STEAMSHIP FRESHSPRING MAGAZINE

Preserving the past to inspire knowledge for the future

£4.00 WHERE SOLD

NO.41 WINTER 2024/25

STEAMSHIP FRESHSPRING TRUST

Registered charity, No.1151907.

Objects of the Charity

To advance the education of the public through the preservation and operation of a historic steamship, and the promotion of maritime studies particularly amongst young people for the public benefit.

Key Contacts

Keep up to date with progress/news via the Trust's website or Facebook page:

www.ssfreshspring.co.uk

www.facebook.com/SSFreshspringTrust

Membership Enquiries:
You can easily join online by visiting:
https://ssfreshspring.co.uk/register/annual-membership or send an s.a.e. for a form to: Steamship Freshspring Trust, c/o Little Cleave, Lower Cleave, Northam, Devon, EX39 2RH.

Volunteering on the ship:
If you would like to volunteer to help on the ship, please call Peter Gillett, our Ship Manager, on 01237 237 183. peter.gillett@ssfreshspring.co.uk.

Registered Office:
Little Cleave, Lower Cleave, Northam, Devon, EX39 2RH

Heritage Fund

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FRONT COVER: The TSS *Earnslaw* waits at the quayside in Queenstown in New Zealand back in March 2019. *Phil Barnes*

From the Chair

The AGM on Saturday 2nd November was a good day with twenty members attending plus two via Zoom. There was an opportunity to see all the progress on board the ship and with the building of our small boat. Members also tried out our Virtual Reality experience and had a chance to play with our excellent Schools STEAM/Education kits plus time to enjoy coffee and cake. After this, we went to a local venue for the AGM proper, an excellent lunch and then an informal afternoon, where we discussed a five year plan for the ship and the Trust. We also talked about quite a few other things. It was a lively and very enjoyable occasion with some very positive ideas being aired. Ros took minutes and we will make these available in due course. The members who attended discussed the forward plan and we are encouraging any member to engage with this.

We are rapidly moving towards another end of year and 2024 has been an interesting one for the Trust. We have been working through our two year National Lottery Heritage Fund (NLHF) programme, which ends in December. This included a review of the strength of the charity and working with a business consultant to create a longer term plan for the development of the Trust and moving towards ship operation. Separate to the restricted funds of the NLHF, our work to raise local funding is ongoing and has been quite successful, which is essential to meet our day to day operational costs and to support our Community Learning Officer; however, the funding environment is not so good and many organisations chase the same funds, which means success rates are down. Several small funders continue to reliably support us and, of course, so do our members.

During the year we have worked to increase Trust membership, which is the lifeblood of the charity. We are so grateful for the generosity of members from donations of equipment, regular financial donations and valued advice. We opened the ship to the public between April and October and we provide an increasing number of resources for schools. I provide talks and we have educational visits to the ship throughout the year, the Trust works hard to engage a progressively wider audience creating wide ranging interests and opportunities.

Through a range of public activity with statutory authorities, partners and event participation, members and volunteers deliver a positive message about heritage and opportunities within the maritime and engineering sectors. As a result of membership and links with the Association of Independent Museums

(AIM) and The Industrial Heritage Network, Trustees work to increase awareness of industrial heritage, engineering, maritime heritage and the delivery of education leading to positive career choices.

We also link with other heritage ships through The Maritime Heritage Trust, who organise regular meetings linked to specific groups. For example, we are members of the powered vessels group and seem to focus on regulations and future fuelling.

This year we attended the New Scientist Live show in London by invitation from our partner British Maritime Technology (BMT). Events like this keep us abreast of technology and enables us to network with high profile people. This ensures we deliver the best opportunities for young people and that we remain aware of changes in technology, which could fuel SS *Freshspring* for the future.

Our Community Learning Officer is key to achieving our aim to reach out to young people and even not so young people, to promote maritime studies and advance education. Indeed, we are delighted to see individuals embark on any career path.

During this year the Trust continued, funded by the NLHF grant, to employ Audience Development staff to ensure a wider range of people engage with heritage. They have worked to increase volunteer participation, increased visitor numbers by utilising social media and create better recording of visitors to the ship and at events.

We have completed the review of the membership scheme and are thankful for the support we have received from other ship and steam attractions who have shared information about their own schemes. Thank you also for your feedback when we asked for your thoughts about our plans back in the Spring magazine. You can read more about changes to the scheme in the next edition of the magazine but briefly, we wanted to ensure the scheme was operating in the most cost effective way while recognising the increasing postal and printing costs and providing Members with the option of retaining the hard copy magazine or opting for a new electronic version. We are also updating the online joining and renewal process via our website as we want to encourage and support new and existing members to use this facility to create an automatically renewing payment process that you are in control of, which avoids your membership lapsing and the additional time and cost we incur sending out reminders. We have also considered the benefits of membership to our members and how we can communicate with you most effectively.

Before the AGM, Wendy Lo Vel, John Puddy and Matthew Wakeham pose for the camera.

The longer term future of the ship has also been progressed with a feasibility study and we have the support of BMT Global to deliver detailed development planning, leading to tendering for a design specification study. It is important that we work to achieve an approved design for the ship, as this will create the foundation for renovation within regulatory boundaries and subsequent operation.

The Trust has also been very active environmentally and culturally and we are active members of the Arts and Culture movement locally and The Taw & Torridge Estuary Forum, which brings organisations together to combat climate change and to support cleaner rivers. This a very exciting branch or our activity as we aim to promote and encourage arts and culture and, of course, do all we can to protect our fragile environment.

Deep in their various conversations. Nearest Vice Chair Annemarie Shillito chats to Gordon Teenan.

Recently many local groups came together to create a march to highlight the need to clean up the Torridge. That was the message of an event held in Bideford on Saturday starting from SS *Freshspring*, attended by diverse groups concerned about water pollution, including fishermen, swimmers, Women's Institute, and environmental and heritage groups.

The aim was to trigger local community action to clean up pollution in streams and water courses along the river, whether from sewage, agricultural run-off, or road drainage. It is a model which is already proving successful in South Devon, designed to support the work of the North Devon Biosphere in a catchment-based approach, working with landowners, planners, and the water authority to find local solutions.

Andy Bell, Coordinator of North Devon Biosphere, said: "I am delighted to see so much community support for this issue. Community groups can get involved with testing water quality, identifying sources of pollution, and engaging with local landowners. North Devon Biosphere can provide advice, resources, and expertise linking to the wider picture of land use and land management."

I am very pleased to see responses to the powering of our ship and John Coulter, our Canadian member, has provided an excellent article on propulsion in this magazine. I hope we see more articles and responses from members.

We look forward to a positive year ahead and sincerely thank our Members for the motivation and positive support they provide.

John

New members

We welcome the following new member of the Trust:

Mr Peter Harvey — *Bideford*

Final day of the 2024 season!

Sam Roberts

As the final open day of the season this year coincided with half term, we decided to hold a Family Fun Day on the Tuesday of the holiday. Local volunteers offered to run workshops, and flyers were sent to our partner schools in Bideford in addition to the usual advertising around the area.

Careful concentration on the threading...

We offered rope making, Halloween glass painting, Morse Code signalling and pom pom ghost and bat workshops with a local jewellery artist.

It was fantastic to see the steady stream of visitors through the day in spite of the dreary weather. We welcomed a total of 92 visitors between 11am and 4pm, with 20 of those being children. We also welcomed a new volunteer steward who is a great addition to the open day team – welcome, Michael!

Look what I made!

Schools activities

Sam Roberts

This Summer term has been a busy one for the Trust. As well as the usual visits from schools, we have had return visits from our local largest primary who are keen to include the SS *Freshspring* in the curriculum for as many year groups as possible.

Two year 2 classes from Westcroft School visited the ship to kick start their topic for the first half of term. These children visited previously in Year 1 as part of their topic 'Francis Drake – hero or pirate?' This term their topic is 'Bridges' and the children worked with Mike Teare from WOTW to draw the two Bideford bridges from the boat deck of the ship. They were excited to see the bridges from the brilliant vantage point offered by the ship on the river. The classes worked in groups, with one group doing the sketching and the other investigating making bridges out of paper to transport a toy car.

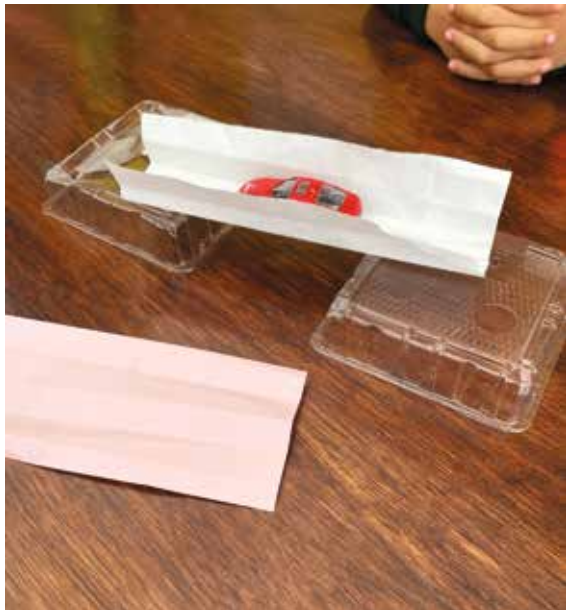
A total of 46 children and eight accompanying adults spent the morning on the ship, going on to the Burton Art Gallery to continue their Bridges project.

Another local town school, East the Water Primary, use the STEM kits in their Year 6 Science lessons for the second half of the Summer term. The teachers used the kits with both Year 6 classes – 58 children to investigate cams, wind and steam power. The feedback from the teachers has been positive. The children enjoyed problem solving and getting involved practically with using the tools and powering the steam

engine for the final session. Through the SS *Freshspring*, Appledore Shipyard have agreed to develop a series of assemblies and workshops to support pathways to Maritime careers for local youngsters.

At the start of October we were delighted to welcome Hugh and Polly from a fantastic charity which is based in Bristol to offer workshops to local schools. SR and possibly others will be trained in delivering workshops to the first two pilot schools in 2025. These workshops can then be adapted to be delivered by SS *Freshspring* staff and volunteers at future dates. For the first year, the two pilot schools – St Mary's and Westcroft – will be able to participate in the workshops for no cost to the schools. In the future, we will look at charging for the workshops and offering them more widely to schools in the area.

The deputy heads of both schools came to the ship and met with Polly and Hugh from 'Your Future Your Choice' and were very enthusiastic about the possibilities of the collaboration. We have set a date of March 2025 for the initial sessions in schools.



As the project is currently in the planning stages, we are still discussing what form the final presentation will take – the current plans are to hold ship visits in early March, followed by a day long workshop in school. The workshop will culminate in groups of children producing a vessel which can sail on a body of water – hopefully the park pond – and deliver a message to someone on the other side. We envisage that this will be a day event involving lots of children and their families, so we will keep all members updated as plans develop.

This will involve two of the schools in the town which we have been keen to work with and as a result will mean that we have an ongoing relationship with all the town schools in Bideford.

Seadream

Following the very successful workshops funded by local councillor grants at Monkleigh School, we are continuing to work with Seadream Education to develop resources for schools to use based on rivers and estuaries in the region. Monkleigh School has approached *Freshspring* to ask if we can facilitate workshops in the coming academic year, so we are in contact with councillors to ask if they have any available grants for this project in 2024/2025.

As always, we continue to work with local organisations to strengthen local relationships with the Trust. We continue to work with local schools and develop links with other charities to support enrichment for all children and other groups through our open days, education provision and opportunities for visits to the ship.

TSS Earnslaw

Phil Barnes

The TSS (twin screw steamer) *Earnslaw* is one of New Zealand's major heritage icons and is well up the 'must do' list for tourists visiting this country.

Although *Earnslaw's* story (named after the highest peak in the region, Mount Earnslaw) is well known; what is probably not known is that during NZ's sesquicentenary in 1990, it got an IPENZ award for being the largest steamship built in NZ and an important part of the country's engineering heritage.

On the subject of its build, it was started in July 1911 at the John McGregor engineering works and shipyard in Dunedin and in order to get it to Lake Wakatipu, it was dismantled with its many parts being numbered and then moved by train to Kingston. It was then re-assembled on the lakeside through 1912. At Dunedin, there is a sign near the railway station proclaiming where the ship was built and the jetty where the kit of parts was off loaded is still there at Kingston.

TSS *Earnslaw* awaits her next departure. Note the coal lorry alongside on the quay.

Further to this, *Earnslaw*, aka 'Lady of the Lake', is now given as the oldest coal fired ship in the Southern Hemisphere and is marketed as a vessel which was launched in the same year as the tragic *Titanic* disaster! Today's passengers are truly international (with a lot being Chinese and Japanese) and ticketing is marketed through realnz.com which makes it easy to book tickets from overseas, thus helping to keep passenger numbers up!

(At the time of my voyage in early March 2019, there

A closer view of the coal lorry on the quay.

The view down into the engine room.

were four 90 minute return trips per day to the Walter Peak High Country Farm (where a lot of the passengers got off) and these depart Queenstown every two hours from 10am to 4pm.

Although *Earnslaw* no longer performs its original role of carrying passengers, livestock and freight between the communities dotted around Lake Wakatipu, it still is the largest ship to have ever plied its waters, being 168ft long and weighing 330 tons. More technical statistics and historic information can be found on various websites on the internet.

Engine room gauges from above.

One of the elegant saloons.

Through the photos accompanying this text, it is clear just how much steam-powered machinery can be seen by today's travellers, or you can just listen to the piano in the main saloon. (On my trip, 'My Heart Will Go On' from the *Titanic* movie was being played as part of the repertoire!!!)

The attractive lines of a 100+ year old steamship.

The engine room telegraph at 'Full Ahead'. It looks a bit in need of a clean, though.

The forward steam winch was made by Emerson, Walker & Thompson Bros Ltd of Gateshead.

HMRC leaves callers on hold ‘for 800 years’, says spending watchdog (NAO 15th May 24)

…….the Wait Music tinkled on – ‘experiencing a high number of calls’ – ‘thank you for your patience’.

Can you game this system? I’ve tried with variable success. Selecting the option - ‘Thinking of leaving us?’ – often gets you a brisk reply. Trying that with DVLA, Torridge Council or HMRC? Less so.

We’re in Australia – enjoying a great deal of ‘lots to like’. Living here has many familiarities. Even the Wait Music is sickeningly familiar. But I’d also grudgingly admit the weather is way better, the beaches drop-dead gorgeous, the politics fall-over hilarious.

We’ve been giving this ‘immigrant not tourist’ business our best shot for more than a year now. This includes tackling mind-numbing levels of bureaucracy.

Take Health. The Financials that begin and end any contact with Health are the worst. Don’t get me wrong – when you try to sort out the invoices, the excesses, the eligibility, the top-up costs, chase the delays – the people are lovely. The premises, if you go in person, are smart and air conditioned with lots of chairs; the wait not too long. And that’s even on the phone.

But the interaction with these lovely people reveals the rats-arse of a system requiring the likes of Turing’s 1936 Bombe to unravel.

Our difficulty is that we constantly find ourselves on the back foot. In the NHS, money isn’t the currency – urgency and postcode are the drivers. I have no muscle memory of a fee-for-service system. My muscle memory has let me BS my way through the NHS, speak the language and know the systems. Here we are in a morass of acronyms, conflicting statements and quite a lot of cost.

Ask any Australian to explain their healthcare system; they all roll their eyes, apologise and wander off.

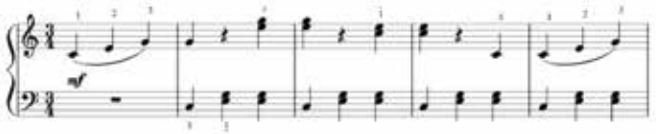
It’s good clinically, I’ve had really excellent treatment. But the ‘Admin’ involved outdistances the time spent being treated by hours and hours.

Here’s a glimpse. It starts in a queue for a Visa* to be Permanent Residents to be nearer all the children. The queue is 30 years long. In the meantime we are on a Bridging Visa A* allowing us to stay. If we want to leave, we need a Bridging Visa B* which lasts precisely a year. Renewable*.

To get subsidised Healthcare we must apply yearly to Medicare* but only if your country has a Reciprocal Agreement. To avoid a tax penalty, the LHA*, we need to have private health insurance* and if your income is above X another policy to avoid the MLS*. You need a tax number from the ATO* who need to complete the HMRC Double Taxation* application and confirm our Right to Residency* certificate.

Our health insurance company is a classic example – lost in the weeds of their own back yard. We needed health insurance. We go in all innocent, answer every question and send lots of documents. We agree the recommended policy, start paying and… 8 (eight) months later we discover this policy provides no useable cover (-$$$$) and they have been applying a 70% premium loading (the LTA) (+$$$$) unnecessarily.

Back to the Wait Music…….



……thank you for your patience……..

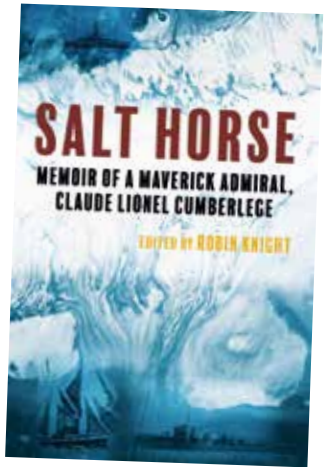
…….your call is important to us……..

No Worries…….
Bestest
John Pook

(*complex form ± fee)

Salt Horse

Memoir of a Maverick Admiral, Claude Lionel Cumberlege
Edited by Robin Knight



This account is an excellent record of life in the Royal Navy from the turn of the 19th century through to the First World War. It highlights the opportunities for an enterprising Naval Officer both in the Royal Navy and the Australian Navy along with some truly remarkable activities performed by Cumberlege and his ships. Indeed, it reads like a well written and compelling novel.

It is complete with accounts of life after the Navy right up until his death in 1963. Clearly Cumberledge had strong views during his maritime life, and these reflected in very successful, but unorthodox actions.

I would recommend this as a book to read and cherish.

240 pages softback. c.100 b/w photographs. 240x170mm. Price £18.99. ISBN 978-184995-572-0. Published by Whittles Publishing. https://www.whittlespublishing.com

From the Editor

Magazines like this rely on contributions from members to continue and the editorial cardboard box is now in the recycling bin as it is empty.

So, if you want this magazine to continue to be interesting, how about coming up with some new material for it? Everyone has a story in them and hopefully some pictures to support it.

It does not matter if you are not good with words; it is my job to pull it all together and I am happy to do that but without the material, I can't do it! The story does not have to be maritime related. What matters is that it will be of interest to fellow members. I look forward to being inundated with material for future editions.

Thank you.

Brian Gooding

Freshspring Membership

IMPORTANT UPDATE!

We are Pleased to Announce that the **membership review** is complete! Over the next few months, we will implement an **improved renewal and payment process** to address rising postal and printing costs while providing our members with **affordable options** and **enhanced benefits.**

Why Was the Review Important?

Our goal is to ensure the **membership scheme** remains both **affordable** and **sustainable.** This review focused on **enhancing your membership experience,** overcoming **cost challenges,** and introducing **new benefits** to enrich your further involvement with SS *Freshspring*.

Member Benefits Will Include:

• **Free entry to the ship**	• **An exclusive Freshspring pin badge**
• **Priority booking for events**	• **Access to ship spaces not available to the public**
• **Quarterly magazine (digital or printed, based on your preference)**	• **Exclusive access to the Members-Only section of our website and regular newsletter updates**
• **10% discount on tickets to Freshspring-organised events**	• **Annual AGM participation, including votes on constitution changes and Trustee/Chair elections**

Improved Renewal and Payment Process

We are making it easier than ever to renew your membership. With our new system, you will be able to:

- **Renew quickly and securely** via our website
- **Set up automatic annual or monthly renewals** – no more worrying about lapsed memberships!
- **Receive advance notifications** of upcoming automatic renewal payments

What's Next?

Stay tuned for detailed **updates** on how these changes will be implemented. We're committed to ensuring your **transition to the new membership plan** is **seamless** and **straightforward.**

Need Help?

If you have any questions regarding your renewal, we're here to help!

Please email us at ros.white@ssfreshspring.co.uk

Weigh The Anchor

Richard Slack

According to Wikipedia “A windlass is an apparatus for moving heavy weights. Typically, a windlass consists of a horizontal cylinder (barrel), which is rotated by the turn of a crank or belt. A winch is affixed to one or both ends, and a cable or rope is wound around the winch, pulling a weight attached to the opposite end. The Greek scientist Archimedes was the inventor of the windlass”.

Freshspring’s windlass is located at the front of the ship and is used for raising or lowering the anchors or pulling mooring ropes.

The windlass is designed to operate using steam from the main boiler and has two pistons driving a crank, a pinion and a large gear. By using several dog clutches, the port or starboard anchor chains and barrels can be turned.

Back in August 2023 it was decided to attempt to get the windlass operating again.

The pistons were removed from the cylinders, cleaned and inspected. The condition of the pistons and cylinders was very good with no signs of rust.

Over a number of weeks the rest of the bearings, pinion and other components were cleaned and inspected. The piston rods and valve gear shafts originally used asbestos fibre rope (packing) to seal the shafts and prevent steam leakage. This asbestos along with asbestos gaskets was removed by our specialist and safely disposed of.

New gaskets were made from a special oil resistant card-like material and new PTFE braided packing was purchased to seal the various shafts (see photo).

Eventually in July 2024 we had the windlass back together with new gaskets and packing ready for a trial run using compressed air.

In October a diesel-driven compressor was borrowed and hooked up to the windlass, all twenty or more oil points were supplied with fresh oil.

There was some scepticism as to whether this would work but with the engine disengaged from the main gear, air was applied and with very little air it chuffed really sweetly. The main gear was then engaged along with each barrel and no problems were found. Would it be capable of raising the anchor? If it wasn't, it would be hard work winding the anchor up by hand!

We decided to give it a go. There was a small problem releasing the port anchor chain restraint but nothing a big hammer didn't solve. As the anchor hadn't moved in a number of years, it took a bit of persuasion to get it to drop but it finally dropped under control of the windlass brake into the river mud. But would it come up again? Lever moved to 'Heave', air supply on and to the disbelief of some, the anchor was raised up from the mud. After a few more operations by the 'boys' with their 'new toy', we had an attempt with the starboard anchor.

This anchor is not the original *Freshspring* anchor as that had been lost in the distant past. Again the windlass raised the anchor from the mud but it kept twisting as its shank entered the hull. A long rope to the shore and a John Puddy solved the twisting problem and the anchor, complete with a lot of mud, was raised into the correct stowage position.

A very exciting day and well done to all those who have had a hand in getting this machine working again.

Maybe in the future the windlass operation can be demonstrated again.

Letter to the Editor

Dear Editor

May I thank Richard Slack for his learned article on how we can power the *Freshspring* in the future.

As I am a member of that exclusive and sadly diminishing group of those who have actually sailed on *Freshspring* when she moved under her own steam and the even more exclusive group that actually worked the machinery may I add to the discussion. I will add that I have no 'engineering' qualifications.

The first point I might make is that ship preservation doesn't always have a happy ending, think *Reliant* and *Queen of the South* or look at the 'at risk' vessels in the National Historic Fleet. Of course, *Freshspring* herself only just survived. So how do we ensure her future?

She clearly could be preserved as a static display. I suggest that in that case the best thing to do would be to place her on dry land and ideally under cover as this would reduce the maintenance costs and access could be significantly improved to the below decks areas as you could go in through the side of the hull not down a ladder.

Before I start discussing what I think the options are, I have been involved in the 'Environmental' movement for most of my adult life so am aware of the issues over Carbon Emissions, Resource Depletion and bio fuels. Points I might make are that oil and coal won't last forever, and truly renewable bio fuels are in very limited supply. Clearly it is possible that we may not be able to find or be allowed to use 'fuel' at some stage in the future and the ship will become a static exhibit.

Freshspring is a steam ship, all her auxiliary machinery is steam so to convert her to anything else would not only be a major job but fundamentally change the nature of the ship.

As pointed out, *Waverley* and the preserved tug *Challenge* both have modern boilers while *Shieldhall* retains her original boilers. The preserved paddle steamer *Kingswear Castle* has a new boiler but it's still coal fired. My inclination would be if possible to keep the original boiler. I don't believe that it saw much use after about 1970 and reports say it is in good condition.

I would be interested to see what the options might be for 'steam raising' or running the ship alongside. The Swiss Firm DML has built a number of steam locomotives with electric pre-heating for the boiler; this would simplify steam raising and allow it to be spread over several days to reduce stress on the boiler. The preserved Tug Tender *Daniel Adamson* was fitted with an electric circulating pump in the boiler which would also be an option to improve circulation and reduce stress on *Freshspring's* boiler.

There is then the question of what fuel to use once *Freshspring* is 'unplugged'. There are 'renewable' liquid fuels; however, the amount of recycled vegetable oil is limited and using 'new' oil is far from ideal. There are a number of coal substitutes being tried on preserved railways. *Freshspring* was a coal burner when built and clearly if the substitutes are satisfactory and willing volunteers can be found to learn to operate the Mk1 shovel, then I suggest that this is an option worth considering.

If neither of these options work, then I suggest Gas Oil as used on *Waverley* and *Shieldhall* should be used.

Anyway these are my suggestions.

John Boxall

Returning to Steam

John W B Coulter

On reading the Autumn 2024 *Freshspring* report regarding various suggestions for potential changes to *Freshspring's* propulsion system, I feel that it is important to comment on some of the considerations. It is clearly important that *Freshspring's* future is based on decisions and actions that are only essential in support of her heritage preservation and technical operating presentation.

As a marine and power plant engineer, I have operated and managed ships and power plants and also the privilege of restoring and operating heritage steamships and personally owning steam boats.

Clearly the two most predominate components of a heritage steamship are the boilers and main engine. Unlike diesel engines that have a defined and finite service life, steam engines are virtually infinite with many dating from the 1800s effectively operating.

The service life of a boiler is primarily dependent on its type, construction and service maintenance. The predominate type of boiler fitted to heritage steamships is the traditional firetube Scotch Marine design that have an extensive service life that can attain over 100 years but at some finite point replacement will be necessary.

Globally the Scotch Marine boiler design is the most efficient and popular firetube boiler and is extensively produced by many boiler manufacturers. Beyond any marine application it is primarily provided for industrial steam power plants and small commercial power plants and is adaptable to any solid, liquid or gas fuel. As such, there are more Scotch Marine type boilers built than any other firetube design. The majority of new Scotch boilers consist of a single furnace but twin furnace units are popular in Europe and overall they tend to be marketed as high efficiency package boilers.

There are two basic types of Scotch Marine boilers consisting of the traditional wet back design that is the basic marine type and the dry back that is not provided with a totally water cooled combustion chamber. Although the wet back design has a higher capital cost, it is more efficient than the dry back, requires less maintenance and provides the longest and most cost effective service life. Some of the new package Scotch boilers also provide a 3 pass combustion gas design in order to increase efficiency to the 90%+ range.

The primary difference between the classic Scotch Marine boiler as found on *Freshspring*, *Shieldhall*, *Kingswear Castle*, RMS *Segwun* and many other heritage steamships is the boiler construction standards with the boilerplate and physical structure being much heavier built than the so called modern package boiler of the Scotch design. A traditional built Scotch boiler can have a service life expectancy of two to four or more times that of the new package boiler types and the RMS *Segwun* is a good example with her coal-fired boiler being 100 years old and still acceptably certified. When *Kingswear Castle's* boiler was replaced in 1962, they chose to have a new Scotch boiler built as a copy of the original traditional design rather than purchase a lower cost low life expectancy package design. The end result supports the adage that one gets what they pay for and now at 62 years her coal-fired boiler is certified and will go on serving cost effectively for many more decades.

When a traditional design and construction Scotch boiler eventually requires replacement, as a result of first cost limitations, a modern package Scotch type boiler is often fitted. Such a decision does not provide a cost effective life and often results in such boilers providing only 20-30 years of service before replacement is again required. *Freshspring* is fortunate in having her original traditional design and built Scotch Marine, three furnace, wet back boiler that has only experienced 22 years of predominately Royal Navy fleet harbour light service engagements in Malta and the UK.

As would be expected, preliminary inspections have determined that the boiler is in good condition with only minor repairs and cleaning required. It would therefore not be responsible to spend significant money replacing the boiler when it is not necessary to do so.

The bottom line is that *Freshspring's* boiler, given a low cost physical cleaning, any light repairs and new insulation and jacket is physically superior to a new package boiler and her operating efficiency in conjunction with the fitting of high efficiency burners would be similar or equal to a new low life boiler.

A boiler's efficiency is governed by its physical heat gain design and the combustion efficiency and the physical heat gain design of the Scotch Marine wet back type boiler is superior to any other firetube boiler design. *Freshspring's* boiler in conjunction with high efficiency fuel oil burners, such as the pre-eminent German Weishaupt models, will provide an efficiency in the 80% range and if refitted as may be required, her existing combustion air heater further assures a high efficiency. The fitting of tube retarders may also be considered to assist efficiency. Given the use of the soot blowers, it is

normally only necessary to remove the retarders once per year for layup tube punching. (It is important that the exhaust gases are not cooled lower than approximately 300˚F in order to prevent condensation and corrosion of the breaching and stack.)

To further assist *Freshspring's* boiler efficiency the installation of an auxiliary steam pumps and engines exhaust steam feedwater heater should be considered and a shell and tube design would be very economical.

Beyond the advantages of *Freshspring's* traditional and efficient Scotch boiler relative to a long low maintenance life, her three furnaces provide important operating advantages.

In conjunction with high turndown ratio burners the three furnaces allow a wide range of variable and efficient steaming conditions control and provide an important operating redundancy and safety factor that is not provided by single furnace package boilers. Over the past years some heritage steamships that were fitted with single furnace package boilers have had burner operation problems that caused the ships to cancel operating days. Such events would not occur with *Freshspring's* three furnaces as in the event of one or even two burner failures the remaining burner will provide operation and take home security.

The matter of thermal shock relative to bringing a Scotch boiler up to steam is valid but can be easily controlled. On ships such as RMS *Segwun*, *Waverley*, and the extensive Swiss and German fleets that operate continually, this is not an operating concern but on ships with a variable operating schedule it is an issue of importance. Depending on the size of the Scotch boiler, responsible steam raising time from cold requires a period of slow low firing for 24 to 48 hours or more resulting in fuel cost and attendance requirements.

The suggestion of fitting electric heating elements within the boiler would not be technically acceptable and in any case experience with electric elements within steam boilers presents long term maintenance challenges and related costs.

The most technically cost effective manner of eliminating the warming fuel costs and related attendance requirements will be the installation of what is termed a side arm electric heater. Such an assembly consists of a shore powered electric immersion heater or preferably a dry well electric heater that is mounted external to the boiler. Although a higher initial cost, the dry well heater is preferred as it provides a significantly longer cost effective life and requires very low maintenance. The heater in conjunction with a small electric centrifugal pump is piping connected to the boilers bottom blow down line and the feedwater line and provides a positive circulation of the boiler's water content and in particular the static water below the furnaces. This provides the slow soaking heating necessary for all of the boilers components and is control adjusted to provide an unattended thermal increase to a temperature of approximately 200˚F. From this point the boiler's centre furnace is slow low fired to raise the steam pressure. Such a system can also be used to maintain a cost effective suitable boiler temperature during extended non steaming periods such as weekend only steaming with lay periods during the week. In ports that do not have a shore power connection the heater could be powered by the ship services diesel generator.

Beyond the importance of providing the boiler with new high efficiency thermal insulation within a new metal jacket, it is important that a tight fitting stack damper should also be installed. This will significantly assist in the heat retention of an unfired boiler and reduces fuel cost and the time to raise steam during short periods of no firing function such as overnight or day layover shutdowns. By experience example, the operating pressure of a boiler fell from 160psi to 0 during a 12 hour period with no stack heat retention. A closed

Starboard oil-fired furnace on SS *Freshspring*.

damper allowed a reduction in heat loss to provide 60psi+ steam retention over the same time period.

Exclusive of the necessity for fitting modern navigation systems, one of *Freshspring's* most important operating advantages, reduced ongoing maintenance costs and related safety strengths is her manual operating systems. On modern ships and power plants the extensive use of automated controls and the high investment in cost and time that is necessary in order to maintain such systems to the expected performance standards is recognised as a significant operating challenge and can also present safety concerns. Such controls also present a negative impact on the basic knowledge development and retention of systems operation, management and control by operating staff. As a result of significant experience, an important safety and control aspect of highly automated systems is to ensure that all automatic controls have a total control manual override. Some alarming examples of the negative impact that automatic control systems can impose have occurred on some ships where the failure of the control systems has resulted in ships being out of service until the controls were corrected when the engines and systems that the controls related to are in perfect operating order. Such costs and operating impacts were unheard of only a few years ago.

In respect to this it is therefore important that *Freshspring* not be encumbered by the installation of technical high capital cost systems and equipment that are not operationally necessary or supportive of her foundation heritage operation and education mission and that will negatively impact her going maintenance costs and incur the eventual replacement costs of such imposed finite life equipment.

On the matter of operating environmental concerns, the most basic consideration beyond any regulations is to ensure that when burning fossil based fuel that only low sulphur No.2 fuel oil is used (this is basically the same as low sulphur diesel oil, only there is no or low tax charged for boiler fuel depending on specific nations). In conjunction with low NOx burners and the existing air heater, the boiler exhaust gases of a high efficiency burner are cleaner than the exhaust gases of a diesel engine. Another important advantage of boiler combustion gases is that there is no combustion slip contamination and the micro carbon content can be lower than produced by diesel engines.

To further assist environmental concerns, the use of 100% bio fuel oil will significantly reduce the negative content of combustion gases. (Typical reductions include: Sulfur 80%; NOx 20-30%; Co2 20%, and a high reduction in particulates.) Unlike diesel engines that have a range of technical operating and maintenance problems with burning 100% Bio fuel that is primarily plant derived and usually Soy Bean based and it is not recommended for diesels, boilers do not have any technical problems with Bio oil combustion. Bio Diesel must not be confused with Bio fuel oil as Bio Diesel has a diesel oil content that can range up to 80%. Sustainable Aviation Fuel (SAF) is similar to 100% Bio fuel oil but is currently blended with aviation fuel. 100% Bio fuel oil is readily available in most nations, is almost the same cost as fossil fuel and may also provide tax incentives.

One could go on in respect to the other suggested considerations for *Freshspring* including the use of LNG fuel that is not generally viable for small ships as a result of the requirement for large and challenging sized storage tanks, but perhaps it is worth considering the successful operating positions of the many other international heritage steamships.

Beyond the important UK examples, the two most impressive fleets are those in Switzerland and Germany. The several Swiss lakes fleets consist of a total of 15 large, and the world's most magnificent, paddle steamers that are always maintained in a better than new condition. An interesting aspect of one of the Lake Geneva fleet ships is that the 1904, 226 ft, 750 passenger PS *Montreux* was converted from steam to diesel electric in 1964 and as a result of requiring a new engine (common with motor ships but almost never with steam), she was re-engined with a new built compound steam engine in 2001. Another of her sister ships that was also converted from steam to diesel is now out of service as a result of long standing operating problems with the diesel engines and is a candidate for propulsion replacement.

The German Elbe river fleet out of Dresden consists of nine large paddle steamers that with the exception of two, all date from the 1800s and only one remains coal-fired. It is also interesting to note that when the steam fleet was provided a total refit, all of the 1960s diesel powered ships were scrapped.

All of the Swiss and German ships are operated by for profit companies with full time employees and no volunteers, similar to the Dartmouth Steam Railway and Riverboat Company that now operates the very successful PS *Kingswear Castle*.

With the exception of oil fired boilers, these 24 ships operate with their traditional steam propulsion plants and are not encumbered with any costly propulsion plant changes. (One of the ships' original boilers lasted for over 106 years.) All of the fleets provide their own shipyards and dry docks.

An interesting factor for both the Swiss and German fleets is that while all of the ships provide extensive daily and high traffic operations serving many thousands of passengers annually and are a significant aspect of the tourist economy, the ships also provide an important component of regional transportation for the local population.

I have attended all of the ships 'many' times and they are truly magnificent and their open engine rooms that are similar in presentation to PS *Waverley* are image unsurpassed in the world.

Based on experience, engagement and extensive participation, for operations such as the Swiss and German fleets and many others one aspect is very clear: heritage steamships are an extremely desirable business operation and highly appreciated by the public. The significant popularity and success of PS *Kingswear Castle* upon her return to home steaming waters is a clear UK example as is the world famous PS *Waverley*. Having been engaged with and observed many heritage steamship operations, I have often found it interesting to observe many dockside passengers reject an available motorship in order to wait for the arrival of a steamship and *Freshspring's* operating future can be equally rewarding.

Beyond any negative impact on *Freshspring's* heritage preservation, presentation and technology fabric for future generations, the imposing of costly new and unnecessary technologies will only further challenge the restoration to operation time period and will impose future ongoing maintenance and eventual replacement cost burdens for her future stewards to bear.

The overriding aspect is that our mission is to preserve, interpret and present a self sustaining operating example of a now unique type of ship. As stewards of *Freshspring's* preservation and presentation, it is our privileged responsibility to ensure that her story, image and the essence of her technologies is retained, presented, taught and functioned in the manner in which was intended. It is essential that we do not lose our way or primary focus and that *Freshspring's* historic technical essence is not altered or lost in order to support other agendas or our convenience. If so many other heritage steamship operations are able to retain, maintain and even expand their heritage and technology course, we must be equally able and no less responsible.

Future generations will judge our actions.

Leaving a legacy to the SS Freshspring Trust

The Steamship Freshspring Trust has benefited greatly from the generosity of its members and friends who have left or given money to the Trust. Legacies provide very necessary financial support in helping the Trust to meet its stated objectives of preserving the past and inspiring knowledge for the future.
If you would like to think of giving the SS Freshspring Trust a legacy, it could not be easier: The following codicil can be completed by you, witnessed, and kept with your Will.

CODICIL
I (full name).....

of (full address).....,.....

.....,.....
declare this to be the (1st/2nd/other.....) codicil to my Will dated.....

I give, free of Inheritance Tax, the sum of

£..... (.....pounds)
to the SS Freshspring Trust of Little Cleave, Lower Cleave, Northam, Devon EX39 2RH (Registered Charity Number 1151907), absolutely for its general charitable purposes.
In all other respects I confirm my said Will.

Testator's signature:.....Date.....

Signed in the presence of:

First witness	Second Witness
Signature	Signature
.....	.....
Full name	Full name
.....	.....
Address	Address
.....	.....
.....	.....
Occupation	Occupation
.....	.....

Note: The witnesses must not be your executor, your executor's spouse or a beneficiary of your Will.

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