



XC. Description of an efficacious temporary rudder

Captain John Peat

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Description of an efficacious Temporary Rudder. 419

| | Time. | Hygrom. | Therm. | Electrom. |
|-----------------|------------|--------------------------------------------|--------|----------------------|
| June 4th. | 9 30 A.M. | 32 | 56 | divergence 1.25 inch |
| June 5th. | 3 30 P.M. | 30 | 53 | 1.1 |
| | 8 — | 29½ | 54 | idem |
| | 10 — | 24 | 80 | divergence 1.5 |
| Potash removed. | | | | |
| June 6th. | 11 0 A.M. | 35 | 53 | idem |
| June 7th. | 0 0 — | a moistened card placed in receiver. | | |
| June 8th. | 11 30 A.M. | 40 | 50 | divergence 1.25 inch |
| | 2 0 — | 40 | 61 | 1.5 |
| | 3 30 — | 37½ | 77 | struck 1 per minute |
| | 3 45 — | 37½ | 80 | 3 |
| | 4 45 — | 39 | 76 | 2.5 |
| | 5 45 — | 40 | 71 | 1.5 |
| June 9th. | 9 | another moistened card placed in receiver. | | |
| June 10th. | 6 0 P.M. | 42 | 60 | divergence 1.25 inch |
| | 6 40 — | 40 | 69 | 1.5 |
| | 6 50 — | 39½ | 73 | struck 2 per minute |
| | 7 25 — | 39 | 77 | 3 |
| | 8 0 — | 39¼ | 80 | 4.5 |

There are several circumstances deserving observation in these experiments, but one in particular; viz. that on the 5th of June, when the air had been dried by a long continued action of the alkali, the power of the column was not increased by a rise of temperature in its usual degree. Possibly the disks of paper had been also deprived of a part of the moisture which appears necessary to the action of the column.

XC. *Description of an efficacious Temporary Rudder.*
By Captain JOHN PEAT, of Bloomsbury Square*.

SIR,— I BEG to submit, through you, for the consideration of the Society for the Encouragement of Arts, Manufactures, and Commerce, a sketch of a temporary rudder, invented and used by me on board of the ship Cornwall under my command, on my voyage from this country to Jamaica, in January 1811; which ship was engaged by the Transport Board for the conveyance of 14 officers, 200 privates, 7 women, and 4 children, to Barbadoes.

In lat. 44° 0' long. 19° 30' on my passage out, I encountered a very severe gale of wind with a heavy sea, which carried away my rudder, and the rudder braces on the stern-post: I was,

* From *Transactions of the Society for the Encouragement of Arts, &c.* for 1813. — The gold medal of the Society was voted to Capt. Peat for this useful invention.

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therefore, under the necessity of fixing a temporary one from the best materials I had then on board. On reference to a plan of Pakenham's temporary rudder, I found it impracticable to fix a rudder constructed on his plan, on account of the heavy sea to which we were exposed. It was therefore absolutely necessary, for the preservation of the lives intrusted to my care, that I should set about the construction of a rudder, which could be brought to act in a heavy sea, or under any circumstances whatever. This, I am happy to say, I accomplished, after a progressive improvement of fifteen days, and found this machine, when substantially fixed, to act in every point with the same effect as the regular rudder. One of the great advantages of the rudder invented by me is, that it can be shipped and unshipped at pleasure with the greatest facility, and under any circumstances.

At my request, a survey was held upon this rudder by the principal officers of His Majesty's yard, and all the old masters of the ships lying at Barbadoes; who were unanimous in their opinion that the same was a better rudder than could be procured at that island; and recommended my proceeding with the ship in that state to Jamaica, which I had no hesitation in doing.

I have had the honour to submit a sketch of this temporary rudder to the Honourable the Elder Brethren of the Trinity House, who were pleased to speak in high terms of the invention, and have subscribed for twenty copies of the above-mentioned engraving for their use.

I am, sir,

Your most obedient humble servant,

No. 11, Bloomsbury-square,
Oct. 24, 1812.

JOHN PEAT.

To C. Taylor, M.D. Sec.

SIR,—BEING requested by Captain Peat to confirm and state the particulars of what I know respecting his invention of a temporary rudder, that he had made on board the ship Cornwall, then commanded by him, when on a voyage from England to Jamaica :

I lament that I am not in London, where I have some papers whereby I could give dates of particular occurrences, which I stated fully in the Barbadoes newspapers on our arrival there. However, I recollect that it was on the night of the 3d of January 1811 that the ship parted with her rudder, when it blew a perfect hurricane, and which continued, without any abatement, the succeeding day and night. When the storm subsided,

Captain

Captain Peat devised a plan of making a rudder, with a spare fore-top-sail yard fixed over the stern, and by means of blocks reefed on each side, it served as a kind of paddle. The first trial was not a successful one, for want of a sufficient weight to keep the paddle under water; but which was soon remedied, for I think that it was on the 10th of January the ship answered the helm, and we proceeded on our voyage, every day discovering some new improvements; inasmuch that on or about the 16th he fixed his helm to the wheel, and we proceeded the rest of the voyage without any interruption, unless it was by negligence of the man who steered.

So confident was I of the safety and utility of this new invention, that on my arrival at Barbadoes I proceeded in her to Jamaica, when I might have gone in other conveyances, a distance of 1000 miles.

At Barbadoes, the master-attendant of the king's yard proceeded to sea in the Cornwall, by directions of Admiral Laforey, for the purpose of forming an opinion of the new rudder. On his return to Carlisle Bay, he declared that he would have no hesitation to sail to the Pacific Ocean with the rudder. He took a drawing of it, which the Admiral was to send to the Admiralty Board.

This new discovery I cannot too much praise, as being the means of once preserving my life; and the fatigue and labour which Captain Peat endured in accomplishing this machine, had nearly cost him his, by a severe fit of illness brought on by anxiety and exertions. If Captain Peat can derive any benefit from the British Government for his discovery, and of which I have bore testimony, I will add to his merits, by stating his humanity in affording comforts to 220 recruits whom he had on board, together with their wives, who were in the most deplorable situation occasioned by the storm, when the ship was unmanageable, and it being necessary to throw their beds overboard: many were sick, and received nourishment from Captain Peat's liberality.

I have the honour to be, sir,

Your obedient humble servant,

Birmingham, Nov. 10 1812.

JOHN RICHARDS.

To C. Taylor, M.D. Sec.

SIR,—IT having been represented to us by Captain John Peat, late commander of the ship Cornwall of London, in our employ, then engaged in the Jamaica trade, that he had submitted, for the consideration of the Society for the Encouragement of Arts, Manufactures, &c. &c. &c. an engraving and model of a temporary rudder, invented and used by him on his passage from

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this country to Barbadoes in January 1811, to which place he was conveying 235 of His Majesty's troops :

We consider that it would be doing Captain Peat a great deal of injustice, were we not to give him every credit due for so valuable and simple an invention, the efficacy of which has been proved by the distance run in so short a time, and the documents we have in our possession, with the information received from many experienced nautical men of great respectability, who were aboard at the time, and had an opportunity of witnessing the great ease with which the vessel was steered on the different points of sailing under all sail, and from the high terms with which it has been spoken of in this country by nautical men of the greatest experience and respectability, it cannot fail of being of great utility to the public ; and we consider that great praise is due to Captain Peat for his perseverance and daily improvement in substantially fitting the machine, from the idea which first suggested the construction of it.

We have the honour to inclose a letter received from Mr. Lockwood, of His Majesty's Naval Yard, Barbadoes, accompanied with a sketch from that gentleman on the subject.

We have the honour to be, sir,

Your obedient humble servants,

THOMSON, OSBOURNE, AND Co.

Billiter-square, Nov. 12, 1812.

To C. Taylor, M.D. Sec.

GENTLEMEN,—I HAVE the honour to forward a sketch of the temporary rudder, by which Captain Peat governed the Cornwall to this island.

The apparent ease with which the ship reached this anchorage, the direct course she made under a press of sail, even studding-sails, and the account of its action, led me to investigate the circumstance minutely, and enable me to speak very confidently of its properties ; and, in order that you may have yet more information than I have time to write, I inclose the sketch with a Barbadoes paper. It was my first intention to send the plan to Mr. Robert Blachford, Chartseller, Minories, for immediate impression, and to propose giving him a right or title to the plan, by sending me 200 copies. Captain Peat suggested the idea of my sending it to you.

I therefore, gentlemen, beg your acceptance of my humble labour ; my sole wish was to render it public for the good of society, as in my opinion it not only supersedes Pakenham's rudder, which stands in such high repute, but every attempt of that nature hitherto made, and reflects the highest credit on
Captain

Captain Peat for his progressive improvement upon the rude idea that first presented itself.

I have the honour to be, gentlemen,
Your very obedient humble seruant,

A. T. LOCKWOOD,

Late Master R. N.

Naval Yard, Barbadoes,

Feb. 18, 1811.

Master-Attendant of Barbadoes Naval Yard.

To Messrs. Thomson and Co.

*Opinions of Officers in His Majesty's Royal Navy, respecting
Captain PEAT's Temporary Rudder.*

Captain LOSACK, of H. M. R. N., thinks that the simplicity of Captain Peat's temporary rudder is its great qualification, and never saw any thing so good under every circumstance; that it can be shipped in cases where Captain Pakenham's cannot; that few merchant-ships have spare caps; that every merchant-ship has the materials to form Captain Peat's rudder; that Captain Peat's method is much superior to that which was adopted by Mr. Nicholson, described in his "Treatise on Practical Seamanship," and as used by him for the Grafton and Elizabeth.

It appears to Captain Losack, that with Captain Peat's rudder a ship will tack, but not with the rudder described by Mr. Nicholson; which is a matter of great consequence.

Captain HANWELL, of H. M. R. N., is of opinion, that Captain Peat's invention can be executed by any merchant-ship, and readily shipped in any weather; that Captain Pakenham's rudder cannot be so shipped; that he has no doubt of a ship tacking with Captain Peat's temporary rudder. He adds, that he agrees generally with Captain Losack in the observations made by him.

Captain JACKSON, of H. M. R. N., thinks Captain Peat's temporary rudder has much superiority over every other invention for the purpose that he is acquainted with; that it possesses great simplicity, and that ships of all descriptions have the means of constructing it.

That in cases of heavy sea and bad weather, he is of opinion that it may be more easily applied than Captain Pakenham's rudder, but he thinks Captain Pakenham's rudder superior when once applied.

That Captain Peat's rudder appears to him more generally applicable to merchant-vessels and small ships of war than to ships of the line; that he cannot judge with precision of its power, from not having seen it in practice, but he believes it can tack in all common cases.

Reference to the Engraving of Captain PEAT's Temporary Rudder, which can be quickly fitted out by a Ship's Company when at Sea, and from such Materials as they always have on board. See Plate VI. fig. 1, 2, and 3.

Plate VI. fig. 3. shows all the part of this contrivance detached, and ready for launching over the ship's stern; fig. 1. shows an elevation of it in action; and fig. 2. a plan answering thereto. The invention consists of a top-mast, placed out of the ship's stern, having planks fixed at the end of it, which go edgeways through the water; the mast is attached to the stern by a kind of joint or socket, on which, by proper guys, it can be inclined in an angle, with the keel either larboard or starboard; and will steer the ship as effectually as a proper rudder.

To fit out a ship on this plan, the following materials must be collected and prepared as soon as the rudder is gone, or expected to be lost.

1st. A spare top-mast AB, fig. 2. and two top blocks *hh*, which must be securely lashed on at each end of it.

2d. A top-sail-yard CD, which must have cleats, nailed securely upon it, forming a shoulder at the end C, which is to be kept on board; and at the opposite end must be framed a case *eee*, formed of pieces of oak plank, nailed firm to the yard, on each side, the left or foremast part being chamfered off and leaded: so that by presenting a narrow edge it may make the less resistance in passing through the water.

As the taff-rail will not, in general, be found sufficiently strong to resist the force of the machine; a frame *klmn*, must be composed of substantial pieces of oak, and erected behind it, upon the deck; it consists of two uprights *mm*, set up from a sill *n*, which is spiked down upon the deck: and they support a rail *p*, which is firmly lashed to the taff-rail: and the whole is strengthened by three shores *kk*, stepped from the deck to the uprights *mm*: between these is supported a piece of oak *l*, $4\frac{1}{2}$ inches thick, with a hole through it, of a proper size to receive the end *f*, of the yard; the hole is leathered inside, in which the end *f* of the yard acts with perfect ease, and can swivel about in all directions; the tapered end *f* of the yard is leathered also, that the whole may act easily.

While these parts are preparing by one part of the crew, some should get the top-mast A athwart-ship, over her quarter, and make it fast by proper lashings; the others should be ready with the several tackles which rig it out, to give motion to the rudder when in the water. They are as follows: two principal guys, *aa*, made of rope which is $5\frac{1}{2}$ inches girt, and should be of very good materials; they are to be made fast to the boards

at

Capt.ⁿ Peats temporary Ships Rudder.

Phil. Mag. Vol. XLIII. Pl. VI.

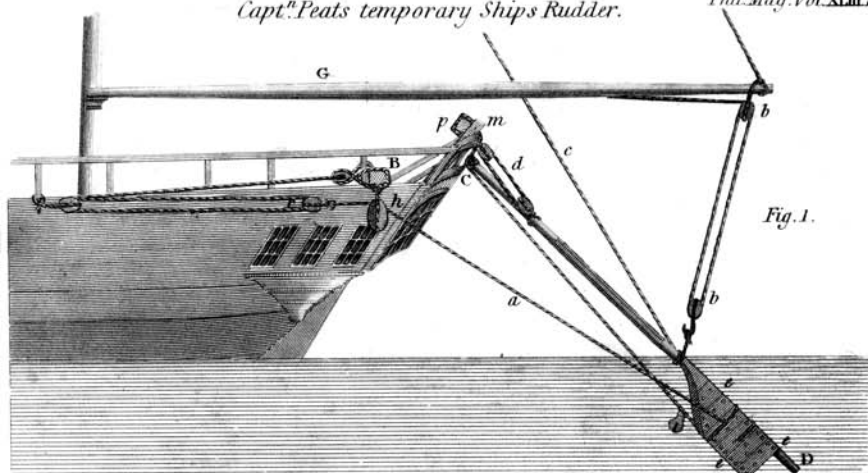


Fig. 1.

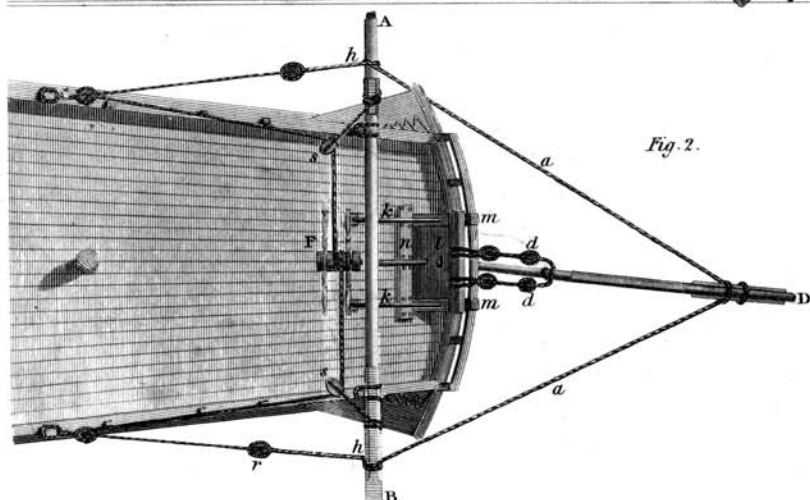


Fig. 2.

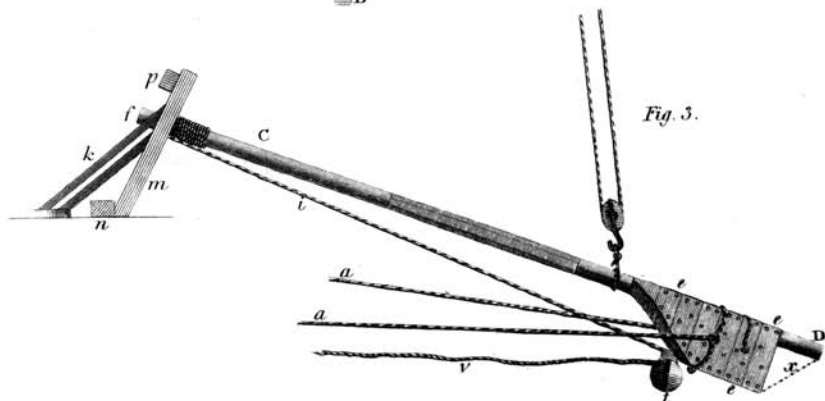


Fig. 3.

at *ee*, and carried through the top blocks at *hh*; the end has the block *r*, of a luff tackle purchase, turned in; the other block being lashed to one of the stanchions on the ship's quarter, and the fall carried through the leading blocks *ss* to the steering-wheel *F*, situated upon the ship's deck.

A topping-lift, *bb*, suspends the weight of the rudder from the spanker-boom *G*: it is a gun tackle purchase, and is of great use in getting the machine out of the water, and also to assist in getting it in; the fall of the purchase is carried along the boom to a cleat spiked to it.

c is another topping-lift from the rudder to the mizen-mast head; it likewise assists to get in the machine, as well as for a substitute, should either of the guys break; it should be $3\frac{1}{2}$ inch rope.

Two short luff tackles *dd*, fixed to the taff-rail and cross piece *p*: they are for the purpose of holding the end of the mast firm in the socket, and materially aid in placing and displacing it.

A jack-stay, *i*. This is a rope stretched tight from the planks at *ee*, to the other end of the mast; on this a weight, *t*, is suspended. The machine is ballasted sufficiently for common occasions when the ship is going less than eight knots; but this additional weight, consisting of shot sewed up in canvass, is to assist in keeping the whole of the machine in the water, when going more than eight knots; and when going less, to be hauled up by the line *v*.

The mode of operation in this machine will appear evident from the above description: the steering wheel *F*, being turned either way, acts to bring in the fall of one of the guys *a*, and give out the other, producing an inclination of the rudder, as in fig. 2, so as to put the ship about as expeditiously as a common rudder; and upon the same principle, viz. that of making a resistance to the ship's motion, on either side of her keel, at pleasure. The ship *Cornwall*, in which the contrivance was first tried, had her wheel fitted close to the rudder-head, and she steered with a short tiller abaft the rudder. In ships fitted in the common manner, the tackles would lead to their wheels in a similar way; the only alteration from the figure being, that the wheel is placed much further forward on the deck, and the leading blocks *ss*, are of course placed opposite to it.

Certificate and further Observations from Mr. A. Lockwood, Master-Attendant of H. M. Naval Arsenal, Barbadoes.

The *Cornwall* lost her rudder on the morning of the 4th of January, and got this machine over on the 7th at noon; arrived at Barbadoes on the 11th of February, and at Port Royal on the 23d. During the passage from Barbadoes to Jamaica, this machine

chine acted with great effect, the ship carrying royals and all studding-sails night and day, and for several hours together going 10 and 10½ knots; during which time she required less wheel than with the common rudder, and at no time did the temporary rudder require to make an angle of more than 10 degrees, either in the act of wearing or tacking.

This simple and truly ingenious method of governing a vessel in distress, I recommend earnestly to the notice of all persons subject to casualties, that may require an expedient of this kind; and although temporary rudders are no new subject, yet the one here delineated is unquestionably the best ever held to public view. Little more need be said in its praise, than the concurrent opinions of seven professional men (whom I know to possess clear judgement) that the rudder was superior to any that could be made at this island, and they had no hesitation in recommending Captain John Peat to proceed on his voyage to Jamaica, without any alteration in it whatever; and I can venture to assert, without hesitation, that the machine in question not only supersedes Pakenham's rudder, which stands in such high repute, but every attempt of that nature hitherto made, and reflects the highest credit on Captain Peat for his progressive improvement upon the rude idea which first presented itself.

The circumstances favourable to the machine are, first, its being composed of such materials as vessels of any description are possessed of; secondly, the simplicity of its composition superseding the absolute necessity of a carpenter; thirdly, that it may be constructed and put in action, even in a gale of wind, in two, or at most three hours. Its properties are, 1st, that it can be shipped at pleasure without delay, and with very little trouble; 2d, that it cannot, by any shock or violence, be rendered unfit or useless; 3d, that the guy tackle fall, being brought to the wheel, requires only the same force to steer as the common rudder; that the ship is under complete command, as will appear by the ship's log-book, in all the following cases:

“Gale of wind, heavy sea, wind quarterly.”

“Light winds, heavy swell.”

“Fresh wind, spanker, main-sail and all sail, on a wind, off the wind.”

“Staying and wearing.”

The sole object of this, my humble labour, being to promote, in however small a degree, the good of the nautical world; I cannot in justice drop the subject without suggesting what, in my opinion, would be, with little additional trouble, a very great improvement. The body of dead water occasioned by the flat open part *x*, of the planks at the end of the yard, tends to impede the ship's progress, and to force the case upwards, which
consequently

consequently strains the guys when going very quick. The dotted lines at *x*, fig. 3, I propose to be a piece of plank to be continued on the end of the topsail-yard, so formed or filled up as to carry off the body of water complained of.

(Signed) ANTHONY LOCKWOOD.

XCI. *Report of the Progress of the Sciences in France in 1813.*

By J. C. DELAMETHERIE*.

ANIMAL PHYSIOLOGY.

On the influence which the temperature of the air exercises in the chemical phenomena of respiration.

RESPIRATION has been latterly regarded as a kind of combustion, viz. that of the carbon and hydrogen contained in the venous blood. The oxygen absorbed by this combustion forms carbonic acid and water.

It has been endeavoured to ascertain the quantity of atmospheric air which a man of a middling stature inspires at each inspiration, and expires at each expiration. It has been supposed that it was from 20 to 30 and even 40 cubic inches; but I have shown that this supposition is not correct. A man of a middling stature inspires only a few inches of atmospheric air. Now the atmospheric air contains only about one fifth oxygen, or 0.21.

In the act of respiration a very small portion of this oxide inspired is combined with carbon, and forms carbonic acid.

Another portion of this oxygen is combined with a portion of inflammable gas, and there is a production or disengagement of water. But the greater part of this light portion of oxygen is not combined, and it is found in the air expired mixed with carbonic acid.

But Delaroche, like myself, has discovered that there is a *production of azote*.

He made a great number of experiments in order to determine the influence which the temperature of the air exercises in the chemical phenomenon of respiration. He placed at different temperatures animals in *manometres* or glass vessels with large apertures, hermetically closed by copper plates and screws. If we compare, he says, the results of the experiments made on one and the same animal placed in the same circumstances and at *different temperatures*, we shall see that almost in all the experiments upon the cold-blooded animals, the quantity of oxygen absorbed was a little greater when the temperature was low than when it was high.

* Abridged from the *Journal de Physique, de Chimie, et d'Histoire Naturelle*, for Jan. 1814.