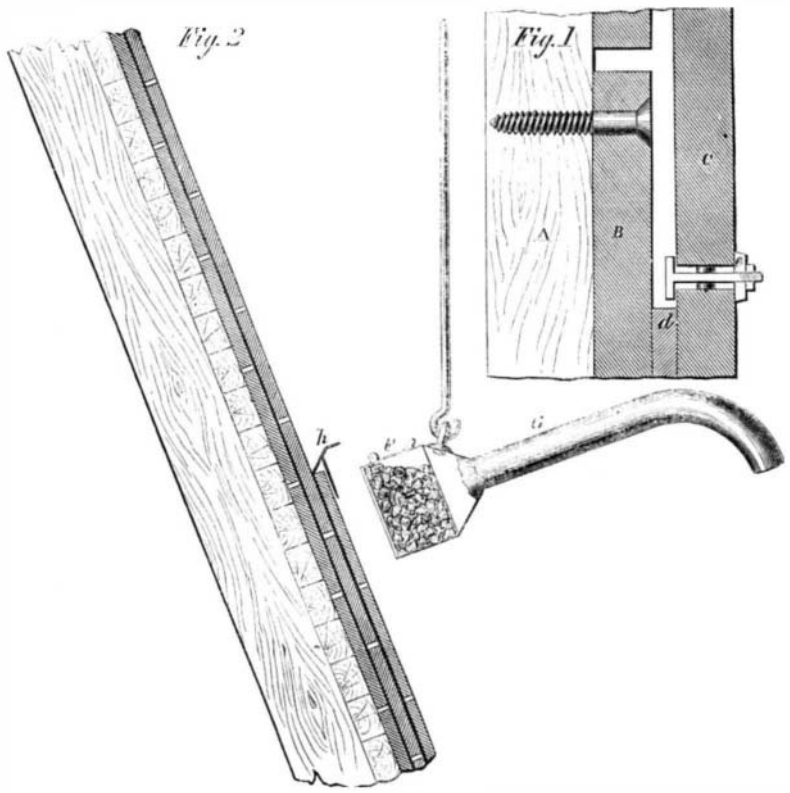
New Mode of Securing Armor Plates.

The principal difficulty in the construction of iron-plated ships is the securing of the plates to the vessel's side. Those only who are accustomed to handling iron can form any conception of the tremendous strain exerted by a plate 15 feet long, 3 feet wide and 4½ inches thick, as the ship to which it is attached is rolled and tossed about in a tempestuous sea. If the plates are bolted to the ship's side the bolts must be large and numerous, and the holes to receive them very seriously diminish the strength of the plate. It is found that when plates are broken by cannon shot, the fracture generally commences at the bolt holes, and a great deal of study has been devoted to the effort to devise some mode of securing plates without piercing them through with these weakening holes.

The annexed engraving illustrates a plan for soldering thin plates one upon another, the inner stratum only to be pierced for bolt holes. The plates are first tinned on the surface, the inner layer is secured to the ship's side by screws, and then the other layers are soldered upon the outside in succession until the desired thickness is formed.

In Fig. 1 A is the wall of the vessel, B the inner plate, and C the second plate, in position to receive the solder, which is melted and poured in between the two. The space between the two plates is closed at its lower edge by a strip of fusible metal, *d*, and the space between the end of the plate, C, and the adjoining plate in the same layer is closed at its outer edge by a slat, *e*, of wood or iron secured in place by a T-headed bolt.

Before the solder is poured into the space between the plates, the outer plate is heated by a swinging furnace, which is represented in section in Fig. 2. The furnace, F, is of equal length with one of the plates, and is supplied with air through the flexible hose, G. A trough, *h*, of sheet iron guides the molten metal into its place.



SHAW'S MODE OF SECURING ARMOR PLATES.

It is claimed that this mode of securing armor plates, besides its great strength, cheapness and ease of fashioning to the vessel's form, renders the vessel water tight.

The author of this invention is Thomas Shaw, who assigned it to himself and Philip S. Justice. The patent was issued to the two jointly, May 13, 1862, and further information in relation to it may be obtained by addressing either of the patentees at No. 21 North Fifth street, Philadelphia, Pa.

Defects in the "Monitor" and "Galena."

From an officer on board the *Monitor* we have received a letter from which we take the following extracts:—

The present hot weather is making apparent some of the defects of our vessel. The principal one is the want of sufficient ventilation. It was supposed that the air forced into the engine room, taken under the floors and admitted by means of registers into different parts of the vessel, would be sufficient, but it does not prove to be so. As long as the weather was cool it was well enough, but as soon as hot weather came on we found that the air in its passage through the fire room (where the thermometer ranges from 130° to 140°) becomes heated. The galley, if you remember, is in the fire room just behind the boilers, consequently the smoke, gas and effluvia arising from our culinary operations mingle with the current of heated air from the fire room and give it an additional stench from the bilge water, as it passes under the floor of the vessel, before we get it for ventilating purposes.

But it is with decklights and hatches closed, as in action, that we experience the greatest want of a pure wholesome atmosphere and a more perfect ventilation. The draught at such a time, what little there is, is upward through the turret, which forms a sort of chimney for carrying off the noxious gases from below, so that the gunners therein, whose labors are severe, inhale the air that has not only taken the route I have just described, but has been deprived of nearly all its oxygen by passing through nearly forty pair of lungs on the berth deck, before reaching them. All on board suffered severely from this cause in our late fight with the Richmond batteries.

Again we find that the pilot house is in the wrong place, as it prevents the boat from being fought head on, which is her best position, as her side armor and all that portion of her aft the turret, would be much better protected.

We find, too, that our guns cannot be fired aft over the smoke hatches without endangering the boilers. This would suggest the expediency of having but one opening in the deck from the furnaces, which arrangement would allow the guns to be trained further aft.

The ports do not allow of sufficient elevation, only 5°.

All of these defects, with many smaller ones which exist, will be remedied, I am told, in the new vessels now building.

The severest blow we have yet received on the turret was at Fort Darling. It was from a solid ten-inch shot fired with a very heavy charge of powder from a distance of about 800 yards. It struck the turret very nearly perpendicular with its side, making an indentation of 3¼ inches, but without any visible fracture of the plates. On the inside, opposite the indentation, the plates were somewhat fractured.

The iron-clad *Galena* was severely handled in this fight, the fire from the batteries being mostly concentrated upon her on finding that their shot were penetrating her sides. I am not positive that any shot passed entirely through both sides, but I saw where a ten-inch shot had gone through her port quarter, where her plating is 2½ inches thick with six inches of wood backing, and after passing over her gun deck had gone through the wood backing on the starboard quarter and crowded off the iron plating. Shells penetrated her side where it was of the thickness I have stated above, and exploded on her gun deck, making terrible havoc among her crew. In two or three places where her spar deck was struck by ricochet shot, the entire substance of the deck, both wood and iron, for the distance of three feet and the width of the shot, was scooped out, leaving a clear opening through to the space below. This deck, however, is ridiculously light, being made of two-inch plank covered with two ½-inch iron plates. As far as resistance to shot is concerned she is a miserable failure.

No less than 200,000 gallons of pickled cucumbers were put up in San Francisco in 1861.

The Northern Pacific Railroad.

A bill has passed the Senate for the construction of a Northern Pacific Railroad, and it will, in all probability also pass the House of Representatives.

The bill grants land but no United States bonds to the Company for its construction. The route was surveyed by Gen. Isaac Stevens (now at Beaufort, S. C.) This road is intended as an addition to the great Central line which had previously been authorized. The President of the United States is empowered to appoint three engineers, who shall immediately proceed to survey a route from Superior City, on Lake Superior, to a point on the western boundary of Minnesota, and thence to the Pacific by way of Columbia river, with a branch to Puget's Sound. Provision is made for a suitable connection with other roads is Minnesota. To aid in its construction the government donates to the States and Territories, through which it shall pass, every alternate section of the lands on each side of the road for twenty miles. Mineral districts are exempted, but an equivalent amount of agricultural lands is granted in place of these. In disposing of this estate the price to purchasers within ten miles of the line is limited to $2 50, and for the residue at $1 25 per acre.

In distributing the lands one half of them are to be donated to the States or Territories, as fast as successive sections of twenty-five miles of road are completed. But as the work of crossing the mountains must be very difficult and expensive, it is provided that the remaining half of the lands shall not be given away until the completion of the road, when it is to be donated to the States and Territories in proportion to the expenditure in building the whole road.

One of the sections of the bill provides for extending the road southwestwardly from Superior City to some point on the Wisconsin river, not further South than Grand Rapids, and thence to the valley of Fox River, on condition of allowing other roads to form running connections with this on fair and equal terms.

Hydrophobia and Muzzling Dogs.

In the hope of checking the prevalence of hydrophobia in France, a tax on dogs was imposed in 1855. The number of these animals did not, however, diminish much, their average number in Paris being about 60,000; and so far from that of the cases of hydrophobia having decreased, they have not been so numerous during twenty years as for the last three years. The most effectual means of preventing dogs biting, and thereby communicating the disease, seems to be muzzling them; and M. Renault, the distinguished veterinarian, in a communication to the Academy of Sciences, states that the assertion that muzzling dogs, by the constraint it produces, is itself a cause of rabies, is utterly unsupported by any well-established facts. On the other hand, he points out the results which have been obtained in Berlin from a general and permanent muzzling of all dogs not tied up at home. A tax had already been imposed with no diminution of the number of cases of hydrophobia, when in 1854 the muzzling was ordered and strictly executed upon all dogs not tied up. From the year 1845 to 1853 inclusive, 278 cases of rabies (nearly twenty per annum), were verified at the Berlin Veterinary School; while from 1854 to 1861 inclusive, only nine cases have occured, and none of these since 1856. The conclusions which M. Renault draws from these facts are, that spontaneous rabies is of very rare occurrence, and that permanent and general muzzling of dogs is a highly efficacious means of preventing the propagation of the disease.

Nickel cents that a while ago sold at 3 per cent discount now sell at one per cent premium. People who a while ago could not think of carrying them are now glad to get them to carry.