Captain Ericsson Himself Before the Public.

The following is a letter from Capt. Ericsson, in the New York *Daily Times* of the 28th ult:

NEW YORK, Thursday, May, 24, 1855.

SIR: The assertions of my opponents that the caloric engine has failed and been abandoned, and that a "new steam engine" has been put into the *Ericsson*, are wholly unfounded.

Every trial made has proved the soundness of the *principle* of the caloric engine, an extraordinary saving of fuel being in every instance well established. I have deemed it prudent, however, not to publish certain facts conclusive as to ultimate success, because it would have encouraged many to help me to "improve," and deprive me, if possible, of the fruits of much labor and expense.

The first engine of the caloric ship was removed, notwithstanding its economy, because it proved too cumbrous for the amount of *available* power it exerted—in other words, because the differential force of the working and supply piston did not prove in practice to realize what calculation promised—losses by leaks, friction, &c., being much greater than reasoning could anticipate. The second engine was applied to remedy this deficiency of power, by employing compressed air, but it was found that the joints of the pipes of the heaters could not be made sufficiently tight to carry more than one-third of the intended requisite pressure. Accordingly, this modified engine proved inadequate to give a speed of more than seven miles an hour to the ship. Apart from the imperfections connected with the leaks alluded to, the machine worked to the admiration of all who witnessed its operation. But although *air* thus escaped through the joints, steam, it was found, could only be retained in the heater pipes, and was therefore employed in a surcharged state, in place of air. It was under the agency of surcharged or overheated steam that the machinery operated on the day of the sad accident of sinking the ship. The sudden immersion and cooling of the furnace pipes, &c, unfortunately destroyed a vital part of the contrivance, and after fruitless attempts to repair and patch, no alternative was left but to apply ordinary boilers. The *engines*, however, are now without alteration; the same as when compressed air was employed. The statement that "new steam engines," planned and constructed for the purpose, have just been put into the ship, is pure fiction. I promised the owners of the ship, on proposing to remove the original caloric engine, to build the second one in such a manner, that if we failed in using air, steam might be resorted to by replacing the air heaters by steam boilers.

The stories relative to the "burning of the bottoms" of the original caloric engine I have deemed it unnecessary to notice, as many practical means obviously might have been adopted to overcome the difficulty. Numerous have been the suggestions I have received from correspondents in various countries, all proving that I am not alone in thinking that the "incurable burning of the bottoms" was, after all, no serious matter.

The positive assertion, that I have altogether abandoned the caloric engine, is a base calumny. The subject has been by me unceasingly prosecuted. Experiment has succeeded experiment, and continued exertions have been made to devise and perfect the useful mechanical expedients for rendering the incontrovertible physical laws involved in the principle of this machine subservient in producing a cheap and harmless motor. How far I have succeeded in the final practical solution of the great problem will soon become known, as I am now engaged in building a test engine of considerable magnitude.

Possibly the performance of this test engine will prove the conductors of certain scientific publications more at fault in their opinion of the caloric engine than Sir Humphrey Davy was when he ventured to ridicule the proposition of lighting London by gas.

Let me add, that should some unexpected difficulty prevent a full realization of the capabilities of the new system when the said test engine shall be put in operation, such an event will by no means stop the prosecution of the matter—nor will any mechanical difficulty whatever cause the writer ever to abandon a plan so eminently based on physical truth, and fraught with such vast beneficial results when perfected. It is much to be regretted that so important a matter should be in any manner retarded by the obtrusive interference of persons who do not possess knowledge enough to understand that our present motor, the steam engine, working as it does within very limited range of temperature, and constantly wasting the caloric, never can be made an economical medium of transferring the force of caloric for motive purposes. Happily, whilst those who only pretend to science thus assail the good cause, the highest authorities support it. The late British Association in England discussed the matter at length, the inferiority of steam as a motor being fully established. The celebrated Regnault—the greatest living authority in relation to caloric—in a memoir to the French Academy, after discussing the relations of force produced and range of temperature, says: "But, as in the Ericsson system, the heat which the air gives out is given up to bodies, from which the entering air takes it again and brings it back to the machine, we see that theoretically *all the heat expended is utilized* for mechanical work; whilst in the best steam engine the heat *utilized in mechanical* work is not the one twentieth part of the *heat expended*." Endorsed by such authority, and fortified by such opinions, the writer disregards assailants, and will continue to labor at the perfection of the caloric engine until the end is achieved.

I am, Sir, very respectfully, your obedient servant, J. ERICSSON.

To Lieut. Gov. H. J. Raymond.

[This letter was written to Mr. Raymond in reply to personal inquiries, and the *Times* introduces it in the following sentence:—

"The public press, for some weeks past has teemed with reports that the caloric engine has proved a total failure, and that the principle on which it was constructed had been finally abandoned by Capt. Ericsson, who had substituted steam engines in the ship with which his experiments were made."

The above sentence from the *Times* is a disingenious mode of saying what is not correct in fact, and Capt. Ericsson must meet the same charge from his own self, for in the first sentence of his letter he denies that the caloric engine has failed, and been abandoned, and that "a new steam engine" had been put into the *Ericsson*, while in the commencement of the third paragraph, he then says, "the first engine of the caloric ship was removed, &c." Now, since we all know that steam engines have been substituted for them, it makes no matter whether these engines are old or new, they are steam engines and not hot air ones—that is the grand criterion point. Neither Mr. Raymond nor Capt. Ericsson dare deny this. Why do they not, then, like honest upright men, tell the downright truth about the matter. This would be creditable to them, for the best of men make mistakes, and Capt. Ericsson is not immaculate. Who his *opponents* may be, we do not know. Ericsson, the engineer, may not abandon hot air while he lives, but *Ericsson* the ship, after giving it a most expensive and thorough trial, has abandoned it for steam.

He says in the above letter, that the hot air engine was abandoned (there were two of them) because it was found to be too cumbrous for the power it exerted, on account of "losses by leaks and friction."

In the *Times* of Jan. 12th, 1853, he stated, "the pistons do not chafe, and hence there is little or no friction."

He now says these engines were too cumbersome, but if his principle of using hot air is correct, why did he not just enlarge his cylinders. In the *Times* of the same date referred to, he again said, "Were we able to introduce cylinders of 20 feet diameter, we should be able to surpass anything that floats on the ocean, and the effect of the improvement would be extraordinary. The enlargement of the cylinders would not cause them to occupy a much greater space in the ship, so that there would be *no appreciable want of room*." We have put these two statements together in order that the public might "look on this picture, and then on that."

Capt. Ericsson says in the above letter, that he is now going to build a *test* hot air engine. What in the name of common sense were the huge air engines of the *Ericsson* built for?

Let us again turn to Capt. Ericsson in the *Times* of January, 1853. He was asked, "are you perfectly satisfied with this trip of the *Ericsson*?" He answered, "It has exceeded my highest expectations—the engine has effected more than I had any reason to anticipate." In answer to another question he said, "I have never been at a loss for means, by making representations to your capitalists. I met a number of merchants, supported by other gentlemen of capital, who afforded me *ample opportunity of testing* the caloric principle on this large scale. The thing is accomplished; there is no remaining difficulty in the way which cannot be met, there is no doubt that cannot be answered. The principle has been tested long enough to prove that it is reliable, feasible, and successful." We advise him and Mr. Raymond, before they write any more on the *Ericsson* and hot air engines, to read the back numbers of the New York *Times*—our Lieut. Governor especially will find them very instructive in his editorial capacity.

Capt. Ericsson quotes Regnaultas sustaining his views; we must deny the correctness of this. As our authority, we refer to the report of a paper read by Regnault to the Academy of Sciences (Paris) on the specific heat of gases,—translated for and published on pages 115 and 116, Vol. 28, *Franklin Journal*, 1854. The whole article militates against Mr. Ericsson's views of hot air, as carried out in his engines, by his *Regenerator*. The paper of Regnault, instead of furnishing proof of economy, for the mechanical work done by saving the heat by that Regenerator, says, "the useful work done by hot air, is more nearly expressed by the heat lost in the fall of the temperature in proportion as the machines are more perfect."

Capt Ericsson's fling at those "pretending to science assailing the good cause," thus recoils upon himself.

The best answer to the above letter, as it relates to the economy of steam and hot air, was published in the *Times* itself, of the 30th, giving an account of the trial trip for thirty hours of the *Ericsson*, with her steam engines. C. H. Haswell, the well-known engineer, who was on board, has reported that the consumption of fuel, according to the speed of the ship, was less in proportion than that of the *Ericsson* with hot air, and the low estimate of 7 tuns of coal per 24 hours, for the speed was about double with the use of two-thirds less fuel—21 tuns—whereas it should have been 28 tuns, estimating the resistance according to the square of the velocity, and according to the "cube" 196 tuns.

The Ericsson under Steam.

The following is the Report of Chas. H. Haswell to J. B. Kitching, Esq., a copy of which he has kindly furnished us. It is more concise, and yet more full and complete, than the account published in the *Times*, to which we have referred above:—

NEW YORK, May 30, 1855.

DEAR SIR: Having, in compliance with your request, embarked on board the steamer *Ericsson*, on the 28th inst., for the purpose of witnessing the performance of her machiney, and having received authority from you to control the operations of it in such a manner as I saw fit, for the purpose of advising myself of the consumption of fuel in her furnaces, speed of vessel, &c., I have now to submit the following report of my observations, and for the purposes of ready comparison and estimate of the value of the elements submitted, I give the following particulars of hull and machinery:

Hull—Length on deck, 250 feet; breadth of beam, 40 feet; depth of hold, 27 feet.

Draught of Water—Forward, 17 feet 2 inches; aft, 16 feet 10 inches (mean 17 feet.)

Coal and Water on Board—550 tuns.

Area of immersed midship section at this draught—546 square feet.

Machinery—Two inclined engines of direct action.

Cylinders—62 inches in diameter by 7 feet 8 inches stroke of piston.

Water Wheels—32 feet in diameter by 10 feet in width.

Boilers—Two vertical tubular, supplied by fresh water from the external condensation of the steam: natural draught to furnaces.

Cut Off—Drop valve with adjustable arrangement, set in this experiment at 45 100ths of stroke of piston.

Dip of Water Wheel Blades—4 feet 6 inches.

Coal—Anthracite, Pittston, Bituminous, and Cumberland.

RESULTS OF EXPERIMENT—1st. *Anthracite.* At sea, May 28th, 1·45 P. M. to 2·15 A. M., 29th, 12 hours and 30 minutes, consumed 26,400 lbs.: 2.112 lbs. per hour, or 0·94 of a tun (of 2240 lbs.) per hour.

2nd. *Bituminous*—At sea. May 29th, 2·15 to 11-30 A. M., 9 hours and 15 minutes, consumed 15,390 lbs.: 1.664 lbs. per hour, or 0 74 of a tun per hour.

3rd. *Anthracite*—At sea, May 29th, 11·30 A. M. to 1·45 P. M., 2 hours and 15 minutes, consumed 4,320 lbs.: 1,920 lbs. per hour, or 0 85 of a tun per hour.

RECAPITULATION.

1st. 12 h. 30 m. × 2112 lbs.=26,400 lbs.
2nd. 9 h. 15 m. × 1664 lbs.=15,392 lbs.
3rd. 2 h. 15 m. × 1920 lbs.= 4.320 lbs.

24h. 0m. 46,112 lbs.

the total consumption for 24 hours=20·58 tuns.

The average pressure os the steam was 22 5-8 lbs. per square inch; the vacuum 27½ inches, and the average revolutions of the engines 13 3-8 per minute. The speed of the vessel, as measured by a chip log, with 25 fathoms of stray line, was 11 knots large = 12·83 statute miles per hour.

The fresh water condensers maintained an uniform vacuum of 27½ inches of a mercurial column, and by the aid of an auxiliary distilling vessel, more water was readily obtained than was required to meet the loss by vents and leaks from the boilers, pipes, &c.

With a view to test the evaporative qualities of the boilsrs, and at the same time to verify the extraordinary results here given, in economy of combustion, the water of condensation therefrom was, at six different periods, measured in a vessel, and the supply was found to reach the unexampled quantity of 9·96 lbs. per pound of anthracite coal consumed, and notwithstanding this unprecedened attainment in a marine engine, it could have been very materially increased with better firing of the furnaces.

In conclusion it may not be amiss for me to add, that all the elements of means and results here given were noted by myself, so far as it was practicabie to do so, and such as I had to transfer to the observation of others, were alone confided to my two assistants, who accompanied me on this occasion for such services. I am, respectfully, yours, &c.

CHAS. H. HASWELL.

JOHN B. KITCHING, Esq., New York.

[The amount of water evaporated by one pound of coal, by the boilers of this vessel, is greater than those of any other steamship with which we are acquainted. The economy of the fuel is attributable to the boilers, and if Capt. Ericsson planned them he deserves great credit, although it may be said there is little, if anything, new about them; the results, however, are good, and he who has accomplished any useful result, deserves the honor which is his just due.

The whole economy in fuel, however, in the *Ericsson*, is not superior to that of the steamer *Brandon*, a brief account of which was given on page 11, this volume SCIENTIFIC AMERICAN. That steamer made the voyage, with a full cargo, from Havre to this port, in 16 days—frequently running 12 knots an hour, with an average consumption of only 15½ tuns of coal per day.