

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

We have nothing of interest to add this week in respect to the general situation of affairs. All along the lines matters were progressing quietly. The object of greatest interest is the condition and prospects of

BURNSIDE'S EXPEDITION.

We announced the sailing of this formidable expedition in the *SCIENTIFIC AMERICAN* two weeks ago. Its supposed destination was somewhere on the coast of North Carolina, to complete the work begun by Gen. Butler and Com. Stringham in August last, when Hatteras was successfully attacked. The expedition sailed from Fortress Monroe on the 11th of January, and no reliable intelligence was received respecting it until the 28th. There was a subdued yet painful suspicion resting upon the public mind that ill winds had overtaken those gallant vessels and their noble armies of brave defenders of the Union, and that ill tidings would be the first news we should receive respecting it. The first news that reached the city seemed to confirm all the evil forebodings concerning its fate, and our people began to feel that a dark cloud had set over their cause; but when the facts became more thoroughly understood the relief was very great. The expedition, thank God! is safe. Gen. Burnside sent a special messenger to Washington with the following dispatches to Gen. McClellan:—

HEADQUARTERS DEPARTMENT OF NORTH CAROLINA,
Hatteras Inlet, Jan. 26, 1862.

We left our anchorage at Annapolis on Thursday, the 9th, and after a protracted passage, owing to dense fog, arrived at Fortress Monroe Friday night, at 12 o'clock. Leaving Fortress Monroe on Saturday, at 10 in the morning, we proceeded at once to sea; but owing to fogs on Sunday night our progress was very slow. On Monday, the 13th, the weather cleared, with a heavy wind and rough sea, which caused our vessels to labor very heavily, and some were obliged to cut loose from the vessels they were towing. Most of the ~~however~~, passed over the bar and anchored inside the harbor about 12 o'clock, noon, on the 15th, just in time to escape the severe gale of Monday night and Tuesday. The propeller *City of New York* ran on the bar at the entrance to the harbor, and owing to the severe weather and want of small boats we could render her no assistance. She was laden with stores, and was lost.

The General also says that he had been led to believe that he would find experienced pilots at Hatteras, but had great difficulty in accomplishing his wish, for want of proper accommodations. He adds that he would commence that day to build a wharf for landing supplies. The men were cheerful and patient, and he would proceed with confidence. An accident occurred in an effort to relieve the steamer *New York*, by which a boat was swamped, and the lives of Col. Allen, of the Ninth New Jersey, his surgeon and a mate of the boat were also lost. After the arrival of the expedition at Hatteras, the enemy made their appearance in one or two vessels on a reconnoitering expedition. Our boats gave chase and drove them back. The transports and vessels grounded will be got off by the aid of the tug boats. Only one, the *New York*, was lost, and no lives, the three above referred to excepted.

Special reports to newspapers represent the storm to have been terrific, and it is a matter of surprise and congratulation that the damage to the fleet was not more severe. The steam propeller, *New York*, of 995 tons burden, had on board a cargo of ammunition, rifles, bombs, tents, &c., valued at \$200,000, and the steam gunboat, *Zouave*, 175 tons, armed with three guns, were both lost. The guns of the *Zouave* were saved, but all else on board these vessels was lost. Other vessels suffered more or less damage, and some were aground in the sound, but it was thought they would be got off by the aid of the tugs and gunboats.

FRESH WATER NEEDED.

A correspondent of the *Times* says:—

One of the most serious difficulties now threatening the expedition is the danger that the supply of fresh water will be exhausted before we shall be in a condition to move to a point where it can be obtained. To think of finding sufficient to quench the thirst of this large army, and the naval force on the land near this point, is out of the question. There is but a limited supply on board each vessel, and something must be done at once, to guard against such a calamity as would overtake us in the event that the water fails. Several of the steamers have a condensing apparatus on board which furnishes a moderate supply, and there is one of Normandy's apparatus in full operation on the beach, going night and day, and turning out a thousand gallons each 24 hours. This machine was put up, and has been kept in operation by Mr. Edward Stillman, who is also about to set to work three others of inferior capacity—one on board the Commodore's ship, one at Camp Wool, and a third at Camp Winfield. The

apparatus of Leighthall's, on board the *Sentinel*, makes 3,500 gallons a day. Altogether, we ought to make 6,000 gallons per day.

Normandy's fresh water apparatus is illustrated and fully described in Vol. II, No. 17 (new series) *SCIENTIFIC AMERICAN*.

ANOTHER GREAT NAVAL EXPEDITION.

Another formidable naval expedition is now preparing at New York and other points, which is to be commanded by Commodore Farragut. It will be by far the most powerful naval force yet fitted out, and will consist of the *Richmond*, *Pensacola* and other large steam frigates, a great number of gunboats and twenty or thirty vessels carrying mortars and thirty-two pounders. The mortar flotilla is connected with this expedition. Speculations begin to be rife among us as to the destination of this great fleet. It is no doubt intended to operate on some point where a powerful demonstration is required. These expeditions are harrassing to the Confederates in the extreme, and they are put to their wits' end to know how to meet them.

THE BATTLE OF SOMERSET.

In our last number we announced the Federal victory at Somerset, Ky. The battle was fought at Mill Spring near that town, and will probably pass under that designation. The victory was complete in every respect; Zollicoffer was killed and his whole army routed in disgrace. It was announced that the flying troops would make a stand at Monticello, but recent information states that Gen. Schoepff was occupying that place. There are many interesting details about this battle which we have not room to publish. The *Richmond* papers at first would not believe it; they declared that it was a Wall street dodge to raise the wind, but they were compelled to admit their defeat, and one of them declared it was more disastrous than the Northern papers led them to infer. We claimed a big victory at the outset, and if the secessionists suffered more than our journals stated, they must have been very severely whipped.

HANG THE RASCALS.

The beef and pork which is now being furnished to the army is the subject of much complaint. A large quantity of it comes from Philadelphia and New York, and no one appears to know how it ever passed inspection. Whole barrels opened in some of the regiments are found to be unfit for use. The coffee, tea and rice furnished the government for the soldiers is generally of the most villainous description.

The *Chicago Tribune* says an attempt was made to palm off cartridges destitute of powder in the ammunition for Enfield rifles served out to the Burnside expedition.

HOMEOPATHY IN THE ARMY.

The Committee on Military Affairs in the House of Representatives have under consideration the expediency of introducing the system of Hahnemann into the army. It was agreed to authorize Mr. Dunn to report a bill instructing the Medical Bureau of the War Department to permit, under certain restrictions as to number and qualifications, the employment of graduates of regular Homeopathic colleges as army surgeons. This measure has been fought bitterly in committee, and has for its opponents the entire present medical force of the army. Every effort will be made by the zealous disciples of the old school to defeat the bill; while the devoted and convinced believer in *similia similibus curantur* are working with the intense ardor of younger and more enthusiastic reformers. We understand that Gen. McClellan, who is a firm believer in homeopathy, is anxious to have the system tested in the army. Why not try it? It has thousands of firm believers in the country, and is rapidly gaining ground. It would be far more economical than the older system, and if it should prove just as successful something would be gained in a pecuniary point of view. The *SCIENTIFIC AMERICAN* is the advocate of steady progress, and we can see no reason why a well-tryed new system should not have a fair chance. Away, then, we say, with all blind prejudices, and give our army the benefit of the best systems. We care not what they are called, we go for the best.

MISCELLANEOUS.

The town of Biloxi, which lies on the Gulf of Mexico, is now in possession of the Federal forces. Commander Smith, with three steamers, went toward this place in search of a secession steamer. Not finding it he demanded the surrender of the place, which request

was complied with. He destroyed a sand battery, seized two cannon and a vessel loaded with lumber, which was found very useful to our troops on Ship Island. The male inhabitants had deserted the town, and it was found occupied by women, children and hogs. We do not learn that any damage was done to either.

We have information through a Savannah paper that the Federal forces have occupied Cedar Keys, on the western coast of Florida, a small group of islands at the entrance to Wakasassa Bay. They are the western terminus of the Florida Railroad, connecting with Fernandina. There is a great deal of valuable ship timber in this locality.

The steam-frigate *Franklin*, on the stocks at the navy yard, Portsmouth, New Hampshire, considered by competent judges the finest specimen of naval architecture in the service, seems to have been overlooked both by the Navy Department and Congress. Her hull has been nearly if not quite ready for launching these several years, and an appropriation for an engine is all that is needed to put afloat one of the finest vessels in the world—larger than any of the steam frigates now in commission, and fitted to mount sixty guns of the heaviest caliber. Wonder is expressed that no movement has been made to secure the completion of this ship.

A large number of 13-inch mortars have been passing for the last few days through Harrisburg, on the Pennsylvania Railroad, to Philadelphia, en route for the city of New York. They were cast at the Fort Pitt Foundry, near Pittsburgh, which establishment has turned out some of the heaviest ordnance in the service, in addition to a large supply of smaller material.

Secretary Stanton.

TEST OF AN INVENTION.

The special correspondent of the *Tribune* states that a patriotic inventor recently entered the office of Secretary Stanton, and proposed to sell the Government a patent armor, when the following dialogue ensued:—

SECRETARY—Has this been examined by a Board of officers?

PATRIOT—No.

SECRETARY—Then I propose a test it myself. Put it on, and I will have you shot at.

PATRIOT—Some part not protected might be hit.

SECRETARY—No danger of that, sir; get Colonel Berdan to shoot you; Colonel never misses, sir.

PATRIOT—nonplussed—I don't consider that a fair test.

SECRETARY—I do; and I don't think much of a man who declines a test that he is willing to subject my soldiers to. No, sir. You can't sell patent-safety contrivances to this Department; but if you will bring an invention here which will push our armies on to the rebel forces, I will buy it. Good morning, sir.

ESSAY ON CHEESE.

A Western man, who said he hailed from the Reserve in Ohio, had about a dozen quires of paper written over two or three times, which he said was an "Essay on Cheese." The Secretary laughed! "You must go to the Commissary General; he has charge of feeding the army." "I have been at first one and another all summer, and somehow or other I do not get any further ahead, and that is why I want you to investigate it;" and he commenced to unroll his papers. Indeed, sir, I do not know how cheese would agree with the soldiers." "That's just why I want you to read these papers and examine these certificates." "But I have not time, sir." All hands commenced laughing, but the Ohio man stuck it out bravely. "I assure you that there is not a soldier in the army who does not like crackers and cheese, and I can make it for three cents a pound." "Now I tell you what you had better do, go to Senator Wilson and get him to put it in his bill, it will then pass the Senate and become an army regulation to give out cheese rations." Well, could you not indorse it, and then it would be sure to be passed? No, I cannot indorse it, because I know nothing about it." Oh, well I will leave these papers," and he made for the table. "I will never read them, if you do, until the war is over." With a look of despair, Ohio made for the door, inquiring of every one he met if they knew where Senator Wilson lived?

Wall-Sided Ships Condemned.

The old school of British shipbuilders complain of a system of modeling which has been recently adopted in England both for ships of war and merchantmen. This system embraces wall-sides in preference to the rounding inclination, which may be seen in all our own old ships of war and in many of our best modern freighting vessels. A writer in one of the English papers says:—"In looking at the *Warrior* from aft you are struck with one prominent feature—her wall-sides. This form has not only been adopted by the Admiralty, but prevails in the construction of our modern merchant steamers. To it I attribute, to a great extent, the rapidly-increasing number of them lost. Several iron-built and well fastened screw steamers in the Baltic trade have gone down with all hands, already this year, and the number without doubt will be increased whenever a gale is met with by any deeply-laden, wall-sided steamer. Why are these wall-sided vessels adhered to when experience has so repeatedly condemned them?"

On this subject the *Commercial Bulletin* (Boston) remarks:—

It is well known that our own most successful vessels of war have been remarkable for the inclination of their sides. All our sailing frigates have bold, rounding sides, and finer vessels of their class have not been produced by any other nation, but like the English our modern steam-frigates are rather wall-sided, particularly those which have been built recently. Our new gun-boats are also too flat along the sides to be safe in heavy weather. Experience has shown that a vessel to sail well must have a good foundation, and this cannot be obtained with wall-sides. We are aware of the scientific reason why propellers are built long and narrow, in contradistinction to having "kettle bottoms." It is, because the latter displace too much water, and thereby offer too much resistance and as speed is the principal object, safety is not sufficiently taken into consideration. In our merchant steamers we notice the same peculiarity—they are all wall-sided, and they all roll tremendously in a heavy sea, because they have imperfect bearings at the line of flotation to check them.

We consider this a very important subject, and hope our shipowners will examine it carefully before they have any wall-sided vessels built. In our merchant ships this new notion is not very prominent, because our mode of measurement would tell against it; yet there are a few flat sides in our mercantile marine. The desire to obtain large stowage capacity, with a small register, has preserved for our trading vessels the good old fashioned rounding sides.

Mechanical Substitute for Horses in War.

Whether we shall ever find a perfect substitute for cavalry in war may perhaps be doubted, or whether any cavalry, however rapid and perfect, will be able to charge in face of a body of well trained infantry armed with rifles of long range, is a matter that will have to be proved by experience on some grand battle-field. In the last grand charge at Waterloo, the head of the advancing columns of Napoleon "melted away" even before the old-fashioned guns brought to bear upon it, so as to render advance beyond a certain point impossible. How much more will rifled cannon and Enfield rifles do this in future!

But for military transportation there can be no doubt that horses will and must be set aside by degrees, by the superior advantages offered by steam for drawing heavy weights, even on common roads. At any rate this war has exhibited some of the disadvantages under which we must and do labor where dependent on horses and mules. Hence it is that the enemy has been so careful of keeping railroad connections in their rear, and so much more successful where they can do than this in Western Virginia. Facilities for transportation are everything in such cases, and the saving of horse and mule flesh is beyond calculation. If the locomotives now employed on railroads could be so modified that on arriving at the end of the rails they could run on common roads, though they might draw but a quarter or even a tenth part of the usual train, or no more than equal to ten or twelve horses each, how great the advantage.

There has been no part of the public expenditure, about which there has been so much just complaint as that in horses. The frauds have been immense. Horses that have been sold and condemned, bringing

not more than from one to five dollars each, are most of them such as ought never to have passed inspection. Many of them have introduced contagious diseases among the horses that were valuable. All of them have to be long trained before of much value, and to be fed and groomed daily at a vast cost, whether at work or not. For the transportation of heavy guns on common roads, they are a most costly motive power, so that in point of fact very little of this sort of transportation is attempted.

One quarter of the money wasted on poor horse flesh would, if expended in proper trials and premiums, have put the government in possession of locomotives or steam carriages adapted to haul cannon and all heavy army supplies on common roads. These could be constructed with wheels of such a breadth as not to mire or sink down on common roads except where any means of transporting cannon must sink down, owing to the weight. They would not require food (*i. e.* fuel) except when at work, would not be subject to diseases, or need months of training nor be liable to a stampede if placed under fire. They would afford facilities for a greater concentration of hauling power at a given point to a degree that the power of no number of horses could be brought practically to bear; while the price per horse power of a steam engine could be brought far lower than the present government price for horses.

Let the government draw up specifications for an engine that shall weigh a certain amount and be able to haul a certain number of tons on a level road, or on a road of any given inclination, offer a fair price for those engines presented that shall fulfil all their conditions, and to contract, at a given price, with responsible parties, for a sufficient number of approved engines, and we have no doubt that in a little time three-quarters of all the teams now in use at such vast cost would be superseded, and the army supplies better and more quickly transported. Such engines could be made to place themselves anywhere, and operate as stationary engines for all the purposes for which steam is and can be used. Put on top of a hill they could draw cannon up and then trot off with them to any desired point. They could be better protected than horses from the guns of an enemy. All the working machinery being under iron-clad mail.—*Phila. Ledger.*

Recent Experiments in Using Steam With and Without Expansion.

Mr. H. P. M. Birkinbine, Chief Engineer of the Philadelphia Water Works, has communicated to the *Journal of the Franklin Institute* an account of some experiments lately made with a pumping engine at the works, using steam at full stroke, and expansively with a cut-off. He says, this engine was originally so arranged as to carry steam the entire length of the stroke. The valve gear was much worn, and defective in its arrangement, a new valve gear was put upon the engine, by which the steam could be cut off at any point of the stroke. The experiments to test the value of this improvement were not made with the precision and care they should have been for publication, but were made simply for the use and information of the department. The results may, however, be taken as practically correct, although more carefully-conducted experiments might make a slight difference. The load upon the engine and the condition of the engine pump and boilers were the same in both experiments. In the first experiments, and with the old valve gear, it required careful firing to keep the engine in motion at any thing like a fair speed—say twelve revolutions per minute. In the experiment with steam cut off at half stroke, as the engine is now running, it is kept up with ease. Steam was not cut off at less than half stroke, on account of the boilers, which are old, and not considered perfectly safe at over sixty pounds pressure. It will be seen that this engine is not economical in fuel, nor is it constructed on the most approved plan, but these experiments show the economy of using steam expansively, in this instance, at least.

The diameter of the cylinder of the engine, horizontal, non-condensing, 30 inches; length of stroke of piston, 6 feet; cubical contents of nozzle, and clearance at each end of cylinder, 1.5 cubic feet; diameter of pump cylinder, double acting, 18 inches; stroke of piston of cylinder, 6 feet; diameter of fly wheel, 22 feet; weight of rim of fly wheel, 18,000 pounds.

There are six cylindrical boilers set in brick work. Diameter of boilers, 40 inches; length of boilers, 26 feet; diameter of heaters, 30 inches; length of heaters, 16½ feet; total heating surface, including one-half of the whole surface of boilers, and the whole of the surface of heaters, about 1,500 square feet; area of grate surface, 200 square feet. The pump is placed horizontally about 25 feet in front of the steam cylinder, and in a plane 18 feet below it. The piston rod of the cylinder gives motion to the upper end of the vibrating beam, by means of a cross head and a short connecting rod, while a similar cross head and rod transmit the motion of the lower end of the beam to the piston rod of the pump. From the upper end of the beam a connecting rod also gives motion to a crank shaft and fly wheel, by means of which the motion of the engine is equalized. The pump receives its water from the river under a head of about 4 feet at mean tide, and forces it through an 18-inch pipe, 13,260 feet long, to a reservoir 118 feet above the average level of the river. The steam and exhaust valves of the cylinder are of the Cornish equilibrium variety, placed in chests at each end of the cylinder, and are operated by cams on a revolving shaft driven by bevel wheels from the crank shaft of the engine. The arrangement for varying the cut off is simple and effective. Each steam valve is opened by a roller on the end of an appropriate lever, which is depressed by a raised face or projection on a corresponding cam. The cams are so made that by moving them longitudinally on the shaft, faces of greater or less length, corresponding to different grades of expansion, are presented to the roller on the end of the valve lever. Under each boiler, in the chamber behind the bridge walls, is a supplementary boiler or heater, connected to the main boiler by wrought-iron pipes.

OBSERVED RESULTS OF EXPERIMENTS.

	Without Expansion.	With Expansion.
Duration of experiments.....	28.5	28
Total number of revolutions.....	21,860	26,250
Total pounds of coal consumed.....	21,520	16,270
Pressure of steam as per gage on boilers.....	38	50
Average effective pressure per square inch of steam piston, as per indicator diagram.....	28.5	28.5

DEDUCTIONS FROM OBSERVED RESULTS.

Revolutions per minute.....	12.78	15.62
Revolutions per pound of coal.....	1.015	1.613
Coal per horse power per hour.....	8.073	5.083
Coal consumed per hour per square foot of grate.....	3.75	2.9
Coals consumed per revolution in lbs. .	.984	.619
Water evaporated per lb of coal, in lbs.	6.72	5.85
Coal saving with expansion in per centums of coal used without expansion.	37.03

[It will be observed that in using the steam expansively in the above case, it was 50 pounds pressure on the inch—12 above that which was used at full stroke. We regret that Mr. Birkinbine did not make experiments with steam at 50 pounds, running full stroke, because it is admitted by those who are advocates of non-expansive steam that there is a gain in using steam of a high pressure and temperature, independent of using a cut off. These experiments, therefore, are not conclusive, although they are instructive and interesting.—Eds.]

Inspection of Steam Boilers in Rhode Island.

In Providence, R. I., there is an excellent association, similar to that in Manchester, England, for inspecting the boilers in that city and vicinity. The Inspector, Mr. James H. Monroe, in his report for last year states that there are 100 steam engines under the charge of the association, the average power of which is 5,150 horse. For generating steam there are 247 boilers used, of the following classes:—

Cylinder boilers.....	142
Flue boilers.....	80
Tabular boilers.....	22
Egg-shape boilers.....	3
Total.....	247

Mr. Monroe says:—"There have been 12 boilers and 3 small engines stopped during the year. I have found 2 boilers unfit for use, which have been replaced by others. I found 17 boilers needing repairs, which have all been properly repaired. I find in all the boilers that I have examined the greatest cause of trouble is the large deposit of sediment and scale collecting in the boiler from the impurity of the water. I would recommend to persons locating boilers a plain boiler, of easy access to clean, as the most suitable for use generally in this city."