Correspondence

"The Science of Aerostation"

MESSRS. EDITORS :—If Mr. La Mountain, before criticizing Mr. Shaw's aerostatic contrivance, as he has done on page 246, current volume of the SCIENTIFIC AMERICAN, had given a little more patient and elaborate study to the structure of that machine, he would not have fallen into some errors. With regard to trimming and tacking in a balloon with an ordinary car, any attempt to turn the balloon by any gearing like that in question, would indeed have been like attempting, "while sitting in an arm-chair, by taking hold of the rounds, to lift one's self off the floor." But listen to Mr. Shaw :—"The balloon itself moves, while the car is kept stationary by the action of the propeller on the atmosphere." This propeller performs the same office in the balloon as the center board or keel in a ship, namely, presents a resisting force and keeps it from drifting, while the wind bears away the sails and imparts motion to the ship." This circumstance Mr. La Mountain entirely overlooks. Again, it is very easy to demonstrate, mathematically, that in all solids, as you increase the linear dimensions, the surfaces increase as the squares, and the solid contents as the cubes, of those dimensions. The calculations of the writer, in the fourth paragraph, with regard to the spherical form of the balloon, are perfectly correct, and are based upon the foregoing principle. But as to the flattened sphere, he (in substance) says that however greatly you increase the diameter above twenty feet, the balloon will not more than lift itself. "You will gain nothing." This is inferring that in the case of the flattened sphere, the contents increase equally with the surface or as the squares of the diameter, which is not true, as in all solids they increase as the cubes of the linear dimensions.

SETH C. CHANDLER, JR.

Boston, Mass., April 30, 1863.

MESSRS. EDITORS :—The communication from Mr. John La Mountain, aeronaut, which was published on page 246, current volume of the SCIENTIFIC AMERICAN, has, no doubt, furnished much incorrect information to many who have not the advantage for observing differently. Although his reasons appear sound, and are probably correct as to the impracticability of trimming and tacking the flying machine he speaks of, in the atmosphere; yet, while he notices Mr Shaw, the inventor, as "very much like a man who has no practical ideas on the subject whatever," referring to his idea of condensed gas as a motive power, he exposes his own deficiency. As it relates to the strength of boilers in sustaining a pressure of steam, your correction of his statement is in accordance with the experience of many engine builders, &c. Many stationary engine boilers are now worked to a pressure of 600 lbs. per square inch. As to the difficulty of condensing gas, I think he has something to learn that would be novel to him, and would suggest that he rest a while from his "patient and elaborate" study of the subject, and make a few observations on "mother earth," and perhaps he will stumble on something that will serve some of his purposes hereafter. The passenger cars of many of our railroads are lighted with gas, which is, of course, carried with the car, in a condensed state. It is forced into iron cylinders until the pressure reaches 340 lbs. per square inch. The thickness of iron is but $\frac{1}{8}$ of an inch, only $\frac{1}{3}$ as thick as that in a locomotive boiler. The apparatus for condensing it is very simple, and consumes but very little power. I have taken a great interest in the science of aerostation, and, although not an aeronaut, beg leave to differ with some of that profession, on some points, and I think that ballooning is but as the old stage coach when compared with the steam car. J. A. M.

Reading, Pa., April 27, 1863.

[Our correspondent asserts that there are boilers driving stationary engines which are worked at 600 lbs. pressure per square inch. This is a very broad statement, and should be supported with the citation of cases. We are not aware of a single case of a boiler being worked at such a pressure. Mr. Shaw's balloon seems to have attracted a great deal of attention from mechanics, and provoked criticisms which will doubtless be taken by him as kindly as they are intended. The mechanical arrangement of the machine has been questioned by Mr. La Mountain in regard to preserving the ovality of the sphere; that this is very readily obtained by the insertion of stays internally will be apparent to all. That the other features mentioned by correspondents, as, for instance, the action of the propeller on the air, and that of the gearing, are liable to criticism, is not to be denied; but we must avow our skepticism as regards the statement that the cylinders containing gas for burning in cars are only $\frac{1}{8}$th of an inch thick, and are charged at a pressure of 340 lbs. per square inch. The locomotive drawing those cars has a cylinder boiler from 38 to 40 inches in diameter, and from $\frac{5}{16}$ths to $\frac{3}{8}$ths of an inch thick, and is strongly braced and stayed to carry a working pressure of even 200 lbs. to the square inch. If the diameter of the gas-containing cylinders is at all in comparison with that of the boiler, how are we to reconcile the fact of $\frac{1}{8}$th of an inch of iron sustaining a pressure of nearly one-half greater than that borne by $\frac{3}{8}$ths of an inch? Is our correspondent willing to apply a pressure of 340 lbs. per square inch to any locomotive in his knowledge, and stand by to superintend the operation?—EDS.

Operations on the Blockade.

We have been favored with the following letter from an officer on the blockade off the North Carolina coast. The precise locality of the ship, signature of the writer, &c., are omitted for obvious reasons. The letter will repay perusal :—

"At present there are only four steamers blockading this place (that is on this side), you can see by looking on the map that there is a shoal makes out seaward for ——— miles; it is only ——— of a mile wide, so we are obliged to support ——— blockades. At present we are on the north side of the shoal; there are ——— steamers on the south side. We can communicate with each other by a narrow channel across the shoal. The Admiral sent a small tug boat on the other side a few days ago, while we ought to have one or two on this side, for, as you know, we require them to run close-in-shore in the night, so as to intercept the 'runners' of which there are plenty just now. Our captains think if they run into six or eight fathoms of water they are very close in, when, in fact, we are four or five miles from the shore; while the class of vessels that run the blockade draw but six or eight feet of water and can steam in and out within a mile of the shore. There were at one time eight steamers at the wharf in ———, and in one week they all got out safely, heavily laden with cotton and turpentine. There was one steamer that came down recently and anchored just inside of the bar; she had two pipes and side-wheels. We knew she was loaded ready to run out, and we kept her in check for two days. She became restive, however, and made an effort to run on the other side. I was turned out one calm night at 2 o'clock A. M.; I heard the firing of guns (some twenty were fired), and thought it was the steamer just mentioned. Sure enough! I saw that she had disappeared from her place, and that another had taken her berth. At high water this last one moved up to ———. The U. S. steamer ——— came around, and her crew said that the 'two-smoke-stacks' steamer had run out and they thought they had hit her, but 'any hit or no hit' she must be in Nassau by this time, with a cargo worth probably more than a million of dollars. In fact the rebels say that they run an opposition line that makes weekly trips. Now, if the Government would only send us two tugs this would all be stopped. I dont know but I wrote you about the steamer that run in in broad daylight; it was so, however, about two in the afternoon. It was a bold stroke for 'Johny Reb' and a successful one; we fired several shots but without effect. The rebels have several Whitworth guns on shore and our captains are afraid of them; they *only* throw five miles and do execution at that distance! This vessel has taken several schooners since her arrival here; but I have given up all hope of capturing a steamer unless by chance. The rebels are steadily putting up batteries along the coast—what they call 'two guns and casemates' they have one of about eight guns and six of two heavy guns. There is one battery being built with a large amount of tressel-work; it is made of heavy timber and runs from the sea-shore back about 1,000 yards, and has a tower some 100 feet high, in the top of which, I think, they are going to place a gun to fire down on our iron-clads, and other vessels. At the foot will be two guns and in casemates they are putting up things in good shape for us. But I think the iron-clads can get in without any difficulty, in spite of these formidable arrangements. I hope they will do it and soon too. I have no more to write this time, only we all enjoy good health with plenty of sea air and 'salt junk;' I dont think there is much danger of the gout on that. . . . . I am sorry to say that two more steamers ran in last night and had the impudence to blow their whistles—I suppose to give us warning to keep out of the way or else be run down."

HORSE-POWER.

The nominal and actual horse-power of an engine are two entirely different things. The actual horse-power means the pressure of steam in pounds upon the area of piston in inches, multiplied into the velocity of the piston in feet per minute, divided by thirty-three thousand. The working power of the engine, therefore, is in proportion to the pressure of steam. By the nominal horse-power of an engine its size and character—high or low pressure—are meant. It would be well if there were a general fixed standard recognized as the meaning of a nominal horse-power for an engine, but no such standard exists in any country, we believe. In a work lately published in London, edited by J. Hopkinson, it is stated that a nominal horse-power is different in several engineering localities. For condensing engines the "Manchester rule" is 23 square inches of piston per nominal horse-power; the "Leeds rule" is 30 circular inches per nominal horse-power. For non-condensing (high pressure) engines the Leeds rule is 16 circular inches per horse-power; the Manchester rule is 10 square inches of piston, and the Glasgow rule consists in squaring the diameter of the piston in inches and pointing off the unit figure; this is essentially the same in form as the Manchester rule, as the process of division is by 10. By the Leeds rule an engine built in that place will possess about one-fourth more power than one built in Manchester or Glasgow rated at the same nominal horse-power.

THE REBEL SHOT.—The rebels say that the projectiles used by them at Fort Sumter, with which they made such an impression on the armor of the *Monitors*, were not of English manufacture, but were the invention of a Lieutenant Brooks. They flatter themselves too much in supposing that the Brooks' balls "riddled the boasted monsters like sieves," and so they probably are too sanguine in supposing that the invention of these balls will revolutionize naval warfare anew, just as the system of iron-plating seems to have become well established. On page 276 (current volume) of the SCIENTIFIC AMERICAN, a representation of the rebel shot "drawn from life" can be seen. The manner in which the rebels came by their projectiles is explained by us on page 314 of the present number.

THE STRUGGLE ON THE RAPPAHANNOCK.—On Thursday, the 30th ult., General Hooker, with his army, crossed the Rappahannock in the direction of Chancellorsville, and on the next day he was attacked by the forces of General Lee. There was fighting between the two armies with varying success for five days, when the Union army was compelled to retreat (on Tuesday the 5th inst.) to its former position on the north side of the river. The fighting was terrific and the loss of life on both sides was immense; but at the time of our going to press, the full particulars have not reached this city.

IT is reported that a Yankee down East has invented a machine for corking up daylight, which will eventually supersede gas. He covers the interior of a flour barrel with shoemaker's wax—holds it open to the sun, then suddenly heads up the barrel. The light sticks to the wax, and at night can be cut into lots to suit purchasers.

GAS or air when heated to 491° doubles its volume, and exerts a pressure of 15 lbs. on the square inch above that of the atmosphere.