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FRIDAY, JULY 23, 1858.

Colonial Secretary's Office,
Auckland, 23rd July, 1858.

HIS Excellency the Governor has been pleased to appoint

WALTER HARSANT, Esq., Resident Magistrate,

to be Coroner at Raglan.

E. W. STAFFORD.

NOTICE TO MARINERS.

Colonial Secretary's Office,
Auckland, 23rd July, 1858.

THE following Notice, respecting the Sunken Reef off Apollo Bay, Victoria, describing certain Beacons which have been erected to mark the position of the reef in question, is published for general information.

E. W. STAFFORD.

1. Commanders of vessels navigating between Cape Otway and Port Phillip Heads, are hereby informed that Four Pillar Beacons, each surmounted with a Ball, have been erected on the coast, to mark the position of a sunken danger now known as Henty's Reef, lying eleven miles north 54' 30" east from Cape Otway Lighthouse, and about two miles south 40' 30" east from Cape Bunbury, which forms the south-east point of Apollo Bay. This reef has not more than eighteen feet of water over it, is steep too, having ten fathoms all round within a cable's length of its shoalest part, and as the sea only breaks on the reef occasionally in bad weather, vessels must give it a good berth in passing.

2. The above mentioned beacons are erected two on Point Hayley, situated about nine miles north-east from Cape Otway, and two on Cape Bunbury, situated about eleven miles north-east from Cape Otway.

3. The Point Hayley beacons are painted, the inshore one white, the seaward one black; they are six hundred feet apart, and bear from each other east a quarter north, and west a quarter south.

4. The Cape Bunbury Beacons are painted, the inshore one white, the seaward one red; they are six hundred feet apart, and bear from each other south-east half south, and north-west half north.

5. The position of the reef is marked by the intersection of two lines, the one drawn through the beacons on Point Hayley, the other through the beacons on Cape Bunbury.

6. Vessels bound to the north-east must keep the black beacon on Point Hayley well open to the northward of the white one until the white beacon on Cape Bunbury opens well out to the north-east of the red beacon.

7. Vessels bound to the south-west must keep the red beacon on Cape Bunbury well open to the southward of the white one until the white beacon on Point Hayley opens out well to the south-west of the black beacon.

Commanders of vessels can have the position of this reef marked on their charts at the office of Ports and Harbors, Williamstown.

The depths are at low-water spring tides; bearings are by compass.

CHARLES FERGUSON,
Chief Harbor Master.

NOTICE TO MARINERS.

Colonial Secretary's Office,
Auckland, 23rd July, 1858.

HIS Excellency the Governor directs the publication of the following Prospectus of an Invention for generating Fresh Water from Sea Water.

E. W. STAFFORD.

NORMANDY'S PATENT MARINE AERATED FRESH WATER COMPANY.—[LIMITED.]

PROSPECTUS.

This Company have become the proprietors by purchase of Dr. Normandy's invention for producing pure aërated fresh water from sea water:

The invention is secured by Letters Patent in the United Kingdom, and in France, Prussia, Belgium, and Holland.

The Company are now applying for Patents in Russia, Austria, and the United States.

The advantages of the apparatus constructed upon Dr. Normandy's principles over the machines which have been heretofore in use, are:—1. That it *aërates* the water, and thus makes it pure, wholesome, and immediately fit for drinking, whereas all other plans for producing fresh water from salt water merely proceed on the principle of a common still, and the water produced by them requires to be aërated by agitation in the tanks or other artificial means, and even then is not only very imperfectly aërated, in consequence of which it remains vapid and indigestable, but is at the same time exceedingly susceptible of being tainted by any impurity in the atmosphere by which it is surrounded.—2. That it produces double the quantity of fresh water from the same amount of fuel.

The apparatus was brought under the notice of his Grace the Duke of Newcastle, when Secretary at War; and, for the purpose of practically testing, for his Grace's satisfaction, the working qualities of the machines, one of them was fixed on board the North of Europe Steam Navigation Company's ship "Levant," during her passage from London to the Crimea with materials for the Balaklava Railway.

The paper marked A, in the Appendix contains copies of the Reports made by the officers and passengers on board the ship on that occasion.

Lord Panmure having succeeded the Duke of Newcastle as Secretary at War, twelve of the machines were, under his Lordship's orders, erected on the Island of Heligoland, for the purpose of supplying fresh water to the Foreign Legion stationed there. The result was entirely satisfactory to Admiral Sir John Hindmarsh, the Governor of that island, and to Lord Panmure.

The paper marked B, in the Appendix, contains copies of Testimonials and Letters to that effect.

By order of Dr. Andrew Smith, the Director-General of the Medical Department of the Army, and with the entire approval of Lord Panmure, the Company has supplied one of the machines for the use of the New Military Hospital established at Suez.

The paper marked C, in the Appendix, will corroborate this statement.

The Peninsular and Oriental Steam Navigation Company are now erecting at Aden, for the use of their establishment there, two of the Company's machines capable of producing together 5000 gallons of fresh water per diem.

The Royal Mail Steam Packet Company, having tested the machines, by using one on board their magnificent ship, the "Atrato," on several voyages to St. Thomas's, have not only decided on retaining it for permanent use on board that ship, but are also proceeding to fit the machines on board the other ships of their fleet.

The paper marked D, in the Appendix, will show that, by using the apparatus, they have been enabled to remove a portion of their water tanks, and thus to make room for thirty tons more cargo, the saving thus effected paying for the apparatus in one voyage.

The apparatus is as valuable on land as at sea, and would be of great service at any town on the coast deficient in a supply of water. It might be made available for producing water on a large scale for the use of the town, either by its adoption by a public company, or by being used by the inhabitants on a more limited scale for the supply of their own personal necessities. Every house, in close proximity with the sea, might be fitted with a small machine capable of producing the water required for daily consumption, and, as the apparatus is self-acting, any servant of ordinary intelligence could attend to it.

The Prussian Government has just ordered one of the Company's machines for erection on a new corvette, building at Dantzig.

And not only is the apparatus essentially applicable to the production of fresh water from sea water, as already stated, but ordinary river, spring, well, selenitous or hard waters of every description, and however charged with lime or other salts, can thereby be made to yield, at an extraordinarily cheap rate, an unlimited quantity of absolutely pure water, and be thus rendered available in several manufactures for which such a liquid is an essential requisite; as, for example, in saltpetre refining, gunpowder making, dyeing, and for brightening colours in calico printing.

The paper marked E, in the Appendix, is a copy of a Testimonial from Messrs John Hall and Son, the eminent gunpowder manufacturers, who have had two of the Company's machines in operation for some time at their works at Faversham.

Several of the machines are also in successful operation on the west coast of South America.

Full particulars of every kind may be had on application to the Secretary, at the Company's Offices, 9, Lancaster Place, Strand, W.C.

APPENDIX.

REPORTS AND TESTIMONIALS.

(A)

Constantinople, Feb. 6th, 1855.

The Engineer being unable to spare steam until the departure of the vessel from Gibraltar, the apparatus was not worked until Thursday, the 25th January, from which day it was worked continuously (Sundays excepted) until its arrival at Constantinople.

The water was made use of for drinking purposes on board, and was pronounced by all the passengers as most delicious.

The apparatus, when set to work, required not the slightest attention; but, after adjusting the necessary taps, supplied itself with steam and sea water continuously, the brine having a constant flow into the bilge; not the least sign of encrustation appears on any of the pipes.

It may be as well to state, that the waters in which this apparatus has been tried contain salt in solution in the proportion of 2 in 32.

WALTER BONARIUS,
Master.
GEORGE WILTON,
Chief Engineer.
ALFRED WILTON,
Superintendent Engineer,
Crimean Railway Fleet.

Constantinople, Feb. 7th, 1855.

We, the undersigned passengers on board the North of Europe Steam Navigation Company's ship "Levant," on the service of the Crimean Railway Expedition, have much pleasure in stating that the water supplied for our drinking, distilled from sea water, we have found most palatable, and, in fact, superior to any we have received from the ship's supply.

THOMAS FAYERS,
Crimean Railway Missionary.
CHARLES J. COVERNTON,
Surgeon.
ALFRED WILTON,
Superintendent Engineer,
Crimean Railway Fleet.
JAMES LEWIS,
Agent to Peto and Co.
WILLIAM CURRY,
Agent to Peto and Co.
F. F. HELMS.

(B.)

Heligoland, May 6th, 1856.

Sir,—As Lord Panmure was pleased to give me certain directions relative to the erection of Dr. Normandy's apparatus for distilling sea water, and that process is a new one—it is with much satisfaction that I have the honour to report, for his Lordship's information, the eminent success of that measure.

1. The machine has been some time at work, producing about 2100 gallons per day of the *very finest water*, and is capable, I am informed by Lt. Lempriere, the Commanding Engineer, of producing, by keeping the fires at work night and day, at least 5000 gallons.

2. This supply is most opportune for the island, on account of a very long drought; the water is issued, not only to the military, but at my request, to the inhabitants also, who feel very grateful, knowing that, but for this unlooked-for-supply, they must have suffered much inconvenience, perhaps distress, and should the drought continue, further measures may become necessary, such as a limited quantity per head.

I have, &c.,
J. HINDMARSH.

The Right Hon. H. Labouchere.

War Department, May 22nd, 1856.

Sir,—With reference to the correspondence which has taken place, relative to the erection of your Marine Fresh Water Apparatus at Heligoland, for the purpose of supplying the British Foreign Legion at that station with good and wholesome water, I am directed to acquaint you that Lord Panmure has received, with great satisfaction, a despatch from the Lieutenant-Governor of the Island, bearing testimony to the success which has attended its operation. His Lordship has much pleasure in furnishing you with a copy of this testimonial.

I am, &c.,
JOHN CROOMS.

H. H. Williams, Esq.

London, June 17th, 1856.

My dear Sir,—In reply to your inquiry respecting the distilled water at Heligoland, I have the pleasure to inform you that it is found very good.

Remaining my dear Sir, faithfully yours,
HENRY STEINBACH,
Colonel Commandant.

J. Stocqueler, Esq., &c., &c.

(C).

War Office, November 2nd, 1857.

Sir,—I am directed by Lord Panmure to acquaint you that his Lordship has decided on sending to Suez an Apparatus upon your plan for the distillation of salt water; and he requests, therefore, that you will be so good as to state what arrangements it will in your opinion, be desirable to make with a view to secure the proper working of the Apparatus on its arrival at Suez.

I am, &c.,
H. STORKS.

To Dr. A. Normandy, 9, Lancaster Place.

Army Medical Department,
November 16th, 1857.
17270—B. F:

Sir,—The Minister for War having sanctioned the expenses shown by your estimate to be necessary to supply the Apparatus referred to in previous communications, and to have it erected at Suez, I have to request you will be pleased to have it furnished with the least possible delay.

I have, &c.
A. SMITH, Director-General.

To Dr. A. Normandy, 9, Lancaster Place.

(D.)

Royal Mail Steam Packet "Atrato,"
Southampton, September 29, 1857.

Sir,—We have great pleasure in informing you that your Apparatus fitted on board this ship has *worked admirably* during the voyage hence to St. Thomas and back, and gave us no trouble whatever, distilling 18 gallons per hour, sea water 70 degrees; 17 gallons per hour, sea water 82 degrees; the distilled water received at the filter having the same temperature as that of the sea water, and being produced in equal proportions of aërated and condensed water fit for the table.

The water is *beautifully clear* and *equal to any water that can be used*, and was as much in demand on board as that received at Southampton. From the little room occupied, and the ease with which water can be had, Dr. Normandy's Marine Aërated Fresh Water Apparatus in time will become one of the requisite appliances in first class passenger Ocean ships. From the certainty with which good water can be had fit for the table, *a portion of our water tanks has been removed*, thus making space for 30 *Tons more* of Cargo, &c.

We are, Sir, your obedient Servants,
F. WOOLLEY, Commander.
JAMES WILKIE, Chief Engineer.
WM. VINCENT, Marine Superintendent.

Dr. Normandy,
Patent Marine Aërated Fresh Water Company.

Royal Mail Steam Packet "Atrato,"
Southampton, November 16, 1857.

Dear Sir,—I beg to inform you of our arrival here on the 14th instant; also to say your Apparatus *worked well* all the way out and home.

I am, &c.,
JAMES WILKIE.

To Dr. Normandy,
Patent Marine Aërated Fresh Water Company,
9, Lancaster Place.

Southampton, November 17, 1857.

Dear Sir,—In reply to your note of yesterday, I have *again* the pleasure to inform you that your Patent Aërated Fresh Water Distilling Apparatus gave every satisfaction during the last voyage of the "*Atrato*."

Yours truly,
ROBERT RITCHIE.

To Dr. Normandy,
Patent Marine Aërated Fresh Water Company.
9, Lancaster Place.

(E).

Faversham, December 17, 1857.

Sir,—We have had your Patent Distilling Apparatus for the production of pure water in operation for some time, and it is satisfactory to us to be enabled to testify our approbation of their utility.

We are, &c.,
JOHN HALL AND SON

To Dr. Normandy.

ON THE PRODUCTION OF FRESH WATER FROM SEA WATER.

BY DR. A. NORMANDY.

Sea water is, as everybody knows, a liquid, which contains from three-and-a half to four per cent. of saline substances, two thirds of which are common salt, and also a certain portion of organic matters, which impart to it its well-known odour and taste, and render it unfit for drinking or other domestic purposes.

The accidents resulting from an insufficient supply, or from an absolute want of fresh water in sea voyages, the difficulty of preserving in a pure state that which is stored up, or of procuring a fresh supply of it when it is exhausted, the valuable stowing room occupied by the tanks containing this most important fluid, have induced many people at various times, and for a great many years past, to contrive apparatuses by means of which sea water could be rendered fit to drink.

At first sight, one would think that it is sufficient to submit sea water to distillation to convert it into fresh water, and that the solution of the problem is altogether dependant upon a still, constructed so as to produce, by evaporation, a great quantity of distilled water, with a consumption of fuel sufficiently small to become practicable.

Distillation at a cheap rate is, doubtless, an important item, and fuel being a cumbrous and expensive article *on board ship*, it is superabundantly evident that, supposing all the apparatuses which have hitherto been contrived for the purpose to answer equally well, that one would clearly merit the preference which would produce most at the least cost; but there are besides other desiderata of a no less primary importance, and it is from having neglected, ignored, or been unable to realise them, that all the apparatuses for trans-forming sea water into fresh water, which have from time to time been brought before the public, have hitherto, without exception, proved total failures, or (after trial) have been quite discarded, or fulfil the object in view in a way so imperfect or precarious, that, practically speaking, the manu-

facture of fresh water at sea may be said to have been until now an unaccomplished feat.

The other desiderata above alluded to are these:—

When water, whether salt or fresh, is submitted to distillation, the condensed steam, instead of yielding, as might be supposed, a pure, tasteless, and odourless liquid, has *always* an almost intolerably nauseous, empyreumatic taste and odour, which it retains for many weeks. This taste and odour are so disagreeable, and the water so produced being, as is the case with ordinary distilled water, deprived of air by boiling, is on that account, so heavy, indigestible, and vapid, that the crews invariably refuse it as long as they can obtain a supply from natural sources, even though this may be of so bad a quality as to endanger their health or their lives, as evidenced by the report of the *Times* own correspondent, in reference to the water supplied to the crews of our ships in the Baltic during the late war.

With a view to remedy these defects, chemical re-agents, such as alum, sulphuric acid, muriatic acid, chlorine, chloride of lime, &c., to be added to the distilled water, have been proposed; but it is evident that the continuous and daily absorption of chemical re-agents might, and doubtless would, cause accidents of a more or less serious nature, not to speak of the trouble and care required in making such additions, an excess of which might be attended with dangerous, and possibly with fatal consequences; besides, as a general rule, we have the authority of Liebig to say, that the use of chemicals should never be recommended for culinary purposes, for chemicals are seldom met with in commerce in a state of purity, and are frequently contaminated by poisonous substances. On the other hand, the pumps, ventilators, bellows, agitators, the percolation through porous substances, through plaster, chalk, sand, &c., which have been proposed to aerate the water obtained, and render it palatable, are of a difficult, inconvenient, or impossible application; they are costly, complicated, bulky, or unmanageable; and as to leaving the distilled water to become aerated by the agitation imparted to it in the tanks by the motion of the ships, the report of the correspondent of the *Times*, above alluded to, shows that this method is attended with but indifferent success. I shall presently explain why no system or method of aeration whatever could be attended with success except under certain conditions, and unless it be done in a certain manner, conditions and manners realised in my apparatus.

Another desideratum lost sight of in the endeavours which have been made to accomplish the object (and it is a condition of extreme importance) is to obviate, or prevent the deposit of saline matter which takes place in the apparatus when the limit of saturation has been attained, and which, in a short time after use, interferes temporarily at least, often premanently, with the working of the apparatus, renders frequent repairs necessary, and in all cases eventually destroys it.

The expansion of metals by heat and their contraction by cold, is another source of failure; so much so, that it can be most truly asserted, without fear of contradiction, that any fresh water distilling apparatus for marine purposes, in any part of which solder is employed, is *ipso facto*, defective, and ought not to be trusted, the soldered parts being sure to give way from the cause just alluded to, and this perhaps (as the event has unfortunately more than once proved) at a time when the machine was most wanted, its unsoundness thus creating the most distressing sufferings, and putting the lives of all on board in imminent jeopardy.

The question, which has hitherto been left unanswered, and yet which must be integrally solved before success could be hoped for, is the following:—

> *To obtain, with a small proportion of fuel, large quantities of fresh, Inodorous, Salubrious, Aerated Water, without the help of Machinery or the Chemical re-agents, by means of a small and compact Apparatus, incapable of becoming incrusted, or otherwise going out of order.*

It is to the solution of this difficult and complex problem that I now beg to call attention, and I will proceed to explain the construction of the apparatus by which the object is attained.

It is a known property of steam that it becomes condensed into water again whenever it comes in contact with water at a temperature lower than itself, no matter how high the temperature of that condensing water may be. It is known that the sea and other natural waters are saturated with air containing a larger proportion of oxygen and of carbonic acid than exists in the air we breathe. Experiments which I undertook several years ago, with a view to determine that amount, showed me that whilst ordinary rain water contains, on an average, about 15 cubic inches of oxygenised air per gallon (of which 15 cubic inches of air per gallon, about 6 cubic inches are carbonic acid), sea water, owing to the various substances which it holds in solution, contains only, on an average, about 5 cubic inches of oxygenised air per gallon, of which 5 cubic inches about 0.6 or 0.7 cubic inch are carbonic acid, or, in other words, one gallon of sea water contains about two-thirds less air than ordinary rain or river water. I have also ascertained that air begins to be expelled from such waters, when the temperature reached about 130°. Fahr. Now, my apparatus consists of two parts—an evaporator and a condenser—joined so as to form one compact and solid mass, screwed and bolted, without solderings or brazings of any kind. The evaporator consists of a space which is pervaded by steam-pipes containing steam, and immersed in a certain quantity of sea water, a portion of which is to be evaporated; steam, at a pressure of about seven pounds, is then admitted into the steam-pipes of the evaporator,

which steampipes are constantly surrounded by the sea water to be operated upon, and which thus becomes heated by them. The steam is procured on board of steamers directly from their boilers, and, consequently, at a trifling cost; in sailing-ships it is obtained from a small boiler, which may or may not be connected with the hearth, galley, or caboose.

The steam of the above-mentioned pressure being of course hotter than ordinary boiling water, serves to convert a portion of the water contained in the evaporator into ordinary or *on-pressure* steam, which, as it reaches the condenser, is resolved therein into fresh water. By thus evaporting water under a slight pressure, one fire performs double duty, and thus the first condition, that of economy, is completely fulfilled, for whilst, in the usual way, 1lb of coal evaporates 8 or 9lbs. of water, the same quantity of coals is thus made to evaporate 16 or 18lbs of water. In fact, I am in a position to prove by actual experiment, that from the same amount of steam or of coals employed, the machine which I have just described will produce double the quantity of fresh water that can be obtained by simple or ordinary distillation, and I may say, that with an apparatus constructed on the same principle, and which was sent to Copiapo, in Chili, not less than 30,000 gallons of fresh water per diem are obtained from the sea.

The steam issuing from the evaporator, and which is condensed by the water in the condensor, imparts, of course, its heat to the sea water in it, and as this water is admitted cold at the bottom, whilst the steam of the evaporator is admitted to the top of the condensor, the water therein becomes hotter and hotter gradually as it ascends, and when it finally reaches the top, its temperature is about 208 ° Fahr.

I have already stated that water begins to part with its air at a temperature of about 130 ° Fahr., therefore, the greater portion of the air contained in the water which flows constantly and uninterruptedly through the condensor is thus separated, and led through a pipe into the empty space left for steam room within the evaporator, when it mixes with the steam.

Now, as about six gallons of sea water must be discharged for every gallon of fresh water which is condensed, it follows that the steam in the evaporator, before it is finally condensed, has been in contact with twice as much air as water can take up, the result being a production of fresh water to the maximum of aeration that is, containing as much air as in pure rain water, whilst, the upper part of the condensor being open to the atmosphere, all pressure is thus removed from the apparatus.

This aeration of the water is a condition of the utmost importance, and, in fact, is a condition which, were it not accomplished, would render the apparatus comparatively useless, even though the other desiderata were fulfilled. When the natural waters supplied to our habitations are obtained from impure sources, as is unfortunately too often the case, the evils resulting from their use may in some degree be remedied by putting in practice the recommendation which has been sometimes made of boiling such water previous to employing is as a beverage; unfortunately, the water being thereby deprived of air and of carbonic acid is, like distilled water, though in a less degree, unpalatable, and vapid, and heavy; it is, in fact of difficult digestion; but there is something worse than that; water which has been boiled, or which has been distilled, by reason of its containing *no air*, has a great tendency to absorb or to take *air* from the media where it is kept, so that if distilled water, which contains no air, be kept in a ship's hold, or in an impure and confined place, it will absorb precisely the quantity of air which it can absorb, namely, 15 cubic inches per gallon, and if that air be loaded with organic particles or impure emanations, it will soon become fetid and putrid. Thus water, though distilled, if kept in tainted rooms, will soon become foul. The empyreumatic odour and taste which distilled water always possesses and retains for a considerable time, is in fact due to the destructive action, of the heated surface of the vessels in which the water is boiled, on the organic substances which are always floating on the air, on those indescribable particles of dust which are seen playing or moving about in a sunbeam, and which have been dissolved or taken up by the water before its distillation. That water has the power of absorbing and dissolving organic matter in this way is, of course, well known, but it may be illustrated in a very simple manner, as follows:—If water, from whatever source, be distilled, the distillate will, of course be fresh water, pure fresh water, but it will have a peculiar, nauseous, and empyreumatic taste and odour, stronger in proportion as the heat applied to evaporate it has been more elevated; it is that smell and taste which render it undrinkable for a while. If, when it has become sweet again by long standing, which period may be hastened by agitation in the atmosphere; if, I repeat it, that distilled water be then redistilled, the distillate will be found to have acquired again the same empyreumatic taste and odour as when it was first distilled. How is this? Because it will by standing or agitation, have re-dissolved a portion of the air in the room in which it was kept, and along with that air it will have absorbed whatever substances were present, dissolved or suspended in it, and those substances by their contact with the heated surfaces of the still, yield an empyreumatic product, which taints the distillate. The only condition necessary for distilled water not to become putrid or offensive is to saturate it with *pure air*, because in that case there is no room left for other gases to impregnate it, at least practically speaking, and in the ordinary conditions of domestic or of ship economy. On board ships, the water which is stored in for the use of the crews in the usual way, in the course of about a fortnight becomes putrid and almost undrinkable, because the organic matter which that water contains is undergoing a course of putrefactive fermentation. But about a month or so afterwards the water

gradually becomes sweeter and sweeter, until at last it becomes drinkable again; because, eventually, all the organic matter which it contained becomes decomposed, carbonic acid and water being the result, and although the air of the ship's hold is none of the sweetest, the water, produced as just said remains for ever afterwards perfectly good and palatable, because it is saturated with pure air, and therefore cannot absorb that of the atmosphere.

Now, Dr. Stenhouse, several years ago, I believe, found that the power which charcoal possesses of purifying tainted air is owing to its burning in an insensible manner the substances to which its bad odour was due; and acting upon that discovery of Dr. Stenhouse, I found that charcoal has the power of destroying the empyreuma of distilled water, *when such water is aërated*, that is to say, when it contains atmospheric air, or oxygen. I found by experiments, carried on upon a somewhat extensive scale for many months, that two cubic feet of charcoal are sufficient to remove entirely the empyreumatic odour and taste of distilled water produced at the rate of 500 gallons per diem, and that the charcoal *never wants renewing*, because it does not act as a filter, but as a burner, the substance burnt being the empyreumatic product, and the result of the slow combustion thereof being carbonic acid and water. I have every reason to believe, from the length of time during which several of my apparatus have been in operation, that such a filter once made will last for ever, because the charcoal disinfects the water, so to speak, as it does air, not by mechanical separation, but by actual though insensible combustion. The water, as it issues from the apparatus, is perfectly sweet, tasteless, inodorous, and completely saturated with a maximum quantity of pure air; it is of sparkling clearness, and being refrigerated in traversing the coiled pipe surrounded by the cold sea water at the lower part of the apparatus, it is fit for immediate use.

And thus is the second condition, that of aëration, of digestibility, of wholesomeness, accomplished, whereby the water so produced is *at once* drinkable, and so sweet and fresh that it cannot be distinguished from the very best spring water.

I have already stated that sea water contains a certain quantity of salt in the proportion of about 1lb. of salt to 33lbs. of water. Now, when sea water is evaporated, all the steam produced therefrom being, of course, fresh water, all the salt which that water contained is left behind; that is to say, the salt previously contained in the evaporated portion if left in that portion which is not yet evaported, and which is, thereof, more impregnated with salt than before. If this salt be not removed, and and the evaporation is continued, it goes on accumulating, furring, and incrusting the vessel, and very soon destroys it. This is, in fact, an inconvenience common, not only to all the sea water stills hitherto contrived, but to the boilers of marine engines; for no boiler or vessel is safe from incrustation as soon as about half of the sea water admitted in them has been evaporated; that is, when the sea water has been saturated by concentration so as to contain 1 lb of salt in about 16 lbs. of water.

My apparatus is not liable to these incrustations or deposits of salt, because the sea water circulates in it in a constant and uninterrupted manner, and the quantity evaporated (one sixth) is much less than is necessary to interfere with the perfect solution of the whole of the salt, since the discharged water contains only about one-half per cent. more salt after than before being operated upon; that is to say, the sea water, as it is admitted into the apparatus, contains, as we said, about 16 oz. of salt in 33 lbs. of water; when it is discharged it contains only about 17 oz. of salt in 33 lbs. of water, which is an insignificant increase. On the other hand, the different parts of the apparatus being made of stout iron plates, riveted, and connected in a substantial manner by screws and bolts, without soldering or brazing of any kind or in any part, it is perfectly impossible that it should go out of order by any kind of accident short of those cases of *force majeure* which, unfortunately, are too often the cause of the ruin or wreck of the ship itself.

From this brief description of my Patent Marine Fresh Water Apparatus, it may he conceived that, by heating the sea water at only 212 ○ Fahr. by means of steam at only a few pounds above atmospheric pressure, it is volatilised in a most economical manner, and is perfectly free from the saline or organic matters which usually impart to it, in other arrangements, a nauseous odour and disagreeable taste; and that the cheapness and small volume of the apparatus, the large quantity of fresh, salubrious, and aerated water which it produces * at an extremely small cost, its absolute safety, permanent order, and the ease with which all its parts can be reached, not only render it pre-eminently suited to marine purposes, but that it is likewise admirably adapted to such stations or places as are deficient in one of the first necessities of life salubrious fresh water, or where it either cannot be obtained at all, or only in an insufficient, precarious, or expensive manner.

* An apparatus 5 feet high, 3 feet long, and 1½ feet wide, produces 24 gallons of fresh water per hour.

Treasury,
Auckland, 23rd July, 1858.

THE following Returns are published for general information.

C. W. RICHMOND.

RETURN of the CUSTOMS REVENUE at the several Ports of New Zealand, during the Quarter ended the 31st March, 1858.

Heads of Revenue.	Rates of Duty.		Auckland.	Russell.	Mongonui.	Hokianga.	Kawhia	New Plymouth.	Wanganui.	Wellington.	Napier.	Collingwood.	Nelson.	Lyttelton.	Akaroa.	Otago.	Bluff.	Totals. Quantity.	Totals. Revenue.	Quarter ended 31st March 1857. Revenue.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Spirits	per gal.	8s.	4,027 2 6	236 3 0	135 19 6	0 0 0	13 16 0	514 13 3	502 0 0	2,899 10 6	724 12 0	46 0 0	1,316 13 9	1,651 7 3	120 5 0	1,043 10 3	48 8 0	33,225½	13,290 1 0	11,887 17 11
Cigars and Snuff	per lb.	3s.	125 17 9	1 16 0	3 9 0	0 0 0	0 0 0	6 9 0	0 0 0	180 9 0	0 0 0	0 0 0	101 17 9	25 3 8	5 5 0	0 0 0	2 8 0	3,018½	452 15 2	324 5 3
Tobacco	,,	1s. 3d.	1,099 11 3	121 5 1	171 16 3	79 7 6	34 15 0	137 18 9	177 7 6	706 5 0	134 1 3	0 0 0	218 0 8	343 1 3	35 10 0	147 12 6	0 0 0	54,505½	3,406 12 0	3,921 1 3
Wine	per gal.	3s.	299 5 0	0 0 0	7 16 0	0 0 0	0 0 0	71 11 0	34 13 0	319 19 7	28 10 0	0 0 0	227 13 6	372 12 0	5 17 0	97 16 0	12 3 0	9,852	1,477 16 1	1,702 10 4
Ale and Beer (in wood) ..	,,	6d.	202 0 0	0 0 0	1 17 6	0 0 0	0 0 0	17 10 0	0 0 0	350 18 6	1 5 0	7 16 0	66 5 0	147 19 0	0 0 0	83 10 0	5 8 0	35,378	884 9 0	749 8 0
Ditto ditto (in bottle) ..	,,	1s.	80 2 0	0 0 0	0 0 0	0 0 0	0 0 0	12 17 0	0 0 0	321 14 0	6 18 0	0 0 0	155 8 0	71 14 0	0 0 0	22 0 0	8 0 0	13,573	678 13 0	1,073 8 10
Tea	per lb.	3d.	298 7 3	0 0 0	0 0 0	0 0 0	0 0 0	34 10 0	4 15 0	215 6 9	2 0 0	0 0 0	127 4 0	103 13 3	0 0 0	83 6 0	1 15 0	69,069	870 17 3	1,430 7 0
Coffee, Cocoa, and Chicory ..	,,	2d.	63 14 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	26 5 8	0 0 0	0 0 0	31 16 4	26 3 10	0 0 0	9 15 6	0 0 0	18,932	157 15 4	2 87 4 6
Sugar	,,	½d.	851 19 11	0 0 0	2 7 4	5 18 4	0 0 0	43 19 8	0 0 0	400 3 11	2 6 6	0 0 0	380 9 1	119 19 8	0 0 0	129 14 10	10 1 6	934,582	1,947 0 11	2,432 7 0
Other articles specifically charged			93 11 8	0 3 8	0 1 0	0 0 0	0 0 0	3 17 0	0 0 0	135 11 6	0 0 0	0 0 0	24 16 4	226 4 2	0 0 0	35 15 6	0 2 0	.....	520 2 10	369 0 4
Measurement, at per.. ..	cubic foot	3s.	1,507 17 3	15 17 6	20 6 9	0 0 0	0 0 0	91 3 6	5 14 9	1,058 13 0	39 6 11	0 0 0	363 12 6	431 14 6	6 5 9	401 18 6	0 12 0	.....	3,943 2 11	3,391 18 5
Ditto at	,,	1s.	637 4 0	0 16 8	14 19 9	1 10 0	0 0 0	30 16 1	14 10 3	527 9 0	17 17 5	0 0 0	331 15 1	447 12 11	0 2 0	310 9 10	10 13 11	.....	2,345 16 11	3,962 2 10
Goods at	per cwt.	2s.	259 5 2	0 10 9	0 18 0	2 0 6	0 0 0	16 12 0	0 0 0	195 0 3	4 8 9	0 0 0	431 7 6	163 15 0	0 0 0	75 16 5	1 14 0	.....	1,151 8 4	
Totals	..	..	9,545 17 9	376 12 8	359 11 1	88 16 4	48 11 0	981 17 3	739 0 6	7,337 6 8	961 6 0	53 16 0	3,776 19 6	4,141 0 6	173 4 9	2,441 5 4	101 5 5	.....	31,126 10 9	31,531 11 8

Treasury,

15th July, 1858.

R. F. PORTER,

Accountant to the Treasury.

RETURN of the NUMBER, TONNAGE and CREWS, of VESSELS, cleared OUTWARDS, at the several Ports of New Zealand, during the Quarter ended the 31st March, 1858.

PORT.	DESTINATION.						BRITISH.									FOREIGN.									TOTAL.								
	United Kingdom.		British Possessions.		Foreign Countries & Whale Fishery.		With Cargoes.			In Ballast.			Total.			With Cargoes.			In Ballast.			Total.			With Cargoes.			In Ballast.			Total.		
	With Cargoes.	In Ballast.	With Cargoes.	In Ballast.	With Cargoes.	In Ballast.	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew.	Vessels.	Tons.	Crew.
Auckland	0	0	12	0	1	0	13	2478	121	0	0	0	13	2478	121	0	0	0	0	0	0	0	0	0	13	2478	121	0	0	0	13	2478	121
Russell	0	0	0	0	21	0	1	199	26	0	0	0	1	199	26	20	7339	579	0	0	0	20	7339	579	21	7538	605	0	0	0	21	7538	605
Mongonui	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	24	8691	707	0	0	0	24	8691	707	24	8691	707	0	0	0	24	8691	707
Hokianga	0	0	2	0	0	0	2	590	25	0	0	0	2	590	25	0	0	0	0	0	0	0	0	0	2	590	25	0	0	0	2	590	25
Kaipara	0	0	1	0	0	0	1	154	8	0	0	0	1	154	8	0	0	0	0	0	0	0	0	0	1	154	8	0	0	0	1	154	8
New Plymouth	0	0	3	0	0	0	3	402	26	0	0	0	3	402	26	0	0	0	0	0	0	0	0	0	3	402	26	0	0	0	3	402	26
Wellington	2	0	11	0	1	0	13	2693	154	0	0	0	13	2693	154	1	280	28	0	0	0	1	280	28	14	2973	182	0	0	0	14	2973	182
Napier	0	0	0	0	0	1	0	0	0	1	434	17	1	434	17	0	0	0	0	0	0	0	0	0	0	0	0	1	434	17	1	434	17
Nelson	1	0	8	0	0	0	9	1366	82	0	0	0	9	1366	82	0	0	0	0	0	0	0	0	0	9	1366	82	0	0	0	9	1366	82
Lyttleton	0	0	4	2	0	2	4	1013	56	4	1483	52	8	2496	108	0	0	0	0	0	0	0	0	0	4	1013	56	4	1483	52	8	2496	108
Akaroa	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	7	3766	262	0	0	0	7	2766	262	7	3766	262	0	0	0	7	3766	262
Otago	0	0	2	1	0		2	383	18	1	550	21	3	933	39	0	0	0	0	0	0	0	0	0	2	383	18	1	550	21	3	933	39
Bluff Harbor	0	0	0	3	0	3	0	0	0	6	898	90	6	898	90	0	0	0	0	0	0	0	0	0	0	0	0	6	898	90	6	898	90
Totals	3	0	53	6	54	6	46	9278	516	12	3365	180	60	12,643	696	52	20,076	1576	0	0	0	52	20,076	1576	100	29,354	2092	12	3365	180	112	32,719	2272

Treasury,
15th July, 1858.

R. F. PORTER,
Accountant to the Treasury.

RETURN of the VALUE of IMPORTS at the several Ports of New Zealand, during the Quarter ended the 31st day of March, 1858.

COUNTRIES.	Auckland.	Russell.	Mongonui.	Hokianga.	Kawhia.	N. Plymouth.	Wanganui.	Wellington.	Napier.	Nelson.	Lyttelton.	Akaroa.	Otago.	Bluff.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
United Kingdom	30,476 9 9	167 0 0	113 0 0	..	30 0 0	2566 5 0	1309 12 10	34,379 0 0	718 0 0	14,441 16 5	21,424 18 0	181 0 0	10,496 0 0	..	116,303 2 0
British Colonies, viz.—															
New South Wales ...	36,740 17 2	347 10 0	..	165 0 0	..	2104 18 0	170 0 0	12,296 0 0	673 0 0	13,357 4 7	11,168 12 2	70 0 0	7862 0 0	1166 10 0	86,121 11 11
Victoria	432 7 0	..	..	225 0 0	..	..	..	2770 0 0	..	1221 11 6	1425 0 0	..	1045 0 0	1321 7 6	8440 6 0
Tasmania	1,164 10 0	..	..	..	..	..	..	855 0 0	..	..	4167 0 0	..	..	3640 3 6	9826 13 6
Cape of Good Hope ...	..	..	..	..	..	..	..	..	..	..	127 0 0	..	..	..	127 0 0
Foreign Countries, viz.—															
United States of America	..	730 18 0	2429 7 0	..	..	..	..	271 0 0	..	..	40 0 0	26 0 0	..	..	3497 5 0
France	..	..	..	..	..	..	..	42 0 0	..	..	..	115 0 0	..	..	157 0 0
Tahiti	..	..	..	..	..	..	..	..	..	145 11 0	..	..	..	..	145 11 0
Whale Fishery	72 0 0	..	..	..	..	..	..	..	..	..	..	..	..	..	72 0 0
Totals ... £	68,886 3 11	1245 8 0	2542 7 0	390 0 0	30 0 0	4671 3 0	1479 12 10	50,613 0 0	1391 0 0	29,166 3 6	38,352 10 2	392 0 0	19,403 0 0	6128 1 0	224,690 9 5

RETURN of the VALUE of EXPORTS from the several Ports of New Zealand, during the Quarter ended the 31st day of March, 1858.

COUNTRIES.	Auckland.	Russell.	Mongonui.	Hokianga.	Kaipara.	N. Plymouth.	Wellington.	Nelson.	Lyttelton.	Otago.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
United Kingdom	..	..	..	..	..	62 0 0	..	26,847 0 0	..	..	26,909 0 0
British Colonies, viz.—											
New South Wales	12,745 16 0	..	..	1310 0 0	..	3260 0 0	7522 0 0	11,183 10 9	2494 13 4	1365 0 0	39.881 0 1
Victoria	1145 0 0	..	..	1800 0 0	..	..	10,393 0 0	..	..	6884 0 0	20,222 0 0
Tasmania	500 0 0	..	..	630 0 0	601 0 0	..	..	..	..	..	1731 0 0
Akyab	..	..	..	..	..	..	14 0 0	..	..	..	14 0 0
Bombay	..	..	..	..	..	..	..	..	60 0 0	..	60 0 0
Foreign Countries, viz.—											
Java	1190 0 0	..	..	..	..	..	..	..	..	..	1190 0 0
Guam	..	..	..	..	..	..	..	..	34 0 0	..	34 0 0
Whale Fishery	..	173 15 0	1948 9 4	..	..	..	..	..	..	..	2127 4 4
Totals ... ... £	15,580 16 0	178 15 0	1948 9 4	3740 0 0	601 0 0	3322 0 0	17,929 0 0	38,030 10 9	2588 13 4	8249 0 0	92,168 4 5

Treasury, 15th July, 1858.

R. F. PORTER,
Accountant to the Treasury.

RETURN of the QUANTITY and VALUE of Expo

ARTICLES.	Auckland.		Russell.		Mongonui.		Quant
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
		£ s. d.		£ s. d		£ s. d.	
Produce and Manufactures of the Colony—							
Bran - - - - bush.	6415	378 8 0	„	„	„	„	„
Butter - - - - lbs.	„	„	„	„	„	„	„
Cheese - - - - lbs.	560	15 0 0	„	„	„	„	„
Cordage, &c. - - - - cwt.	67¼	105 0 0	„	„	„	„	„
Curiosities - - - - pkgs.	2	10 0 0	„	„	„	„	„
Flax - - - - tons	¼	13 0 0	„	„	„	„	
Fruit - - - - bush.	12	12 0 0	„	„	„	„	„
Gold Dust - - - - oz.	186	665 0 0	„	„	„	„	„
Grain, Maize - - - - bush	160	50 0 0	„	„	„	„	„
„ Oats - - - - bush.	621	186 0 0	„	„	„	„	„
„ Wheat - - - bush.	„	„	„	„	„	„	„
Gum (Kauri) - - - tons	470¾	5645 0 0	„	„	„	„	50
Hides - - - - number	157	69 0 0	„	„	„	„	„
Oil (Fish) - - - - galls.	1629	320 0 0	„	„	„	„	„
Onions, &c. - - - - tons	5½	109 10 0	„	„	32½	542 16 4	„
Plants and Seeds - - - pkgs.	1	3 0 0	„	„	„	„	„
Potatoes - - - - tons	394¼	1638 0 0	„	„	155	929 17 0	„
Skins (Sheep) - - - number	1 bale	10 0 0	„	„	„	„	„
Spars - - - loads & number	21	50 0 0	„	„	„	„	60 37 loa
Stock (Live) - - -	„	„	„	„	76 pigs	117 18 0	„
Timber - - - loads and feet	„	„	„	„	43cords	51 10 0	260 & 2 loa
Timber, sawn - - - feet	327,000	2300 0 0	„	„	„	„	„
Whalebone - - - lbs.	724	58 0 0	„	„	„	„	„
Wool - - - - lbs.	24,996	1666 8 0	„	„	„	„	37
		13,303 6 0	„	„	„	1642 1 4	„
British Foreign, and other Colonial, Produce and Manufactures - - -		2277 10 0	„	178 15 0	„	306 8 0	“
Totals - - - - £		15,580 16 0	„	178 15 0	„	1948 9 4	“

Treasury,
15th July, 1858.

Printed and Published by W. C. WILSON,

s from New Zealand, during the Quarter ended the 31st March, 1858.

okianga.		Kaipara.		New Plymouth.		Wellington.		Nelson.		Lyttelton.		Otago.		TOTALS.	
y. Value.		Quantity.	Value.	Quantity	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity	Value.	Quantity.	Value.
£ s. d.			£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.
,,		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	6415	378 8 0
,,		,,	,,	2236	98 0 0	,,	,,	,,	,,	,,	,,	,,	,,	2236	98 0 0
,,		,,	,,	,,	,,	,,	,,	,,	,,	10,916	328 0 0	,,	,,	11,476	343 0 0
,,		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	67¼	105 0 0
,,		,,	,,	,,	,,	8	18 0 0	,,	,,	,,	,,	,,	,,	10	28 0 0
100 0 0		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	5¼	113 0 0
,,		,,	,,	,,	,,	,,	,,	4	10 0 0	,,	,,	1	2 0 0	17	24 0 0
,,		,,	,,	,,	,,	158½	593 0 0	3318¼	12,858 5 0	,,	,,	,,	,,	3662¾	14,116 5 0
,,		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	160	50 0 0
,,		,,	,,	,,	,,	,,	,,	200	70 0 0	,,	,,	,,	,,	821	256 0 5
,,		,,	,,	,,	,,	,,	,,	135	54 0 0	,,	,,	,,	,,	135	54 0 0
600 0 0		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	520¾	6245 0 0
,,		,,	,,	40	24 0 0	39	39 0 0	107	54 0 0	52	39 0 0	41	37 0 0	436	262 0 0
,,		,,	,,	,,	,,	567	100 0 0	,,	,,	,,	,,	,,	,,	2196	420 0 0
,,		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	37¾	652 6 4
,,		,,	,,	50	20 0 0	,,	,,	,,	,,	,,	,,	,,	,,	51	23 0 0
,,		,,	,,	15	75 0 0	,,	,,	,,	,,	,,	,,	,,	,,	564	2642 17 0
& ,,		,,	,,	796	161 0 0	,,	,,	165bdls.	43 0 0	,,	,,	No. 264	13 0 0	,,	227 0 0
s 2085 0 0		130	165 0 0	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	No.211 371 Loads.	2300 0 0
,,		,,	,,	,,	,,	,,	,,	4 entire horses	1000 0 0	,,	,,	,,	,,	,,	1117 18 0
ok 10 s 930 0 0		51,653	320 0 0	"	,,	,,	,,	,,	,,	,,	,,	,,	,,	26 pks 240lds 51,653	1301 10 0
,,		1617	15 0 0	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	328,617	2315 0 0
,,		,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	724	58 0 0
25 0 0		,,	,,	41.913	2794 0 0	256,124	17.075 0 0	334,803	22,326 4 0	30,700	2046 13 4	122,866	8191 0 0	811,777	54,118 5 4
3740 0 0		,,	500 0 0	,,	3172 0 0	,,	17,825 0 0	,,	36,409 9 0	,,	2413 13 4	,,	8243 0 0	,,	87,248 9 8
,,		,,	101 0 0	,,	150 0 0	,,	104 0 0	,,	1621 1 9	,,	175 0 0	,,	6 0 0	,,	4919 14 9
3740 0 0		,,	601 0 0	,,	3322 0 0	,,	17,929 0 0	,,	38,030 10 9	,,	2588 13 4	,,	8249 0 0	,,	92,168 4 5

R. F. PORTER,
Accountant to the Treasury.

or the New Zealand Government, at the Printing Office, Shortland Crescent, Auckland.