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THE  
Steam Navy of the United States:

ITS  
PAST, PRESENT, AND FUTURE.

A LETTER TO THE

HON. GIDEON WELLES,

SECRETARY OF THE NAVY,

FROM

EDWARD N. DICKERSON,

OF NEW-YORK.

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New-York :

JOHN A. GRAY, PRINTER, STEREOTYPER, AND BINDER,

FIRE-PROOF BUILDINGS,

CORNER OF FRANKFORT AND JACOB STREETS.

1863.

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STEAM NAVY OF THE UNITED STATES

New York, January 22, 1882

Hon. Gustavus W. Wells, Secretary of Navy, etc.

The condition of the steam navy, as now existing, is  
 the result of the example of the "Oregon," and other of her  
 class, made under your administration, having attached much  
 public observation and proving the Navy Department also  
 very general public disapproval. I propose to call your attention  
 to a few of the facts of the case, in order that you may have  
 the means of avoiding the errors of the past in the conduct of  
 the future. I have the liberty of doing this because I have  
 watched attentively the progress of construction which has  
 been made, and have witnessed and formed the comparison  
 of the progress which has been made in the construction of  
 the navy from the beginning of your administration,  
 and being therefore perfectly familiar with the facts and details  
 of a deep interest in the success of our navy for our country's  
 sake. I think it my duty to address you on the subject now,  
 that doubts no longer need be entertained and things be  
 certain.

Before Mr. Isherwood undertook to dictate the plans for the  
 engines of the navy, all the plans in use had some form of  
 "cut-off" for working the steam expansively, and using the  
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 slide had a rate of speed equal to that of other engines of  
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When you assumed the office of Secretary, some of the  
 engines were made on the old plan, and

1863  
 J. M. Wells  
 Sec. of Navy

THE

## STEAM NAVY OF THE UNITED STATES.

NEW-YORK, January 6th, 1863.

HON. GIDEON WELLS, Secretary of Navy, etc. :

SIR: The condition of the steam-navy, as now exhibited to the world by the examples of the "Ossipee" and others of her class, made under your administration, having attracted much public observation, and brought the Navy Department into very general public discredit, I propose to call your attention to a few of the facts of the case, in order that you may have the means of avoiding the errors of the past in the conduct of the future. I take the liberty of doing this, because I have watched attentively the progress of construction which has now matured, and have foreseen and foretold the consequences of the ignorance which has controlled the engineering department of the navy from the beginning of your administration; and being therefore perfectly familiar with the facts, and feeling a deep interest in the success of our navy for our country's sake, I think it my duty to address you on the subject, now that doubts no longer need be entertained, and failure is certain.

Before Mr. Isherwood undertook to dictate the plans for the engines of the navy, all the ships in use had some form of "cut-off" for working the steam *expansively*; and among the engines using slide-valves the plan of cut-off on the "Iroquois," "Dacotah," and several others, was the best. These engines were satisfactory so far as their valve-gear was concerned; and the ships had a rate of speed equal to that of other men-of-war of their class in other navies.

When you assumed the office of Secretary, some ships were ordered hastily, whose engines were made on the old plans, of

which the Tuscarora, a good ship, was one; but after this you authorized Mr. Isherwood, in violation of all former practice of your predecessors, to reject the talent and knowledge of the country, and the experience of the past, and to construct all the engines for the navy in accordance with a mere hypothesis of his own, that he had printed in a book, the leading features of which are thus stated by himself: "The simplification of steam-engines—marine ones particularly—is of the first consequence to success and cheapness; and if it can be shown that complicated variable expansion-gear, *with a wide range and ability to cut off very short*, does not economize fuel more than simple fixed kinds, cutting off longer, and *attached to smaller cylinders* doing the same work, with the power graduated by the throttle, then a great step will have been taken in the right direction." (*Isherwood's Engineering Precedents*, vol. ii. p. viii.) This hypothesis, however, had never yet been subjected to the test of experience in our navy—it was contradicted by all experience on land-engines—and in theory is manifestly absurd, as you may see by reading Mr. Isherwood's book, written to defend it, where you will find every argument, *without exception*, demonstrably false, by applying to it the simplest rules of logic and the well-settled laws of nature.

Take one example of the nonsense by which this new hypothesis is attempted to be supported—it is the principal argument employed by Mr. Isherwood to show that a "cut-off" is not useful, and he devotes a large space of his book to its "discussion." It is this: Coal burned under a boiler only makes half the steam it would if *all* of its heat were converted into steam—the other half of the coal being consumed in heating the chimney to make draft, in radiating into space, and in leakage of steam. "It is plain enough now (says Isherwood) that any saving of fuel by the use of steam *expansively*, can only be made upon *that half* of the total fuel consumed which is applied to the generation of steam. Upon the *other half* the fact of expansion has no influence; and this at once produces a *practical reduction of one half in the theoretical gain of fuel, due to the measure of expansion employed for steam.*" (*Isherwood*, vol. ii. p. 49.)

I will not insult your intelligence, Mr. Secretary, by arguing

the self-evident proposition, that the steam produced by burning a certain amount of coal, is simply the *representative and equivalent of that coal*; and that any mechanical means by which the power of that steam may be *doubled*, or otherwise increased, *in its effect upon machinery*, must of necessity *double* or proportionately increase the power and value of the coal which produced that steam; and that it is immaterial to this result whether the coal consumed to make that steam did in fact make *all* the steam which chemists suppose it ought to make, or whether one half of it is spent in producing draft, or is wasted by reason of the imperfections of boilers. As it is childish ignorance to assert, as Isherwood does, that a saving of any proportion of steam which would otherwise be needed to produce a given result, is not a saving of the *exact amount of coal* which would be needed, under the circumstances of the particular case to make the steam thus saved, so it would be childish in me to spend time in *arguing* against the assertion, and I have no more to say of it. But as an American, I have the satisfaction of knowing that such profound ignorance as this is not all on our side of the water; for the *Artisan*, a leading English scientific paper—captivated no doubt by type, handsome binding, and gilt lettering, as many are—quoted this dogma with approbation, although I presume the author of the praise was not Engineer-in-Chief of the British Navy.

Having disposed of "*one half* of the theoretical gain of fuel" due to a cut-off, by this *convincing* dogma, he makes short work of the *other half* by confronting it with four other arguments, equally nonsensical, the chief one of which I will mention, not to refute it, for it does not require *that*, but to say that I have had the curiosity to try to ascertain in what class of society the ignorance it exhibits *properly* belongs, in a way which I will relate. The statement by Isherwood is this: "If any vessel filled with steam be a little enlarged, so as to allow the within steam to *expand*, though ever so slightly, condensation, produced by that expansion *per se*, will instantly take place, and proceed with continuously increasing rapidity until *all the steam be converted into water*, and this *without any aid from external cooling*." (*Isherwood*, vol. ii. p. lvi.) This I exhibited to my washerwoman, who at once showed that it did not belong to



her class, by informing me that she *knew the fact to be* that clothes washed and exposed to *dry on a freezing day*, when all the water in them is at *once turned into ice*, will in a short time "freeze themselves dry," (as she termed it,) "and they dry very white, Mr. Dickerson," said she; and she therefore concluded that if *ice, on a freezing day*, will evaporate — or *expand itself into vapor* — it couldn't be true that that *same vapor by expanding itself* would again turn into water and be frozen — either *per se* or otherwise, (she don't understand *Latin* — I only pay her for washing,) and I think she is right. I haven't tried any lower.

But no doubt as he read the book, in fine binding, created *all by himself*, Mr. Isherwood hoped his new ideas might be right enough if he could only get a chance to try them, and then laying down the pen, he offered himself ready to spend hundreds of millions of the people's money to test their soundness, and *you* placed the public purse in his hands and authorized him to begin. The fallacy of such *arguments* (if they be called so) might have been exposed at a cheaper rate.

Under this license, thus given him by you, Mr. Isherwood proceeded to shut the doors of his department in the face of the engineering ability of the country, and indeed of the world, and in due time the drawings came forth from which the future navy of the United States was to be built, exhibiting two sizes of engines, one for the gun-boats, and a larger size for the sloops. At the Allaire Works, where I was at that time building the "Hu Quang's" engine, Mr. Main, the gentleman who designed and drafted the engine of the "Iroquois," was the engineer, and he at once saw the gross defects in the machines, and in consequence of his representations the "Allaire Works" wrote to Mr. Isherwood, advising him, among other things, that the valves of the sloop engines could not work unless some means were devised to take off the steam pressure (about thirty tons) from their backs, whose weight would necessarily cause them to grind or "cut" the surface on which they were to slide; but Mr. Isherwood made a curt reply in writing, that they were just right as they were, and ordered the work to proceed—and it did. Some time afterwards, Mr. Isherwood seems to have been alarmed by some one else, in regard to this

particular defect, and he then attempted to patch up the original plan, when the work was partly done, by an arrangement for taking off the pressure, which does not work in practice—although there are many practical plans in use in the navy and elsewhere—and now the valves do “cut” themselves, and are useless, as Mr. Isherwood was warned they would be.

But, sir, I presume you will agree with me when I say that the country is entitled to have as good results produced under your administration, in the construction of our war-steamers, whose excellence is so important to our national existence, as had been attained in the navy before you took its control; and I shall proceed to show to you that instead, the ships now produced, and being produced, are vastly *inferior* to their predecessors, and practically useless. For this purpose I will take the “Iroquois,” as a type of the old ships; although there are superior plans in use.

The “Iroquois” is a ship of the same class as the “Ossipee,” “Lackawanna,” etc.—sloops-of-war of the large size, whose engines were built on Mr. Isherwood’s new discovery; and they should be at least as *fast, as economical of fuel, and as useful as she is*. If they are not, this inferiority must be in some particulars in which they differ from her; and these I will point out.

*First.* They both have Montgomery’s boilers, just alike; but the new ships have 8950 feet of heating-surface in their boilers, while the “Iroquois” has only 7500 feet, thereby giving the new ships a greater capacity to make steam than the old ones, and so far an advantage in the source of power.

*Second.* The new ships have blowers to their fires, whereby they can burn much more coal than the old ones, which have none, and therefore they ought to go faster, although of course they must burn more coal with blowers than by natural draft.

*Third.* Both ships have “surface-condensers,” but the Iroquois has a genuine “Pirsson condenser,” which has been for many years in practical use on our fastest ships, and which Mr. Isherwood certified to be good as used on the San Jacinto during the last Administration; while the new ships have an infringement of Mr. Pirsson’s patent, made for the purpose of enabling Mr. Sewell to apply to the tubes which compose the

machine, a certain patented method of his for making their ends water-tight, (not needed, however, in the genuine Pirsson condenser,) and to receive for that *useless service*, a large amount of money from the government.

*Fourth*, and principally. The "Iroquois" and her class have "a variable expansion gear, with a wide range and ability to cut off very short," which Mr. Isherwood has discovered not to be useful; whereas, the new ships have *no variable cut-off* at all, but have "smaller cylinders"—about two thirds of the capacity of those of the Iroquois—and are constructed in exact accordance with the hypothesis I have quoted above. Whether I am right in these facts, you can see for yourself in your own office.

What results have followed this change of plan from a *cut-off to no cut-off*—from *large to small cylinders*—from *Pirsson's condenser to Sewell's infringement of it*? You know, I presume, as well as I do, but the public do not, and I propose to let them into the secret.

The "Iroquois" can maintain a constant speed of eighty revolutions a minute, on a screw, whose pitch is increasing from nineteen to twenty feet, and can go with her smaller boilers, without blowers, eighty-six revolutions when urged, carrying thirty pounds of steam pressure. Her speed is from thirteen to thirteen and a half knots an hour; and she has performed satisfactorily a large amount of service, and become well known as an excellent ship.

The speed which the new ships can *maintain* on their screws is *nothing*, since they can not run at all continuously, for any considerable time. But the best results which could be got out of the "Adirondack"—now lost—was about seventy-five revolutions, on a screw of seventeen and a half feet pitch; and the ship never could go twelve knots an hour at sea. The "Laekawanna" has been run at the dock at Brooklyn, ninety-six hours, and in that short time she "cut" her valve-seats and broke one or more of her brass bearings, so that new "brasses" have to be made, and *two extra sets* are ordered for her, so as to furnish her the means of getting home again when she goes to sea. The "Monongohela," at Philadelphia, has cut down her valves when running at the dock, so as to be useless; and the "Ossipee" has reached "Monroe," with her valves cut, and her "Sewell"

condenser broken down. And any attempt to drive these engines up to the power of the boilers will result in disabling them in a few hours, as every engineer knows who knows the machines: so that it is *perfectly certain* that these engines *must come out of the ships*, and new ones take their places, before the vessels can be used for any purpose which requires the *ordinary speed of such ships* — which result no human ingenuity can avert. Of course, if the ships are not required to go at the usual speed, or are left at the dock, the engines are as well polished and handsome as any in use, and as useful.

I know the difficulties which surround you. The engineers of the navy, who make a living by driving the engines, and who wish to make it as easily as possible, dread the vengeance of Isherwood, who can make their places very uncomfortable, and they must keep silence; but if they can be indemnified against the consequences of telling the truth about these new vessels, they will give you a story that should astonish you. You have, however, no difficulty in ascertaining the facts. Order one of these engines to be run up to her boiler-power for a day, and have some one to see it done who is not under Mr. Isherwood, and the results will convince you that they must come out of the ship. No one of them can run so long, and no one of them can *maintain*, at sea, a speed of eleven knots. The simple truth is, sir, that these engines are in this dilemma; the cylinders are *so small*, in order to agree with the book I have quoted, that they can not run fast enough to work off the quantity of steam made by the boilers, at a pressure of twenty-five pounds to the inch, and of course the ships can't go; and if the pressure is raised to forty pounds, the valves are cut to pieces by excessive weight of steam, the brasses are destroyed by pounding, the engine would not last long enough to carry the ship to the Gulf, and the coal consumption would be so immense, if they could run, that the ship would be practically useless. And this dilemma is the direct result of your taking the tremendous responsibility of allowing one of your engine-drivers, because he could write nonsense in rows of figures, and had made money enough to print it in a book, to revolutionize at once, the whole system upon which the navy has been built, and for the sake of making engines so *simple*

that the firemen could become engine-drivers, and an engine-driver be relieved from attention, and be at liberty to enjoy the *military rank, gold lace, and sword*, with which they are invested, to sacrifice all the advantages which the science of half a century has produced, and at a single bound go back to the beginning, and place our ships at least twenty years behind the standard of to-day. It is a grave responsibility, Mr. Secretary!

But, sir, you have gone still further than this, and allowed this person to make the plans of a great number of side-wheel boats, (twenty-eight I am informed, are building,) which are equally ridiculous; although they will be able to run at some cost of fuel at some speed. I do not know whether any are yet in service, or how they are expected to operate; but I will show you a comparison by which to judge them, and will make a prophecy as to their results.

They, like the gunboats, are built upon the same idea of small cylinders and low rates of expansion. Their engines have each one cylinder of one hundred and sixty cubic feet capacity, with a *fixed* cut-off. The boats are two hundred and forty feet long, thirty-five wide, and twelve deep, drawing eight feet of water. To drive them they have Montgomery's boilers, with two hundred square feet of grates, and with two blowers to still further consume coal. How fast ought they to go? Let us judge by comparison.

The steamship "Eagle," belonging to Spofford & Tileston of New-York, whose engine has one of those variable expansion gears on it so abhorred by this new discoverer, is a ship two hundred and forty-five feet long, thirty-seven feet wide, and twenty-two feet deep, drawing thirteen to fourteen feet of water. Her cubic displacement is probably *nearly double* that of the government boats. She has only two hundred and seventeen feet of grates, on which to burn coal, against two hundred feet on your boats, and has *no blowers* to drive her fires, while yours have. Her boilers are not so good as yours, by at least one fifth, to make steam, as they are plain flue-boilers. The "Eagle" can go *three hundred and forty miles a day* with this two hundred feet of grates without a blower, simply by virtue of the fact *that she works steam expansively with a good variable cut-off* and exhaust valve-gear; and I have

no doubt she can tow one of your boats faster than it can go alone, although any one of them must burn *more coal a day than she does, since they have blowers, and only eight per cent less grates to burn it on.* And I have no doubt that the "Eagle" can *tow two of them backwards*; each burning more coal per hour *than she can burn* under any circumstances, and doing its best to prevent it. And yet your boats upon all principles, except for their worthless engines, ought to beat the "Eagle"—they can burn more coal than she can; they have better boilers to make steam; with about the same length, they are narrower, and draw only two thirds as much water; but you will find that the "Eagle" can go *four miles to their three* at least. If this result follows, Mr. Secretary, what will you say? Will you suffer the government and people to be disgraced by completing these twenty-eight boats to produce such results? Surely you can not say that the knowledge of building *side-wheel steam-engines* is confined to the engine-drivers of the navy, whose almost entire experience has been in running *screw-engines*, while the engineers outside of the navy have devoted themselves especially to side-wheel engines.

I mention the "Eagle" merely as a type; she is not the best, nor fastest, although I designed her valve-gear by which she does what she does. Others upon the same general plan produce better results, but she is just now running a route whose average time is well known, and she beats all predecessors in doing it, with less coal than any other ship of her size.

The steamboat "Hu Quang" is another instance worth mentioning. She is just exactly such a boat in plan as the "Plymouth Rock," or "Commonwealth," on Long Island Sound, and of nearly their size. Her engine is exactly of their size—seventy-six inches by twelve feet. She is arranged to carry *high rates of expansion*, and has a steam-jacket on her cylinder, which Mr. Isherwood has also discovered to be useless. Although a river-boat, she went all the way from New-York to China across the ocean, *at about the same rate of speed per hour* as the "Plymouth Rock," and her mate ran from New-York to Groton in the Sound, burning only a *ton of coal an hour*, while they burn *more than two tons*—they having the advantage of *fresh water*

*in their boilers*, clean fires, and smooth water to run in. In every particular of construction, except their *valve-gear and steam jacket* — she having such things as Isherwood denounces — they are her equals; and in the circumstances of their running they have an advantage, which I believe no engineer would estimate at less than twenty-five per cent in their favor. Their engines have the same *valve-gear* as your new boats have, but they are vastly superior to them in the greater size of their cylinder in proportion to the steam which their boilers can make. And yet such are the results, notwithstanding, that according to Isherwood, expansion only effects a saving of that part of the coal whose *particular quantity of heat* gets into the steam.

In respect to those side-wheel boats, it is not now too late to repair the damage, as most of them are only in progress, and such alterations may be made as to vastly improve them. In respect to the sloop engines, now in place, there is no remedy but to remove them; but those now building can be altered by taking out the cylinder and valve-gear, so as to save much of the remaining parts, while at the same time a fair result can be produced from them when altered.

If your Engineer-in-Chief would content himself with making useless the ships which are built under his orders and on his plans, it would not be so bad; but he does not rest there, and seems determined that no one else shall be allowed to produce for the Government any engines whose performance might be used to bring his into still greater contempt by contrast. Mr. Webb, of this city, is building a large ram for the Government, and is sincerely anxious to produce the best results which he can command. With that view he has employed, either directly or indirectly, the services of Mr. Main, the engineer who drafted the "Iroquois," and the drawings are made for a cut-off and valve-gear like that of the "Iroquois," "Tuscarora," etc. When it was known that Mr. Webb had adopted this plan—which is no doubt almost, if not quite, the best *slide-valve* gear—a strong protest against it was served on him from Mr. Wood, the resident superintendent here, and an engineer of the navy, urging him to use no expansive gear. Mr. Webb had the intelligence and manliness to refuse to give up a plan

which he knew worked so well on so many ships, for one which he knew worked so ill; and although, of course, he will be embarrassed and vexed in every way for his contumacy, his engines will not be reduced to the common level of worthlessness on which the others stand.

I hope, Mr. Secretary, that you will sustain Mr. Webb in his position; for I assure you it requires no small amount of conscience and courage to take it; for if he had no other end than to make money out of the Government by the work he has undertaken, he would have permitted Isherwood to ruin his engines on his own responsibility, and thus saved money, and avoided all responsibility for himself. If, however, there is any disposition to press him still further to abandon the well-settled plan of a cut-off, I have this statement to make which may be an argument in his favor: *It is not necessary to use the cut-off* on the engine if you have it there; so that at any time its action may be suspended in a minute, and it only requires five minutes on any engine to ascertain whether it will go better with than without a cut-off. If, however, you don't have one there, and it should turn out, after all, that saving of steam is really the same thing as saving the coal which makes the steam, then you have no way of availing yourself of this law of nature, (if it should happen to survive Isherwood's book,) and the engine is a failure.

The laws of nature, Mr. Secretary, are unlike the laws of man; they enforce themselves, and punish disobedience inexorably. They can not be persuaded out of their course by pamphlets, nor bought off by money, nor driven off by force. The United States, like all private persons, must submit to them; and the sooner that truth is learned in your engineering bureau, the sooner the country will be relieved from the disgrace of engaging in a conflict with the eternal principles upon which the existence of the universe depends, and of being ridiculously beaten by their invisible but certain power.

Very respectfully yours,

EDWARD N. DICKERSON.

P. S.—I herewith annex a copy of a letter on this subject, written by me to the *Times*, which explains itself.

Since it was published I have received some complaints,



through common friends, from some of the engineers of the navy, charging me with placing them on the same level of engineering skill with Isherwood, and claiming a better position. In reply, I have to say that such was not my intention; nor do I have any opinion of the skill or attainments of most of the engineers of the navy, for I do not know them. All that I meant to say was, that the Government employs these men for the purpose of driving their engines, and does not require of them, nor pay them for, any higher qualifications than such as fit them for that duty. Some merchants pay higher wages to engineers than Government does, and some lower, but on the average, the pay, the long absence of navy engineers and all things else considered, is about the same, and our best merchant engineers will not go into the navy. But for all this, it may be true enough that some of those engineers do possess a knowledge of all known sciences, and are really qualified to build ships as they ought to be built, only it is also true that they are not employed or compensated for this extra knowledge. I have a great respect and kindness for some of these gentlemen, as I have for several in their stations in the merchant service. I have been an engine-driver myself, and appreciate perfectly its duties and what it requires; but I can not say that a good engine-driver is qualified, *for that reason*, to alter settled plans with advantage, or to defy and overturn the results of the science of the world in respect to these very complex and difficult questions.

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NEW-YORK, Monday, Dec. 29th, 1862.

TO THE EDITOR OF THE NEW-YORK TIMES :

It is only when some great disaster occurs that the mind of the public and of Congress can be attracted to the defects in the administration of our public affairs which lead to such results; and as soon as the excitement produced by some such disgraceful example of our folly as the present impunity of the Alabama affords, has subsided, the authors of our disgrace hold up their heads again and proceed to reproduce the causes which will indefinitely reproduce disasters. Shall the present excitement bring us no better results? If not, I see no hope for our navy in the future—nothing but miserable inefficiency and constant national disgrace.

The fact now stands before the world that the rebel government has a cruiser at sea, carrying a sufficient armament for most purposes, which defies the entire navy of the United States — which paralyzes commerce, and compels us to transport our precious metals from one of our States to another, in English ships and through England itself, although we have some hundreds of war-steamers, and are building as many more of the same kind as can be supplied with machinery by all the machine-shops of the country. The explanation of this shameful fact is simple; and if Congress would attend to it the difficulty would not long be continued.

The whole reason why the Alabama can sail up to our coast with impunity is her *superior speed*. In the war of 1812, the Constitution was the pride of our navy and the terror of the enemy. Why? Simply because she could *outsail* the English ships. The enemy had many vessels of greater battery power — could hunt her with whole fleets of vessels her equals in power; but the Constitution never went to any fight in which she was inferior to the enemy, and never missed any fight in which she was superior. The whole British fleet had her becalmed in their presence off the Jersey shore, and if they could have persuaded her to stay would have captured her, of course; but the breeze sprang up and she sailed away, hovering near the flock of her pursuers until she picked up some of them that had got separated from their fellows—and she might have continued that game for a year with safety. The lesson the Constitution taught falls now upon listless ears, until it is repeated at our expense, to our shame and ridicule, by a foe who have no harbors, and but one man-of-war.

The Alabama is said to have a speed of *fourteen knots*. She carries a light armament of heavy guns, and a crew of one hundred and thirty men. With that speed she can carry her light armament and small crew away from or up to any proper war-steamer, with two exceptions, perhaps, (and they are old ships,) in the service of the United States; and the Vanderbilt is the only temporary war-steamer, outside of the regular navy, which can come up with her. The San Jacinto was lying in the neutral harbor of Martinique with the Alabama. She had a crew of five hundred men and a heavy armament; but of what use were they? The Alabama sailed away and left her!

The Navy Department may feel happy in contemplating the great battery and the noble crew of fighting men on board that ship, but without the power to carry them to the enemy they are but a useless expense to the people, and in effect a discredit rather than an honor to our country. What happened to the San Jacinto will happen to every other ship of the navy, with, perhaps two exceptions, if they ever fall in with the Alabama; and if the Vanderbilt meets her, and she can go fourteen knots, as they say, the chances are that, in a stern chase, she will disable the Vanderbilt's engines before she can be overtaken—for it must be remembered that the Vanderbilt can not maintain a speed to exceed fifteen knots.

The question, of course, comes, why is it that our navy wants the speed necessary to cope with such a ship as the Alabama, or such as hundreds of others belonging to other nations; and it can only be answered by declaring the willful stupidity and ignorance of the two departments of the navy which produce our men-of-war—the *Engineering* and *Construction* Bureaux.

Speed in a steamer is simply the measure of the relation between power and weight; and higher speed results only from diminishing weight, or increasing power, or both. Good model is the result of light weight, in proportion to the length and width of the ship; for within certain limits of length and width it is apparent that every pound of added weight either sinks the ship deeper in the water, or requires a "fuller model" to sustain it at a fixed draft, and in either case requires more power to drive it.

Before the present Administration came into power, the preceding ones had built only a few steamers, and had, among others, produced the Iroquois, a second-class sloop, built on plans furnished by a shop in this city. I mention her name, because she has become somewhat famous for her good qualities and her speed; and I observe in the *Herald*, to-day, her name mentioned as the only one of the screw-steamers of the navy which could overtake the Alabama. The Iroquois, however, is not a particularly good steamer, but she is so much better than all the recent ships of the navy as to make them them perfectly ridiculous by comparison. The merit of the

Iroquois consists not in lightness of model, but *in her power*, and her superiority in that is produced by working steam *extensively*, and using the best form of slide-valve "cut-off" now known. In other particulars, she does not differ materially from the ships of her class since built.

When Mr. Lincoln came into power, he appointed as Engineer-in-Chief of the Navy Mr. Isherwood—a person who had qualified himself by active political service, and was at the time one of the engineers of the navy. This person had recently made himself somewhat notorious by publishing a book, in blue and gold binding, announcing the remarkable discovery, made exclusively by him, that there was no advantage in using a "cut-off" on steam-engines, and that all the engineers of the world, from James Watt down, were ignorant in comparison with the author of that blue book. Of course, every one who ever paid the coal-bills for a steam-engine knows how utterly false this is; and I have too much respect for Mr. Isherwood's knowledge of what is well known in every steam-mill in the country by the most ignorant, to suppose that he believes it himself. But this book (the only book, by the way, I ever read, in which every material proposition, *without exception*, is demonstrably false) looked scientific, and Mr. Isherwood was appointed Engineer-in-Chief. The law under which this appointment was made did not give the President much choice; for this same Mr. Isherwood claims the merit of having got a provision into a statute requiring the Engineer-in-Chief to be appointed from the engineers of the navy, of whom he was one, whereby the number of eligible candidates was very small. Under this law, the best *engineer* in the world can not become Engineer-in-Chief, unless he will first become an *engine-driver* in the navy; and if the committee who passed it had any theory, it must have been either that no more knowledge is needed to control the construction of a navy than is required to qualify an engine-driver for a ship; or else that the United States had in its service, under the humble guise of *engine-drivers*, a body of *engineers* competent to decide the difficult and complex questions of construction—each one of whom, if out of the service, could earn much more than his wages as an engine-driver, in the intellectual and agreeable employment of studying the laws which control such

questions, and in improving engines for others' uses. Or, perhaps, like the Japanese grandees who came on board Commodore Perry's steamer at Jeddo, and were struck with such awe at the supposed power of the engine-driver, who with a crow-bar was working the valves of the engine to allow the steam to drive it, that they offered to purchase such a man for a large sum of money, our legislators had the impression that the engine-drivers who drive our machines must necessarily know all about the laws of steam and dynamics, and be qualified to construct as well as to drive an engine. But whatever may have been their reasons, they have made it impossible for the Government to have the services of any one as constructing engineer for the navy, except some person whose talents, up to the time of his appointment to this very important duty, have been of no more value to himself or to the world than to be spent upon the very useful but extremely simple problem of "standing around" a steam-engine so many hours a day, while the firemen kept it moving by feeding the furnaces with coal. And so Mr. Lincoln had to appoint one of these, and that one was Isherwood.

Having printed it in a book that a cut-off is of no use, (although there is not a steamboat nor a factory of any size in the United States, driven by steam, which does run or can run successfully without a cut-off,) Mr. Isherwood at once proceeded to put his discovery into practice, and tried his 'prentice hand on the gunboats. The history of those engines, if it were not so suggestive of national disgrace, would be laughable. Instead of making, or permitting others to make, engines as good at least as those of the Iroquois, he had the plans drawn at Washington, photographed and distributed to the various shops; and they had no cut-off. It was given out that the gunboats would be very fast, (the blue book said so,) and public expectation was at the highest. When the boats started, however, they were very slow and very expensive of fuel, besides being afflicted with other disorders, which may be better described by the term that the physicians use when the diseases are numerous and incurable—"a complication of disorders." These engines were the first, I believe, which were designed at Washington. Before them, the method was to invite proposals, accompanied by drawings, from the whole country, and then a

board of "engineers" sat to select the plans out of all presented—thus exercising a function of very inferior importance to that of creating the plans—and the engines were built by those who designed them. But Mr. Isherwood knew better than that—he had it all in his book bound in "blue and gold," and he invited no other man to aid the Government. If he had, the builders would have guaranteed results, and the Government would only have paid for what it got. Now the only redress is to be found in reading the book, where any one can see that Mr. Isherwood is right; and if the ships won't go, so much the worse for the ships.

There are some circumstances about these gunboats which are very suggestive, and I will mention them here, leaving others to draw the inferences. There is a plan of boilers known as "Martin's boilers," for which Mr. Martin got a patent from the Patent-Office, when he was Engineer-in-Chief. These boilers, from their construction, must be *high*, and if used in the gunboats must *rise above water*, and subject the men to a certain and horrible death by scalding, if the ship should be struck midships by a shot in action. Numerous other forms of boilers could be used as good as these, and yet be below water, but no patent fee could be got for them. Mr. Isherwood required the contractors who made these engines to use these boilers, and to pay Mr. Martin a fee for the patent before they could get their money from the Government. The patent, however, does not belong to Mr. Martin, but to Mr. Montgomery, to whom the Patent-Office issued it over the one granted to Mr. Martin, upon proof that he and not Mr. Martin was the inventor; and so the record stands this day. Yet Mr. Isherwood compelled the builders to pay Mr. Martin for a boiler which ought never to have been used at all, and the title to which, if it were to be used, was, by the judicial decision of the Government, acting through the Patent-Office, in another man. Mr. Montgomery has demanded his fees for it over again, but as the Government, by its Engineer-in-Chief, has compelled the builders to pay another man for his property, they refuse to pay him, and so he is defrauded. What does that mean?

Mr. Sewell has a patent for a particular way of making tight the ends of the tubes used in a "surface-condenser," and upon

the strength of that patent is supposed by some to be the inventor of a surface-condenser itself. His way of tightening the tubes is not a particularly good way, in my opinion, and certainly not so good as a well-known way of doing it which has been in use for thirty years. Mr. Sewell, like Mr. Martin, is also an Ex-Engineer of the Navy, and Mr. Isherwood's particular friend. When the plans for the engines were given out, a surface-condenser called "Sewell's," was required, and the contractors compelled to pay him his fees before they got their money. The object of the surface-condenser is to make fresh water for the boilers; but when the first of these machines started, it refused to perform that office, and the boilers were as salt as if no such machines were used. That it must have been so, is manifest enough from the drawings, without seeing it tried; that it is so, every one knows who knows the boats. Yet from that time to this, every other gunboat has the same machine in it, although, one after the other, they have all produced the same result. If any one wishes to know the facts in detail, let the builders be examined, or let the engineers of the boats be called and sworn. But while money is thus paid on compulsion for a machine which every builder and every engineer knows to have proved itself worse than useless in all these gunboats, Mr. Pirsson is the inventor of a *condenser*—not of a way of packing the tubes of one—and there was, and now is, unless destroyed, a certificate on file in the Navy Department at Washington, by Mr. Isherwood himself, that he used that condenser three years on the engines of the San Jacinto, when he was driving them, and that the water kept so fresh all that time in the boilers that no salt was ever blown off.

The cost of making these Sewell's condensers is so much more than that of making Pirsson's, that Mr. Pirsson has informed me he would be content to take the difference of cost for his patent fee—thus saving the other fee, and securing a well-known and efficient instrument. And to make the complication complete, these condensers so used under the name of Sewell's, are a plain infringement of one of Mr. Pirsson's patents, and he has demanded compensation for the use of it. What does all this mean?

The great merit claimed for these engines in not having a cut-off, was their simplicity—a merit which, when the engine-drivers on duty wear *gold lace, a sword* and gloves, and set the firemen to be engine-drivers, I am compelled to allow as necessary to be attained; but when several of these boats were required to go up the river from New-Orleans, they were broken down in their *valve-gear*, the very part where simplicity was so commended. And on the trial trip of one of these boats in New-York, the valve-gear was of such a very *simple* construction that the boat could not be stopped, and it ran over and sank a vessel loaded with shell at the Navy-Yard, costing thereby a large sum of money for simplicity.

And then, to complicate still further the diseases of these unfortunate gunboats, the Bureau of Construction lent a hand; and, when the boats were launched, they drew about a foot more water than they were calculated and coppered to draw; thus showing that the constructor could not *guess* within about two hundred tons the weight of vessels which ought to have been known to an inch. It was laughable enough to see them, as I saw them, coppering this top foot after the boats were overboard, by floating around them on a raft. Of course, if the Government had called upon the builder who built these boats, to construct them so that they would only draw the fixed draft, and yet carry the required weight, it would have been done; but the Bureau of Construction knew better than that, and furnished the models themselves, and we have the gunboats.

The same operations which so signally failed on these gunboats have been repeated on the sloops, and the general result is that the speed has fallen off below the standard reached before this reign of ignorance and presumption began; and now we see an enemy we are accustomed to despise, flying his flag in the face of our navy with impunity, upon a war steamer which can go to its own fights and stay away from any one's else, as it pleases; and when we ask for speed to pursue him, we must find it either in vessels built years ago, or in private ships temporarily used, whose machinery is liable to be disabled at once by a broadside.

And now, Mr. Editor, is it not time that this system should



be stopped? Either go back to the plan of inviting and using the talent of the whole country, and confine the Engineer-in-Chief to the duty of regulating the stations and services of the other engine-drivers in the navy, as before Mr. Isherwood's time it was, or offer a compensation for the service of some scientific *engineer*, which will command the abilities necessary to deal with these difficult problems, and exclude from the place men who use it rather to promote the personal interest of their particular friends, than to increase the power of the country in its struggle for existence as one of the family of nations. Will not Congress look to it that these outrages cease?

Of course, Mr. Editor, I know that in making this exposure I shall incur the enmity of a class interested in maintaining the present order of things. I have no other interest in it than to serve my country, if possible, by pointing out the true path to follow in this particular branch of its service; and knowing, as I do, the miserable results which have flowed from the present system, I could not conscientiously allow this occasion to pass without saying at least as much as I have said. When I see a man who certainly could not get employment in any private concern to decide any question of engineering, raised from the respectable but humble position of an engine-driver, to the responsible and important duty of fixing the permanent character of our navy, on his own responsibility, and without appeal; and when I see that man shutting the door against all the ability of the country, while at the same time he pronounces presumptuously that all the world's science is at fault in regard to a vital question affecting the speed of the navy; and when I see him spending hundreds of millions of the public money upon the faith of this presumptuous dogma of his own, unsupported by any man of recognized knowledge in the world, and in the face of notorious innumerable facts to the contrary, I should think myself an unworthy citizen if I longer kept silence. Whether in the clash of arms, and in the general decay of public honesty, I shall be heard, of course I can not foresee, but at least I have done my duty. VINDEX.

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