



# The Swordsman

Issue 50 - May 2023



**The Worshipful Company of  
Engineers**

*(Incorporated by Royal Charter 2004)*

## The Swordsman - Issue 50, May 2023

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*Jodrell Bank radio telescope in the Spring. Photo: John Williams*



## From the Editor

This edition is the sixth and final one under my editorship, which has covered the masterships of Gordon Masterton, Peter Blair-Fish and Audrey Canning. It has included the period of lockdown and restricted activity enforced by the Covid pandemic, as well as periods during which the Company was able to hold a normal programme of in-person events. In the true engineering spirit of rising to a challenge and finding work-arounds, the Company was able to maintain contact between members during the pandemic by hosting online video events, including technical soirées, dinners and drinks tastings, which together made for a lively programme and an interesting magazine.

We have had articles on engineering, historical and modern, Company's and individual members' charitable activities and the innovative work of our award winners. The increasing size of the magazine is a reflection of the growing scope of the Company's activities and I am grateful to all members, partners and others who have contributed articles.

I now leave you in the capable hands of our next editor, Past Master Peter Blair-Fish, and I trust you will all be as generous to Peter with your time and literary skills as you have been to me.

*Chris Elston*

## Contributors

My thanks to the following who have contributed articles and photographs: *The Immediate Past Master, PMs Blair-Fish, Brooks and Masterton; Barry Gasper (Hon. Almoner), Wardens Penny Taylor and Dolores Byrne; Janet Groome, Diana Blair-Fish, Clive Walker, John Crackett, David Holmes, Helen Ramsay, Mike Howse, Stefan Kukula, John Williams, John Canning (Hon. Photographer), Mark Whitter Photography, "Just a Drop" and Notpla.*

## Consorts' Visit to Gray's Inn and Lunch at Brasserie Blanc

6 October 2022

The Inns of Court are professional associations for barristers in England and Wales. All barristers must belong to one of them. Each Inn is governed by Benchers (Master of the Bench) and barristers have their chambers there; they alone have the power to call students to the bar.

Gray's Inn is the smallest and oldest, dating back to the 14<sup>th</sup> century. We began our tour with an introduction by our blue badge guide, David Lloyd, alongside the wrought iron gates with large griffins keeping guard on their pillars. (photo 1) From there we passed on to South Square which was presided over by a bronze statue (by F.W. Pomeroy) of Sir Francis Bacon; it was he who laid out the gardens in 1606 when he was Treasurer of the Inn. Around the square are the Hall, the Under-Treasurer's office, the Common Room and the Library. Young Charles Dickens was employed here as a junior clerk by an attorney for 13s 6p per week; he described Gray's Inn as the most depressing institution known to the children of men, using the setting in many of his works. Mr Pickwick had his office in Gray's Inn Square to which we went next. This is a much larger square in which is a 19<sup>th</sup> century water pump; around the courtyard stand the original elegant gas lamps. The Hall was the scene of the all-important dinners, a prerequisite to becoming a barrister, and moots or mock trials supervised by barristers were held as well as masked revels and plays. Among notable members of Gray's Inn is



Baroness Hale of Richmond, the first woman President of the Supreme Court.

A short walk away we entered Lincoln's Inn which was founded in the middle of the 14<sup>th</sup> century and took its name from either Thomas de Lyne or Henry de Lacy, 3<sup>rd</sup> Earl of Lincoln. It comprises a large complex of buildings in various architectural styles from its beginnings through to the 18<sup>th</sup> and 19<sup>th</sup> centuries. Alumni include Thomas More, Gladstone, Pitt the Younger, Asquith, Thatcher and Blair. We were met by imposing white buildings, designed in the Palladian style by Robert Taylor in the 18<sup>th</sup> century. He also designed the Lord Mayor's coach. The current chapel built between 1619 and 1623 has a beautiful open, fan-vaulted undercroft (photo 2) where students and legal practitioners could walk, talk and hold meetings. John Donne was a member



Above: the group in front of the gates opening onto Field Court Grays' Inn;  
below: chapel undercroft



of the Inn; he laid the foundation stone and was the preacher here before becoming the Dean of St. Pauls. In the mid-18<sup>th</sup> century young women left their babies, born out of wedlock, here to be looked after. In 1750 the price for taking in a child was 5 shillings. The Inn then cared for and educated the children; boys eventually entered the armed services and girls domestic service.

As buildings were added over the centuries through to the completion of the New Hall and the Library, some architectural details like distinctive brickwork, towering chimneys and Queen Anne style were included, tying the whole area together. We left Lincoln's Inn through Wildy & Sons' passage (photo 3) to arrive in Carey Street opposite the Royal Courts of Justice. Walking through Gray's Inn and Lincoln's Inn our overall impression was of large open spaces (squares and gardens) surrounded by grand buildings – it was hard to imagine we were in the centre of London!

Before heading to Brasserie Blanc we passed Ede & Ravenscroft (Est. 1619) who sell gowns, hoods and wigs. They recently supplied gowns to our Company.

At the restaurant we were joined by those who had not walked and were welcomed by John Canning, the Master's Consort. He introduced Christine Holmes, who described her year as High Sheriff in Shropshire, 2016-17. A High Sheriff is the monarch's representative in the county for judiciary and law and order and supports the emergency

services, armed forces, church and voluntary community. It is a voluntary, non-political, self funded appointment. The formal dress for women is less elaborate than that for men, but steel cut buttons, a hat with ostrich feathers and lace jabot are essential. Christine's local search for suitable attire relied on a much loved hat for which she found ostrich feathers at a theatrical outfitter. However, her coup was tracking down Shropshire lace makers who designed and made lace cuffs and a jabot just for her.

Christine recalled attending parties to mark the late Queen's 90<sup>th</sup> birthday and in complete contrast acting as the trapped victim in a crashed car for a fire and rescue exercise! Christine made a special mention of the voluntary efforts in the county and for the cadets of the three armed services.

A highlight for Christine was the annual Legal Service at St. Mary's Church, Shrewsbury, when the Shropshire judiciary rededicate themselves to the people – a grand affair attended by the Lord Lieutenant, visiting Sheriffs from neighbouring counties, judges, and military and civic dignitaries.

As cheese soufflés made their entrance, John thanked Christine and we all settled down to enjoy an excellent lunch, after which he proposed the Loyal Toast. Yvonne Joyce, the Senior Warden's Consort, gave the vote of thanks to the speaker and the toast to the Company. Conversations continued as we left for home.

*Janet Groome and Diana Blair-Fish*



*Wilds and Sons' Passage*

## Company Banquet, Mansion House

28 October 2022



*The banqueters at the Mansion House*

The annual Banquet at the Mansion House, a highpoint of the Company Year, was held on Friday 28<sup>th</sup> October. The event was attended by 145 members of the Livery and their guests. The Lord Mayor was represented by Alderman Professor Michael Mainelli, who was recently made a Honorary Freeman of the Company. Also present were Sheriff Alistair King DL, Sheriff Andrew Marsden and the Masters of several Livery Companies. The Principal Guests were Chi Onwurah MP, Shadow Minister, Science, Research and innovation, and Professor Dame Sarah Springman DBE FREng, Principal of St Hilda's College, Oxford.

The Banquet was held in the magnificent Egyptian Hall. This grand room, seating 350, is a jewel of Georgian opulence. Contrary to the expectations of many, there are no sphinxes, no scarab beetles nor hieroglyphs to be seen: even the columns have Corinthian, Greek capitals. The room takes its name from the arrangement of the columns which was said by the famous Roman architect Vitruvius Pollio to be Egyptian.

We entered the Mansion House by the unassuming side doorway, known as the Walbrook entrance. This leads to an austere vaulted chamber from which a simple granite staircase leads to the Saloon and State Rooms on the first floor. The Walbrook entrance was added in the 1840s to allow the lord Mayor private access to the building. In the vaulted area the Hallkeeper's Chair is particularly eye-catching. This would have been located outside the building. It is well designed to shield the Hallkeeper from draughts and the British weather.

The seat of the chair has a metal lined drawer where a pan of hot embers could be placed.

At the top of the granite staircase the members and their guests were greeted by a Guard of Honour provided by the Croydon Sea Cadets before proceeding to the receiving line formed of the Master Engineer, Audrey Canning, and the Wardens and their consorts. The members and their guests then progressed into the Saloon and drawing rooms where a drinks reception was held. The walls of these spacious, majestic rooms are decorated with Dutch and Flemish 17<sup>th</sup> paintings from the Harold Samuel Collection. The collection, which includes some of the best works by Avercamp, Hals, de Hooch and Jan Steen, is said to be the finest formed in Britain in recent times. Not heard of Harold Samuel? Well, he was a post-war property developer and is credited with coining the phrase, location, location, location.

As the Banquet was the first formal event since the passing of Her Majesty The Queen in September, before dinner was served, the Master requested everyone to stand and observed one minute's silence in memory of Her Gracious Majesty. She then welcomed the principal guests and thanked the Clerk, Cdr. Peter Gracey RN, and his assistant, Sandra Watts, for all their work in organising the Banquet and spoke briefly of the great challenges facing the City of London after Brexit, the pandemic and the war in Ukraine and how engineering might be used to lessen their impact.

The four-course dinner, which everyone that I spoke with agreed was excellent, was concluded with the traditional Loving Cup Ceremony. Since the





The Master and Alderman Professor Michael Mainelli

pandemic, for obvious reasons, wine has been replaced with liquor chocolates. And when my neighbour retrieved a Ferrero Mon Cheri chocolate this triggered a serious engineering discussion on whether the chocolates contained brandy or wine and how many could be eaten before one became intoxicated. It was noted that some people took two!

Following the formal toasts to the king and the Royal Family, the Master proposed the Civic toasts to the Lord Mayor, and The City of London Corporation and The Sheriffs. Alderman Professor Mainelli, replying on behalf of the Lord Mayor focused on how engineering had helped the development of The City and had made it into the global power house that it is. He closed his speech by thanking the Company for its donations to this year's Lord Mayor's Appeal, 'A Better City for All', and to the Mansion House Scholarship Scheme, which provides funds for students and young executives from countries visited by the Lord Mayor to come to the UK for education or to gain experience. The Master then presented Alderman Mainelli with a gift of two pewter coasters engraved with the inscription 'Alderman Vincent Keaveny, Lord Mayor of London 2021 - 2022.

Following tradition it fell to the Junior Warden, Eur. Ing. Penny Taylor JP, to propose the toast to our guests. She welcomed a number of distinguished people and eight Masters of other Livery Companies; namely, the Master Arbitrator, Armourer, Constructor, Coachmaker, Fan Maker, Pavior, Water Conservator and Master Wax Chandler.

Professor Dame Sarah Springman responded on behalf of the guests and proposed the Company toast,

'The Worshipful Company of Engineers – may it flourish root and branch forever'. She began by saying how engineering had made an important contribution to the wealth and prosperity of The City over many years. Subsequently, she presented her views on engineering education and stressed the importance of diversity in the profession. She particularly praised Switzerland, pointing out that in that country apprentice engineers could go on to study at university. When speaking of the Company's commitment to educating engineers she drew attention to the presence amongst the Company's guests of Professor Clive Buckberry FREng, and Dr. Mark Roberts, both members of the team from Quanta Dialysis Technologies of Warwick who won this year's prestigious, MacRobert Award, which is supported by The Company.

The Banquet Address was given by Chi Onwurah MP. A full transcript of Ms. Onwurah's speech is given elsewhere in this issue of the Swordsman. Her core messages were that engineers 'make everything in the world that makes the world go round' and that 'engineering and politics are the two principal drivers of progress'.

As my wife Jan and I had anticipated this was a very uplifting evening at a wonderful venue combining excellent company, good food and stimulating conversation. An occasion not to be missed as is evident from the many participants who thanked The Master at the end of the evening or sent personal messages of thanks the following day. Below are a few extracts from those messages: 'It was a great joy to be there with you and your wonderful Company', 'Congratulations to you on fielding such interesting speakers', 'Thank you for a great evening on Friday, we thoroughly enjoyed ourselves, as did our guests' and 'Thank you so much for making last night happen in such a splendid setting'.

Clive Walker



Junior Warden Penny Taylor toasts the guests

### Speech given by Chi Onwurah, MP, at the Mansion House Banquet, 28 October 2022

"Good evening, it is a real pleasure to be with you – if somewhat surprising. Growing up on my Council Estate in Newcastle I ever imagined speaking somewhere like this – it is a touch gilded for my more utilitarian sensibility. But I am pleased to be here because I am pleased the Worshipful Company of Engineers is here. Engineers make the world go around - well to be scientifically precise they make everything in the world apart from the world go around! But anyway it is right that we are at the heart of things.

"I say we because before running away to join the circus... sorry I mean before coming into Parliament, I spent over twenty years working as a Chartered Electrical Engineer - building and designing the networks which now make up the internet in the UK, France, Nigeria, the US, South Africa, Singapore and Denmark. I've now spent over a decade as an Engineer in the House of Commons. I always say I entered politics for exactly the same reason I entered engineering. To make the world work better for everyone."

#### Engineering as a caring profession

"Engineering and politics are the twin engines of progress. One of the reasons I moved from the one to the other was because over time I realised that whilst I could design the world's best mobile network – still think I could! - whether it got planning permission, who could afford to purchase services on it and who had the skills to benefit from it – they were all predominately political decisions. The truth is that all engineering takes place within a political and ethical framework. The biggest challenges facing our world – from climate change to healthy living, from food poverty to data privacy, have engineering at their heart and huge social and economic consequences. That's why I say that engineering is the most caring profession. What could be more caring than clean water, affordable energy or saving the planet?"

#### The importance of inclusion in STEM

"And I knew from a young age that I wanted to be an engineer. But I suffered from what I now call Marie Curie Syndrome – the inability to name more than one female scientist or engineer.

"When I entered Imperial in 1984, 14% of engineering students were women. Almost forty years later and the percentage of female university students studying engineering has climbed to... 18%. That's a percentage point per decade.

"At this rate it will be 2344 before we reach gender parity. That ain't fast enough."

#### Importance of Diversity

"Diversity is not an optional add-on, it is an economic imperative. It needs to be at the heart of



Chi Onwurah, MP

policy, because we cannot build a more prosperous economy without making use of the talents of everyone. I always say I can tell within 90 seconds of walking into a boardroom whether an organisation really believes in diversity or treats it as a tick box exercise. Don't be that organisation!"

#### Climate Change

"The great existential challenge of our time is climate change. We need to democratise the sector and make sure that opportunities are available for everyone.

"Ultimately, climate change is a moral imperative with science and engineering at its heart. It is a considerable challenge but also a huge opportunity.

"The next generation are determined to rise to the challenge of climate change – and for many that could mean going into engineering.

"Labour see a clear path from science and engineering to the jobs you can raise a family on. Climate change is an opportunity to make the world fairer while bringing jobs and skills to new people and regions in the UK.

"This is precisely why we need engineering and politics to work together to ensure the right decisions are made for this country – and it is why I am so pleased to have been invited here today. Diversity and engineering are two of my favourite topics and engineers are my kind of people."

#### Closing remarks

"With the right leadership, I'm confident we can build a strong relationship between Parliamentarians and engineers to make the world work better, for everyone.

Thank you."

Chi Onwurah, MP



# 'Enlightened Engineering' -

Junior Warden's Lecture 9 November 2022

## Introduction

If you pick up any newspaper today, or listen to the news, you might well be very despondent at the state of the world. Maybe the four horsemen of the apocalypse are on their way – for pestilence read global warming, war (Russia invading Ukraine), famine (Ethiopia, Yemen, Malawi, Sudan, Afghanistan and others) and death (the recent Covid pandemic). However, I am personally more optimistic and hope to persuade you that not only is there a lot of hope for the future, but overall, we have more opportunities for better lives than any earlier generation, more discretionary time and longer, healthier lives. There is a lot to be thankful for, but further to go and we can all play our part.

We must remember that the basic state pension introduced through the National Insurance Act of 1946 paid men at 65 and women at 60 when most women only got the widows entitlement and most men only lived to collect 3 years of pension! Average UK life expectancy has increased a further 18 years since then. This increase in life expectancy is due in a large part to health improvements, which would not be possible without the engineers who designed and built the equipment needed for medical devices, imaging, mass-production of vaccines, clean water, sewage treatment plants etc I could go on...

My title is Enlightened Engineering: the path of progress and I aim to show you what I see as enlightened engineering and how it will help us progress as a country, as a society and as a global population.

The idea of enlightenment comes from Immanuel Kant a 17<sup>th</sup> Century German Philosopher who was one of the key Enlightenment Thinkers and saw it as "humankind's emergence from its self-incurred immaturity" and that progress comes from each age "extending their insights, increasing their knowledge and purging their errors" His motto was "Dare to understand!", which was underpinned by the demand for freedom of thought and speech.

## The Missing Women

Enlightenment thinkers were white men - the people who had the opportunities, education and platform for history to remember them. The women of the time are often shadowy figures only mentioned as 'wife of'. Women whose days were spent in cooking, cleaning, washing - hard physical labour and if they had paid employment that was generally

hard physical labour too! There was little time or energy left for reading, thinking or learning.

Thankfully the enlightenment that has taken place during my career recognises the varied inputs of a wider range of people to make a broader contribution to society's progress. Some of this progress has meant that women have more time to make meaningful contributions through the invention and development of labour-saving devices such as washing machines, irons, central heating, indoor plumbing etc.

Figure 1 shows how the use of basic household appliances has reduced the number of Housework working hours per week from around 18 hours for my mother, to less than half that today and much less than that for me personally which is probably a contributing factor in me being Junior Warden!

You can see from the lower graph how housework was a full-time job up until the 1930s, so there was no capacity for most women to enter the workforce. They were already working full-time.

We can generally look forward to around 320 minutes per day to be spent on leisure activities BY MEN and 270 minutes per day BY WOMEN. There is still a gender gap, but we all have much more leisure time than our parents did and that has to be a good thing.

"Back in the 1960s several thinkers advised that the greatest threats to the human species were overpopulation, nuclear war and boredom. One scientist warned that the first two might be survivable the third definitely would not. As people no longer have to work all day and think about where their next meal is coming from, they will be at a loss as to how to fill their waking hours and will be vulnerable to debauchery, insanity, suicide and the sway of religious and political fanatics." [Stephen Pinker; Enlightenment Now]

If we then look at how that leisure time is used, you can see that it gives us capacity to do the things we enjoy, many of which are included in the activities of the Worshipful Company of Engineers, such as visiting with friends, eating out, parties, hobbies, going to the theatre and concerts. We now have more leisure time to spend on the things we enjoy as well as better health and longer life-expectancy – so we've never had it so good! Whatever the doom-mongers who write news headlines have to say and the short-term political and financial chaos that we're currently living through. We have successfully solved the boredom crisis and are instead experiencing the Chinese curse of living in 'interesting times'.

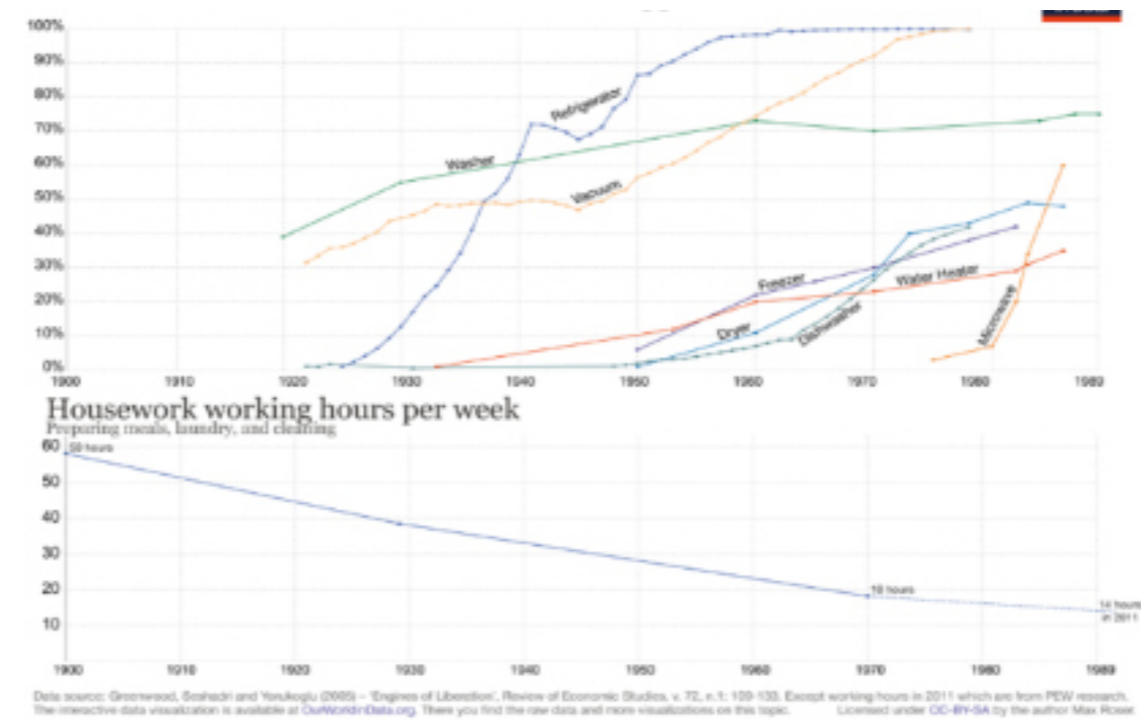


Figure 1: Graphs showing the introduction of labour saving devices and the resulting reduction in housework hours per week.

## Women in STEM

Figure 2 below shows the percentage of women in STEM occupations from 1960 – 2021 and you can see how engineering is much lower than other STEM subjects. Things are improving in engineering but very slowly. Will we ever get to 50:50? According to one of the Guest Speakers at the recent Annual Banquet, Labour MP Chi Onwurah, herself an electronics engineer, she quoted 2344 based on the current rate of growth.

The red stars show how the Worshipful Company of Engineers fares as regards percentage of women. The Company was founded in 1983. The first lady joined in 1988 – Baroness Beryl Platt of Writtle. Two other ladies joined between 1988 and 1998. Then in 1998, the then Master, Dr David Mitchell persuaded the company to hold a luncheon to which ALL the female Fellows of the Professional Engineering Institutions were invited. At that time, I believe there were around 200 female Fellows and some 40 attended the lunch, which resulted in 7 joining the company, including our current Master (who is 8 ahead of me in number order) and me. Today we have 36 female members of the company across the livery and freedom, approximately 10%.

## Car Seats

Figure 3 shows my first visit to the IMechE at One Birdcage Walk. I was the first and I think only girl to win the Queen's Silver Jubilee Prize in a

competition where I had to give a 20-minute presentation about my final-year project. Here I am being presented with a cheque and certificate. My research was looking at how to relate objective measurements of the vibration transmitted through a car seat to the subjective feeling of comfort by the person sitting in the seat. Up until this time, car seats had predominantly been 'sofas on wheels' – large squashy foam cushions, with a covering made of relatively normal upholstery fabric, PVC or leather.

If you think about the vibrations that go into a car as it drives along the road, most of the vibration is damped by the suspension, but some will still get to the floor pan. This then transmits up through the seat rail into the base of the seat. For subjective comfort in a showroom, soft squashy seats are what people say they prefer, however if you then take that car for a drive for a couple of hours, firmer, more supportive seats are more comfortable. This is the dilemma for the car manufacturer, as still more than half of car buyers buy a car without taking it for a significant test drive and more than a quarter never test drive it at all! The seat is also your primary safety system, so there is a lot more engineering that goes into a car seat than most people are aware of. They are very sophisticated items that can drive a sale or equally put off a purchase.

One of the key areas of complaint (usually from tall men) is that the seat cushion does not provide adequate support at the back of the knees. The reason for this is that for small women you have to limit the length of the cushion, so that it doesn't dig in at the back of their knees. This is caused by a large variation in the 'buttock to knee position' – with the



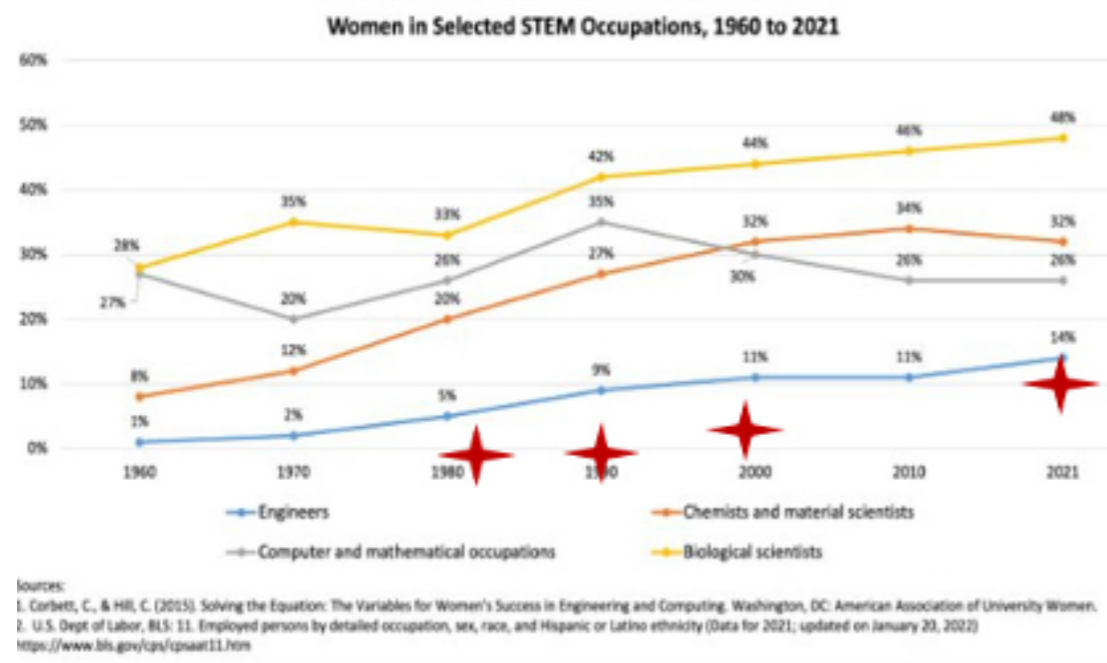


Figure 2: The percentage of women in different STEM subjects since 1960.

95 %ile male being almost 22% larger than the 5 %ile female (a full 120 mm or nearly 5 inches difference).

Men are more likely than women to be involved in a car crash, which means they dominate the numbers of those seriously injured in car accidents. This makes perfect sense when you look at the number of miles travelled in cars by men and women – most professional drivers are men, and they clock up many thousands of miles a year. But when a woman IS involved in a car crash, she is 47% more likely to be seriously injured than a man and 71% more likely to be moderately injured even when researchers control for factors such as height, weight, seat belt usage and crash intensity. She is also 17% more likely to die and it's all to do with how the car is designed and for whom.

Women tend to sit further forward than men when driving this is because we are on average shorter. Legs need to be closer to reach the pedals and we need to sit more upright to see clearly over the dashboard. This is not however the standard seating position. Women are considered to be 'out of position' drivers. Our wilful deviation from the norm means that we are at greater risk of internal injury on frontal collisions. The angle of our knees and hips as our shorter legs reach for the pedals also makes our legs more vulnerable. Essentially ladies, we're doing it all wrong.

Back in the early 1980s researchers argued for the inclusion of a 50th percentile female in regulatory tests but this advice was ignored, and it wasn't until 2011 that any female crash test dummies were developed let alone used. There is one EU regulatory

test that requires what is called a fifth percentile female dummy which is meant to represent the whole female population. This dummy is only tested in the passenger seat so we have no data at all for how a female driver would be affected, something of an issue you would think given women's out of position driving position and secondly this female dummy is not really female at all it is just a scaled down male dummy. It's a shocking fact that there is more legislation relating to dogs in cars than there is relating to women in cars.

More women working in the industry is starting to have an effect on design and standards as well as the business-case of women now making up 62% of all car buyers.

This lack of representation in design, regulation and testing on most products, means that women are not well served by most engineered products.

### Enlightened Engineering

To have truly enlightened engineering, we need engineers from the full spectrum of society – across all ethnicities, genders, ages, religions etc so that the products that get engineered are of use to the whole wide cross-section of society. One of the ways of having that broad range is to value and promote professional registration which we can all do and should maintain that link as the basic entry level to the Company.



Figure 3 The author receiving her prize and cheque at the IMechE

The Past President of the IMechE, Phil Peel recently wrote about his visit to the Conservative Party Conference

“What struck me most strongly was an appreciation of the wider human, social and political ecosystem within which engineering exists. In our profession, we speak a lot about ‘systems engineering’, to make sure that we’re considering the bigger picture. For instance, we know that electric vehicles only make sense if they are supplied with electricity from carbon-free sources and if there is an extensive re-charging infrastructure. This is all rather obvious.

“Ultimately though, it’s only part of the story. Any engineering-based activity or project, especially the more strategic, needs wide political support in the form of public perception, press views, and lobby group opinion as well as support, in the case of energy consumption for example in the form of changed individual behaviour. Very often, these factors are ambiguous and contradictory with no ideal solution, the opposite of the in-built engineering mindset.”

We know that the engineers’ approach is one of rigour which in turn leads to dependability and certainty, often in difficult circumstances. For example, we take flying for granted despite the fact that travelling at 500mph at 37,000ft in air that’s at -56C and too thin to breathe is fundamentally a rather unsafe activity – all as a result of thorough engineering.

Perhaps this mindset is one that could be a useful addition to the political mix especially at a time when

our most fundamental societal challenge - climate change - is so dependent on engineering.

### Unexpected Solutions

Not every problem is a crisis, a plague or an epidemic and among the things that happen in the world is that people solve the problems confronting them.

You may have heard of the ‘Great Horse Manure Crisis of 1894’ when cities were drowning in horse manure. London had over 50, 000 horses on the streets every day. The Times Newspaper predicted...” In 50 years, every street in London will be buried under nine feet of manure”. The terrible situation was debated in 1898 at the world’s first international urban planning conference in New York, but no solution could be found. It seemed urban civilisation was doomed.

However, necessity is the mother of invention, and the invention that could not have been foreseen in this case was that of motor transport. Henry Ford came up with a process of building motor cars at affordable prices. Electric trams and motor buses appeared on the streets, replacing the horse-drawn buses. This motor transport has provided many engineers like me with good careers over the last century and a quarter, but new inventions will come along.

Just as the horse manure crisis of the late 19<sup>th</sup> century was solved and the boredom crisis of the 1960’s has been allayed; I am optimistic that the global warming crisis of today will be solved in due course.

I am confident that the next generation of engineers, will be sufficiently enlightened, passionate and talented to solve the problems that seem SO unsurmountable to us today.

All we need to do is create the right environment for them to do their work, allow them to learn from our mistakes and create a more open and tolerant environment that allows for all to contribute to an open exchange of ideas, knowledge and innovation. Nothing can erase an engineering disaster, but no disaster needs to be repeated, as by talking and writing about them we can learn from them, and by learning from them we can make sure they do not recur.

George Santayana one of the most important thinkers of the first half of the 20thC wrote “We must welcome the future, remembering that soon it will be the past; and we must respect the past, knowing that once it was all that was humanly possible.”

Penny Taylor,  
 Junior Warden, 2022-2023



## Lord Mayor's Show 2022

12 November 2022

Saturday 12 November was the date for the 2022 Lord Mayors Show. Our Master, Senior Warden, Clerk and Liveryman John Chandler were among the approx 6,500 people, 200 horses, and around 150 groups and floats taking part in a three-mile-long procession to mark the first full day in office of the 694th Lord Mayor of London Nicholas Lyons.

The Show dates back to the 13<sup>th</sup> century when King John insisted that each newly-elected Mayor of the City of London should come to Westminster and swear loyalty to the Crown, and the Mayor of London has been making that journey for over 800 years! The procession begins at Mansion House and arrives at the Royal Courts of Justice, via St Pauls, where the new Lord Mayor swears their oath of allegiance, and then heads back to Mansion House.

The procession includes military bands, Taiko drummers, mounted knights, dancing troupes, inflatables, giant contraptions, ceremonial displays and many floats including one highlighting the Pollinating London Together (PLT) initiative. This is a pan-Livery project that is raising awareness of the importance of biodiversity and pollinators, and their substantial recent decline. Our Company is actively supporting the PLT initiative.

Every year the procession is different and surprising. But the absolute highlight is the golden State Coach, which has been used in every Lord Mayor's Show since 1757, and is the oldest ceremonial vehicle in regular use in the world.

It was my first participation in the Lord Mayor's Show but what a wonderful experience! The crowds, estimated at 250,000, cheered and waved as the procession passed. Lots of high fives! And the weather was terrific, a sunny and surprisingly warm day for November, just perfect for lunch on HQS Wellington.



*The Engineers' party at the Lord Mayor's Show: L-R Master Audrey Canning, John Chandler, Middle Warden Dolores Byrne, Clerk Peter Gracey*



*The new Lord Mayor of London, Nicholas Lyons, waves from his state coach at the Guildhall*

Following lunch the procession continued its passage via Embankment and Victoria Street. The crowds were just as enthusiastic, cheering us en-route until we again reached Saddlers Hall amidst the glorious sound of the bells of St Pauls and other City churches. It was a very memorable day!

*Dolores Byrne*



*The Master with the Master Fueller*



*The Master and Clerk enjoying the parade*

*Photos: John Canning*



## Turning New Manufacturing Technologies into Commercial Reality

Virtual Soirée No. 28, 22 November 2022

A visit to the University of Strathclyde's Advanced Forming Research Centre (AFRC), part of the National Manufacturing Scotland (NMIS) Group, had been planned for November 2020 which would have been during the Covid-19 pandemic so the visit was postponed. To show us what we missed, Dr Alastair Conway who is head of operations at AFRC was the speaker at a virtual Soirée in November 2022.

AFRC was founded in 2008 and now employs about 90 people. Its success was the catalyst for the creation of the overall NMIS Group, which employs over 250 people. The AFRC is funded one third by industry, one third by academia and one third by Government. AFRC is the only High Value Manufacturing (HVM) Catapult focussed on metal forming and forging. Its industrial partners including Rolls Royce and Boeing pay a fee to work with AFRC, which is a globally recognised centre of excellence.



Multi-forge equipment at AFRC

Metal forming includes various manufacturing processes to plastically deform metal at high pressures between contacting surfaces to achieve a desired geometry. Metal forging involves the use of pressurised blows to deform a metal workpiece. These processes can replace multiple machining operations and thereby reduce material waste and improve rates of production. Applications include seals for high speed turbine aero engines and landing gear for aircraft. Finite element analysis, mechanical testing and other techniques are used to predict and monitor final shapes, material properties and residual stresses, and the life of dies and tools. Metals formed include steel, Inconel, titanium and aluminium. Formed thicknesses may be as thin as 0.8mm.

The AFRC's capabilities include characterisation of metals by mechanical testing; modelling and simulation; strain mapping; incremental near net shape processing; hot and cold steel sheet forming, bulk and process metal forming, and metal

processing. AFRC has production scale equipment. Its three engineering R&D teams are focussed on forging and incremental technology, forming, and materials and residual stresses. Process modelling can be used for a range of alloys to predict and improve grain flow and microstructure, and reduce use of energy, tool stresses and temperatures and avoid premature tool failure.

Dr Conway gave examples of the forming processes used—flow forming, spin and shear forming, and radial forming. In one example, the length of a pipe was increased threefold by flow forming over a rotating mandrel with one or more rollers. He noted the improved metal utilisation that can be achieved compared with forging and machining, and the improved mechanical properties, high accuracy, reduced process time, and less use of energy that can be achieved.

Future developments are needed to reduce the weight of road vehicles, especially battery electric vehicles which are heavier than vehicles with Internal Combustion Engines; reduction in carbon footprint on the path to Net Zero including less use of materials, resources and energy including manufacturing at lower temperatures and the reuse of swarf from machining; and forged components for storage of fuels at low temperatures.

Dr Conway answered many questions from an appreciative audience, noting that the UK is very inventive but sometimes needs to get better at getting approvals for new techniques and products! There is more detail in the video of his talk at <https://www.youtube.com/watch?v=jbjg0WcuS4k>

PM Peter Blair-Fish

## Annual Carol Service

The Chapel Royal, Tower of London, 13 December 2022



Photo: John Canning.

The evening of 13<sup>th</sup> December saw a bunch of intrepid Engineers and partners brave the icy weather and rail strikes to gather at the Tower of London's West Gate in eager anticipation of the Carol Service that lay ahead. The cold was tempered by the magnificent backdrop of the Tower and Tower Bridge and a display of festive lights atop the Shard.

It felt like a special experience to be walking down Watery Lane without the crowds and past Traitors' Gate before turning into Tower Green.

The Green looked wonderful with its Christmas trees and sprinkling of snow still on the ground. The almost Dickensian scene of the glow from the Canon's residence created an idealised yuletide setting.

As we waited outside the Chapel Royal we could hear the tail end of the Choir practice. It was all very atmospheric.

The Rev Canon Roger Hall MBE let us in to the welcome shelter of the Chapel and once we were all seated, reflected on the sad loss of our own Honorary Chaplain, Peter Hartley.

Having then treated us to his usual short history lesson about the Chapel and its interesting internees, including Anne Boleyn, Peter advised that he had passed into history himself as the longest serving Chaplain and was keen to stress that the Chapel is not a museum but a working place of worship whose heartbeat was driven by services like ours which are

so important when the country seems to be falling apart.

As a final sign off before he headed to the vestry, he lay down a small inter-Livery challenge. None of the many carol services he had held this season had been interrupted by a mobile phone....enough said!

A reflective calm then descended while we waited for 18.00 start.

A sharp ringtone then cut through the silence. There were amused rumblings around the chapel, it was not clear if these were a sympathetic response or that the Engineers were marvelling at the British designed 16 billion transistors that were the source of the noise. No words were spoken, but we knew that the integrity of our Company was untarnished, as the service had not officially begun!

The proceedings were splendid with the traditional benchmark carols and excellent readings from Livery Court members, with Peter Blair-Fish standing in for our Master and her consort who sadly were unable to attend through illness. The country may be falling apart but, reassuringly, we can still put on a proper carol service.

After we had wrapped up, we were back into icy night for the brisk walk to Clothmakers' Hall, where we had an excellent dinner and most entertaining principal guest Christine Ridgen, Past Master of the Constructors, who gave a great pre-dinner speech about her role as an Ale Conner.

Dick Elsy



## Court and Partners' Dinner, Girdlers' Hall

12 January 2023



Following the court meeting on 12th January, a dinner was held at Girdlers' Hall for court members and their partners.

The principal guest was Mr Mike Roberts a past master Girdler. Mr Roberts explained the history of the craft of girdling and the history of the godless company and they're hall. In mediaeval times before the invention of zips and buttons girdles were belts used to secure clothing. A girdle was also used as a means of storing useful items and valuables such as money. They were therefore vital piece of mediaeval clothing.

The Girdlers' company received its letters patent from Edward the third in 1327. Although the craft of girdling is no longer practised the company has the owner of presenting the girdle and stole worn by the sovereign at each coronation.

The present Girdlers' Hall is the third the first was built in the 1430 is and was destroyed in the great fire

of London, the second built in 1681 what is destroyed by enemy action in December 1940 and a present Hall was completed in 1961.

Past Master Roberts drew guests' attention to the Girdlers' carpet which hangs on the wall of the dining hall. This magnificent carpet, measuring 8 yards x 2.5 yards, was donated to the Company by one Robert Bell who was master in 1611 and again in 1634. Bell was a merchant adventurer who served as a prominent member of the East India Company, and who acquired carpet during his employment. The carpet was woven in Lahore, which was a prominent centre of weaving in Mughal India. Fortunately, the carpet was rescued at the time of both the great fire and the blitz, and it has since been lent to the Victoria and Albert Museum and to the Metropolitan Museum of Art in New York.

Chris Elston



Above: court and partners; below: the Girdlers' magnificent carpet.  
Photos: John Canning



## Engineers Trust Outreach Project Round-up

Kalomo District, Zambia



In late 2021, the Engineers Trust awarded the first Engineering Outreach Grant of £5,000 to the charity Just a Drop (<https://www.justadrop.org/>) for an engineering project that contributes to the relief of poverty. We are now pleased to receive the following round-up report from Just a Drop.

We are pleased to present this final report to The Engineers Trust for the project generously funded at Lusumpuko Primary School, Zambia.

Before work began Lusumpuko Primary School lacked adequate access to gender-sensitive latrines, hand washing facilities and clean water. Limited access to safe hygiene and sanitation mean students often suffered from waterborne illnesses and absences were high, especially for girls who struggle to attend school during their periods, further reducing their chance of accessing a full education.

Thanks to your support, we have worked with the local community to construct four gender-sensitive latrines including a washroom for the girls and a hand washing station for all students, using Interlocking Stabilised Soil Block (ISSB) technology.

As part of the project, students and teachers received WASH training to improve the overall hygiene and

sanitation practices of the school, helping to improve the health of students and teachers.

Across the project, the following activities have been delivered:

- General community meeting;
- Procurement of ISSB brick press and shipping from Kenya;
- The community bringing materials to the site: pit sand; river sand; clay soil; crushed stones; and soak away stones;
- Marking of the site, and digging of pits by the community;
- Training staff and the community on use of the ISSB brick press;
- Moulding of ISSB inter-locking stabilised soil blocks;
- Construction of the sub-structure and the flood-proof slab;
- Construction of the super-structure with ISSBs, and the rainwater harvesting tank to supply the washroom;
- Roofing, beam filling, flooring, fittings, painting and glazing;
- Drainage installed;
- Sign off by District Education Board, and project handover to the school.





Latrines under construction

The local community provided 25% of materials, marked out the site, dug the latrine pits, moulded ISSB bricks, and fetched water. The community was supportive and worked hard to play their part. The ground at the site was very rocky but they persevered to complete the digging of the pits by hand. The community had to divide their time between assisting with this project and attending to their own livelihoods, so it took longer to mould ISSB bricks than planned, and our partner African Revival involved the District Education Board and the local chief to encourage the community in moulding bricks for the project.

Once the bricks had been moulded, the construction of the building was straightforward, and on completion of the latrines, the Construction Co-ordinator conducted training for the Maintenance Committee on 13th October 2022.

The Maintenance Committee is made up of the school administration and the Parents Teachers' Association and they are responsible for taking care of the new infrastructure. The training will help the

school management and pupils to take care of the facilities through preventative maintenance. The school administration will also be responsible for drawing up a cleaning rota for the pupils. The Construction Co-ordinator will monitor the project regularly to check on the upkeep.

WASH training of the pupils has helped to improve hygiene standards in the school. Pupils have developed a habit of washing their hands after use of latrines.

This project has reduced the ratio of girls to latrines to 1:20, which is higher than the government standard of 1:25, serving the school well for a long time to come.

Overall wellbeing at the school is increased, as students and teachers are healthier due to improved sanitation and hygiene. Girls' absences decrease as they now have access to gender sensitive latrines. Children have a better chance to gain a quality education, as a step out of poverty.



'WASH' training in action



Project commemorative plaque

## From Hawley Award 2021 to £1M Earthshot Prize 2022

### Notpla's seaweed-based packaging that replaces single-use plastic

In July 2021, the Engineers Trust was impressed with the submission by Pierre Paslier, co-founder of Notpla, for "Developing Notpla's seaweed technology towards replacing single use plastics" and selected him as joint winner of the 2021 Hawley Award. This recognised Notpla as a company that created an innovation that helps to achieve Net Zero Carbon. Pierre, and Notpla co-founder Rodrigo Garcia Gonzalez, are graduates of the Royal College of Art / Imperial College Dyson School of Design Engineering and are grateful for this support which helped them to progress their aspiration to make packaging disappear.



Figure 1 Credit Notpla - Philip Paslier and Rodrigo Garcia Gonzales

Notpla creates truly sustainable packaging solutions from seaweed and plants that disappear naturally, giving consumers the convenience of single-use, without the plastic waste.

In the fight against climate change, seaweed could be a surprising – but vital – weapon. Seaweed is one of the planet's most abundant sources of biomass - Giant Kelp's biomass, for instance, increases by 20% per day, its production does not compete with food crops, requires no fertiliser or fresh water to produce. Finally, farmed seaweed captures carbon 20 times faster than trees, addressing one of the key causes of the climate crisis. Actually, if 9% of the ocean had seaweed farms, we could draw down all the CO<sub>2</sub> we produce (see <https://www.youtube.com/watch?v=DTy-bJVH2U>, La Revoluton des Algues, Vincent Doumeizel).

Notpla are famed for their edible liquid packaging, Ooho, their takeaway box coated with Notpla Coating, and their single-use film sachet replacements. To date, their solutions have already replaced 2.8 million pieces of single-use plastic from entering our



Figure 3 Credit Longlong Han - Notpla Takeaway Boxes



Figure 2 Credit Longlong Han - Ooho Tasting

environment. Falling outside of the new EU Single-Use Plastic Directive which aims to ban synthetic materials such as PLA, PHA and other bioplastics,

Notpla packaging solutions easily biodegrade in nature in just 4-6 weeks without the need for industrial composting

or special conditions.

Winning the Hawley Award Prize strengthened Notpla's credibility in the packaging industry and allowed them to continue expanding their mission to make packaging disappear. Stakeholders were able to see that what the team were doing was really valuable to help resolve our plastic crisis, and that now is the time to join the fight against single-use plastics.

Since July 2021, the company has grown massively. From two products in the portfolio, Notpla now counts eight packaging solutions for different applications, from the food service industry to cosmetic.



2022 has seen significant growth in partnerships and international expansion. Products are now available in eight countries thanks to partnership with Just Eat TakeAway.com <https://www.justeattakeaway.com/>, and Notpla packaging solutions have been used at momentous football events, including the Women’s Champions League Final in Turin, the Men’s Europa League final in Seville and the Women’s Euro final at Wembley stadium.



Figure 4 Credit Earthshot Prize - HRH Prince William, Pierre Paslier and Rodrigo Garcia Gonzales

In December 2022, the start-up was thrilled to win the prestigious £1,000,000 Earthshot “Build a Waste-Free World” Prize for their innovative plastic-free packaging <https://earthshotprize.org/winners-finalists/notpla/>. This recognition is a testament to the hard work and dedication of the whole team.

In March 2023, Notpla announced as one of the Grand Prize winners of the Plastic Innovation Prize <https://plasticprize.org/#winners> ! This global competition, founded by TOM FORD and powered by non-profit Lonely Whale, source and scale marine-safe and biologically degradable alternatives to

traditional thin-film plastic made from fossil fuel.

Notpla’s success is a classic example of what Past Master Bob Hawley sought to achieve when he set up the Hawley Award in 2006 to inspire and encourage engineers and scientists to commercialise their innovative engineering projects that benefit the environment. Although the Engineers Trust’s financial contribution to Notpla’s endeavours was small (relative to later investors and global prizes), its significance in providing that early encouragement, and showing confidence in Notpla, should not be underestimated. A great testimony to PM Bob’s foresight!

By seeing how their donations are put to good effect, members of the Engineers Company are invited to help other such winners – through donations to the Trust, Mentoring, or advice via the Company’s Entrepreneurs Scheme.

## Blueprints for Successful Innovation—In Conversation with the 2022 MacRobert Award Winners Quanta Dialysis Technologies

21<sup>st</sup> November 2022 at the Royal Academy of Engineering, Prince Philip House

Quanta Dialysis Technologies won the 2022 MacRobert Award for its compact, portable and affordable dialysis machines, suitable for home dialysis (see <https://macrobertaward.raeng.award.uk/2022-finalists>). Speaking in conversation with Hannah Prett, deputy business editor of The Times, Quanta’s innovation was described by Professor Clive Buckberry FEng one of the founders of Quanta Dialysis Technologies, as a disposable fluid cartridge system, re-engineered from a fast food juice

dispenser, which allows for a compact dialysis machine. This confers distinct advantages of patient choice and convenience—an affordable home dialysis system to replace the traditional time-consuming visits to hospital (dialysis) centres staffed by nursing and health care staff. Patients with kidney failure typically visit hospital three times per week for four to five hours of dialysis. It enables dialysis on a “little and often” basis, with the advantage of better overall water balance and avoids accumulation



SC+ Compact Dialysis Machine

of water and toxins which over the long term can lead to renal failure.

Potential advantages to the National Health Service are huge. With 28,000 NHS patients receiving hospital dialysis and 2.2 million globally, total cost of care amounts to 2-3% of the NHS annual budget with the number of patients growing at 5% per year.

At Quanta’s foundation a fee of £1 was ceremonially exchanged for the two original patents. Since then over a 14 year development period Quanta has raised £400 million of funding, primarily from overseas sources and secured a CE mark and approval of the US Federal Drug Agency. The whole enterprise is supported by 250 people in Warwick, England and Beverly, USA, many more than the original team of seven.

The next phase will entail roll out in the UK and US. It will require scale up and manufacturing from small scale production of bespoke parts to manufacture at scale.

Asked by Hannah why he had entered the design for the award, Professor Buckberry credited the long standing encouragement of Member of the Livery Dr Ian Nussey over the lifetime of the project. He described his own early academic background and his conviction of recognition of the achievement of the entire team behind the innovation, as judged by engineering peers in the industry.

Professor Buckberry and Ms Prett were joined for a panel discussion by Professor Sir Richard Friend, Chair of the MacRobert judges; Ms Noemie Turner, VP of Technology Development and Commercialisation for BP and Ms Liz Upton, Chief

Marketing and Commercial Officer for Raspberry Pi, both companies being previous MacRobert winners. The panel considered what factors made for successful engineering innovation. Sir Richard explained that innovation could take place in organisations of any size and for the purpose of the MacRobert Award, it was essential that the development could be taken through to the commercial stage. The panel agreed that this required a team of people with diverse skills, including marketing, manufacturing, and sales, and that there must be an emphasis on the customer.

Other requirements include funding, it being noted that all the money raised by Quanta had come from outside the UK because of the difficulty in getting UK funds to invest in manufacturing. There needs to be a skilled workforce from which to draw. The UK has good skills in automotive and these are transferrable, but it was noted that government intervention has a role to play: Silicon Valley came about because the US government was making huge investments in defence research.

The discussion concluded with the panel giving their opinion of the advantages that the UK has. These included diversity; compact geography allowing better interaction and feedback; great innovation skills. To make these effective, we need to create centres of expertise and attract talent from around the world.

The Chair concluded by thanking the RAEng and the Engineers’ Company for their support of the MacRobert award and a drinks reception followed.

Peter and Diana Blair-Fish and Chris Elston



## Virtual Burns Supper

8 February, 2023

### “Robert Burns and Engineering”



*PM John Baxter slays the haggis then rewards himself with a generous dram*



Who but an engineer would try to run a virtual Burns supper, link Robert Burns to engineering and use a PowerPoint presentation for the Immortal Memory?

Past Master John Baxter did this for an audience of 50+ Livery Members and partners who enjoyed the evening and were educated about Burns and the wider social history of his time. During John’s Out of Town in Glasgow, Past Master Gordon Masterton did the ‘Address to the Haggis’ with considerable aplomb and theatrical manoeuvres. As Gordon was not available this year John, for the first time ever, did the Address. It was evident that he was tentative at the point of cutting into the steaming flanks, not least as the prospect of hot liquid offal spraying him and his computer screen were on his mind. And bow tie and tartan trews aren’t classed as PPE! However, no injuries were reported.

During the evening John read selected Burns poetry, mainly those poems which can almost be understood by a non-Scottish listener. His mother’s favourite was “My love is like a red, red, rose...”. For John it is “To a Mouse” with the wonderful environmentalist sentiment which is still relevant today - “I’m truly sorry man’s dominion has broken nature’s social union...”.

John’s extensive research on Burns’ links with engineering proved to be fruitless. Both James Watt (John’s engineering hero) and Thomas Telford (to whom John is distantly related) were Fellows of the Royal Society of Edinburgh at the time when Burns

lived in Edinburgh, but the RSE has no record of any meetings with Burns. Thomas Telford did write a very moving poem when he heard of Robert Burns death and we’ll just have to hope that James Watt kept a book of Burns alongside his workbench to read when he wasn’t doing engineering.

Additional contributions to the evening came from Assistant Tony Whitehead and Middle Warden Dolores Byrne. They continued a good-humoured ‘battle of the sexes’ by delivering the ‘Toast to the Lassies’ and the response ‘Toast to the Laddies’. Tony praised our “moderating influence on the behaviour of those laddies present at Worshipful Company dinners”. He also thanked the lassies for undertaking the domestic duties of the evening with “an opportunity to demonstrate your extraordinary culinary skills - obviously at an event where you would not trust your Laddie in the kitchen - and later on to show your Laddies how to load the dishwasher correctly or to do the washing up properly!” Dolores raised the stakes by replying in rhyming couplets! I particularly liked: “Joking aside, we love them all, our Friends, Partners and Lovers, And most of all we thank them all, for not comparing us to their mothers.”

Another most successful virtual soiree and dinner with the video being available on the Company YouTube Channel.

*Penny Taylor*

## Mini Out of Town Visit to Cheshire

31 March to 1 April, 2023



*The Engineers’ Party at Jodrell Bank. Photo: John Williams*

### Friday 31 March: Big dish - Big Day

On 31 March 2023 forty members of the Company visited Jodrell Bank as part of the Cheshire Mini-Out-of-Town visit.

Modern cosmology is based on radio astronomy: mostly developed at this Manchester University Research Centre. After WW2, Bernard Lovell believed he could study cosmic rays using ex-military radar equipment. Finding the centre of Manchester too electronically noisy, he moved to the then university botany department in the countryside. Instead of cosmic rays, Lovell found radio waves emitted from meteors; subsequent work discovered pulsars, quasars, gravitational lenses, black holes and the distant after-glow of the Big Bang. The science of radio astronomy had been born.

To improve reach and resolution, larger and larger telescopes were needed, and in 1950 Lovell conceived the idea of a 250’ (76m) steerable parabolic dish. Nothing like it had been built before, and the dimensions of the bowl had to be maintained to strict tolerances. Ultimately, conventional steel lattice trusses – based on bridge engineering - were employed to give the necessary rigidity and lightness. In a nod to the austerity of the times, second-hand rack and pinion gearing from scrapped warship turrets was used to tilt the dish.

Work started in 1952, but – true to innovative engineering projects throughout history - costs spiralled, progress stalled, and the project ran

massively into debt. Lovell was roundly criticised for the waste of public money. Unlikely as it seems, he was saved by the USSR. In 1957 the Russians launched Sputnik 1, and the telescope proved to be the ideal device to track its progress. Funds were mysteriously facilitated to complete the work and render the telescope functional in a matter of days.

The telescope continued to be used for tracking and early-warning purposes alongside its research work. It is still in use today, but technology has moved on to include Very Long Baseline Interferometry, where signals from dishes many hundreds of miles apart are integrated to produce higher resolution images. Its iconic status was recognised by being made a Grade 1 listed building and, in 2019, a World Heritage Site.

After an introductory video, our party enjoyed an immersive film show of the origins of the cosmos – incidentally demonstrating how easily the sense of balance can be fooled by visual stimuli. We then made our somewhat wobbly ways to the brand-new First Light Pavilion, a state-of-the-art museum telling the story of Professor Sir Bernard Lovell, the site and the telescope. The Pavilion is a semi-underground, futuristic design with polished concrete walls, mimicking the size and shape of the telescope dish. Fortified by a splendid tea, we moved outside into the gentle Cheshire drizzle to admire the telescope itself, and to play with the many interactive exhibits, seemingly designed for engineers of all ages!

*John Crackett*



## Friday 31 March Dinner and Saturday 1 April Canal Walk

We regrouped at the conveniently located De Vere Cranage Estate Hotel for overnight accommodation and dinner. After a champagne reception the dinner was well received, and many complimented the quality (and quantity) of the food. As ever we all enjoyed the good company too.

We breakfasted on Saturday morning for departure around 09.30 to Northwich and the Anderton Boat Lift about 10 miles away. We met at the boat lift car park at 10.30 with the sun shining and there was an enthusiastic turn out for a beautifully organised WCE Livery heritage six mile walk in the heart of the Cheshire countryside along the North Cheshire Way, through parkland to the Trent and Mersey Canal. The sun shone as the circular walk began at the Anderton Boat Lift Visitor Centre where we had an opportunity to see the boat lift, a masterpiece of Victorian Engineering and the lovely Budworth Mere with its diverse bird life.

The Anderton Boat Lift links the River Weaver and the Trent and Mersey Canal, which were used for transporting salt and pottery, two major industries in the north-west, due to the natural deposits of salt in Cheshire and clay in Staffordshire. An excellent explanation of the Cheshire salt industry has been curated by historian and industrial archaeologist, the late Lady Mary Rochester, at the nearby Weaver Hall Museum. For the Chemical Engineers amongst us, we



were excited to learn that low-density polyethylene was first produced by Imperial Chemical Industries Ltd in 1933 at the nearby factory, now known as, Tata Chemicals Winnington Works.

The walk entered the country park where, after 4 miles, we arrived at a convenient pit stop of a picnic area with a coffee trailer together with clean public toilets, both well received and patronised.

We arrived back at the car park at 1.30 with free time for inspection of the boat lift and its visitor centre. Regrettably, the lift was under maintenance and not operational but nevertheless its grandeur was clear to all. The 50-foot Anderton boat lift is the world's oldest operational boat lift. Designed by Edwin Clark and opened in 1875, the hydraulic lift had two wrought iron tanks, caissons, which could each take two narrowboats or one barge. Manually operated, vertical-lift gates, were raised and lowered to allow boats in and out of the caissons.

After a very pleasant walk with some wonderful company, we enjoyed the excellent sustenance of the Anderton visitor centre, with grateful thanks to the intrepid organiser, Jean Billingsley.

Overall, this was an excellent two days hosted by Master Audrey Canning, ably assisted by Consort and photographer John and brilliantly planned and choreographed by Jean Billingsley.

*David Holmes and Helen Ramsay*

*Above: the walkers step out, led by Jean Billingsley; below: the assembled party at the Anderton Boat Lift. Photos: John Williams*

## Thanksgiving Service for the Late Reverend Peter Hartley

At St Vedast-alias-Foster, 21 February 2023



The Thanksgiving Service for the life and ministry of our late Chaplain, Reverend Peter Hartley, was a lovely occasion. Through hymns, anthems, memories, a homily, prayers, and readings, the congregation were reminded of Peter's caring, faith and accomplishments, which made him the special person he was, although one should add, he would not like to be described thus.

The service was led by the Rector of St. Vedast-alias-Foster, Reverend Paul Kennedy, assisted by the Reverend Dr Simon Hill. A goodly number of members of the Engineers Company attended the service with Fiona, Peter's wife, his family and friends. The service began with the welcome and opening prayer by the Rector, followed by the hymn 'Lord, Jesus Christ, you have come to us'. The service, particularly the hymns, was very reflective of Peter, his faith and his ministry.

There were three 'Remembering Peter' speeches, by Past Masters Isobel Pollock-Hulf and David Johnson, (given by Past Master Pat O'Reilly in David's absence), and by David Swann, our previous Clerk. In their differing ways, they all spoke of Peter as a caring, compassionate and thoughtful confidante, with a well-developed sense of humour. Isobel reminded us that he was foremost our Chaplain, a person of deep faith, who led and focused our thoughts at the start of our meetings whether that be Court meetings, church services or Out of Town dinners. Many members of the company will remember Peter mostly from his thoughts that he gave at the start of the Zoom talks during lockdown and the Covid restrictions in 2020 and 2021. They were always perceptive and uplifting and stressed the importance of caring and fellowship during those difficult times.

Isobel and David Swann both spoke movingly about the support and counsel Peter gave them during and after the illnesses and deaths of their spouses. He gave considerable help and guidance to all Masters, staff and countless members of the Company.

David Johnson and Peter's friendship was enhanced by their shared interest in railways. Members were reminded of Peter's role in the Bluebell Heritage Railway and the visit the Company made there in 2017. Pat rightly reminded us that Peter was also a professional engineer. He made an important contribution in designing and managing civil engineering projects worldwide. Peter drew on his extensive experience to write a well-received book entitled 'Consulting Engineering: Constructing the Future'. One thing I did not know about Peter was the major role he played in the Engineers Charitable trust. He was a trustee of long standing who, besides transforming its financial affairs, was clearly its moral compass and creative spirit.

After the hymn, 'O Christ the same, through all our story's pages' the Master, Audrey Canning, read from Ecclesiastes 3, 'There is a time for everything'. The Choir sang Psalm 121, 'The Lord is your keeper'. A homily was given by Reverend Dr Hill, who had known Peter through ministry and friendship for 43 years. He shared his understanding of Peter's deep faith which was based on his love of God and his love of all. When thinking about all that Peter meant to us and did for us, we should remember he came to us in the name of the Lord.

Reinforcing the homily, the choir then sang a moving anthem, 'Love bade me welcome' based on a poem by George Herbert and composed by Vaughan Williams. This was new to me and I suspect many others. The hymn 'Tell out, my soul, the greatness of the Lord' followed prayers. The choir were in continuing good voice with the familiar anthem 'The Lord bless you and keep you' by John Rutter. The service ended with a splendid organ recital of Toccata (5th Symphony) by Charles-Marie Widor.

After the service, there were refreshments served by the Court members when we were able to ponder on the lovely service we had witnessed and share our memories of Peter. Reverend Peter Hartley was a special person due to his love, his faith, his caring, his service and his fellowship.

*Mike Howse*



## Master's Invited Lecture - Geopolitical Challenges, International Competition and Trade: The Role of the UK Armed Forces

18 April 2023, Stationers' Hall



Though not strictly a company event, the Master was joined at her final event to mark the end of her year by Aldermen Alison Gowman and Robert Hughes-Penny, and 27 Masters/Prime Wardens and Immediate Past Masters/Deputy Masters representing 23 Livery Companies. The lecture was held in the newly refurbished rooms on the 3<sup>rd</sup> floor of Stationer's Hall. This is a modern space which was excellent for hosting this gathering. The Master was also joined by a small group of Court Members.

The Master on introducing her speaker, noted that the year had come full circle. Her first Guest Speaker gave a talk on the role of standards in trade, and her final speaker was to give a talk on the current geopolitical challenges to Trade.

The talk was given by Captain and Barrister Ian Park of the Royal Navy. He has served on seven ships and deployed worldwide in support of the Royal Navy's contribution to defence. He has also deployed as a legal adviser on operations to Afghanistan and, on many occasions, to the Middle East. Ian is, or has been, a Visiting Fellow at Harvard Law School, a Hudson Fellow at Oxford University, a Mountbatten Fellow at Cambridge University, a First Sea Lord's Fellow, and a Freeman of the City of London. He is a graduate of St. John's College, Cambridge, has a doctorate in international law from Balliol College, Oxford and has lectured at Harvard Law School, The National University of Singapore, The Academy of Military Sciences, Beijing, Hanoi University, and Freiburg University amongst other

institutions. Ian has written or contributed to four books including a monograph *The Right to Life in Armed Conflict* (Oxford University Press, 2018) and currently teaches part-time at Yale Law School and serves in the UK Ministry of Defence.

His talk was entitled 'Geopolitical Challenges, International Competition and Trade: The Role of the UK Armed Forces'. The talk was wide ranging and authoritative. The challenges not only to Trade (50% of world shipping trade travels through the East Asian region) but also economic stability were discussed. Not surprisingly climate change is also a factor, opening up the Arctic sea trade routes, and changing the balance between the countries bordering these routes. It was noted that there are currently 27 armed conflicts ongoing around the world, a surprise to many in the audience. Takeaways included that we are in a time of profound geopolitical challenge, there is an enormous significance in partnerships, the role of UK arms forces remains important, but is a significant resource challenge, and have we learned the lessons of the recent past?

After a fascinating lecture which stimulated much discussion, informal discussions continued over canapés and a glass of wine/soft drink.

*Audrey Canning*

*Above, the Master and Captain Parks; above opposite, the Master, Captain Parks and invited guests. Photos: John Canning.*



## LIVERY EVENTS

### Election Court

14 March 2023

At the Election Court held at Saddlers' Hall on the 14<sup>th</sup> March 2023, the following were elected to serve for the year 2023-2024:

**Mr Raymond Joyce**, as Master;

**Dr Dolores Byrne, OBE**, as Senior Warden;

**Eur Ing Penny Taylor, JP**, as Middle Warden; and,

**Professor Andrew McNaughton, FREng**, as Junior Warden.

Livery Members **Professor David Bogle; Mr Norman Dawson; Mr Ivan MacTaggart and Mr Paul Mayo** were elected unopposed to fill three Court vacancies as Assistants.

The following were re-appointed:

**Commander Peter Gracey, RN**, as Clerk;

**Mrs Sandra Watts**, as Assistant Clerk;

**Mr Lee Taylor** as Beadle.



*The Master and newly clothed Members of the Livery. Air Marshall Sir Julian Young; Mrs Julie Wood; Mr David Payne and Mr Steve Harridge*



## United Guilds Service and Lunch

24 March, 2023

The 79<sup>th</sup> Service of the United Guilds of the City of London (UGS) was held on a blustery day with the odd passing shower thrown in to add interest to clothing choices. The many tourists outside St Paul's were clearly impressed by the Gowned/ Badged Livery and I am sure we feature in many hundreds of photos. The Master, Senior Warden and Clerk, appropriately robed, joined the throng of other Masters/Wardens/Clerks in an orderly queue to gain entry to St Paul's Cathedral for the ever popular Service first held on 25 March 1943. It is one of the few occasions when the Livery Companies and Guilds come together as a whole.

After the obligatory photo call on the steps of St Paul's, the Master, Senior Warden and Clerk joined the other 17 members in the allocated Company Pew (no 48) or the reserved overspill seats. It was an honour to be welcomed to our seats by St Paul's Wandsman Gillian Scahill. Needless to say, St Paul's is packed for this special occasion in the life of the City.

As Consort, I was privileged to have a reserved seat under the Dome alongside the other Consorts, many but not all, wearing hats (small). A seat under the Dome is probably one of the best seats in the cathedral and does not suffer from the 0.5 second sound lag encountered at the Company pew.

The Service is full of finery and ritual as one would expect, touched with humility. The music and the choir were glorious. The Trumpet Fanfares clearly belonged in such a great building. The readings, including by our Lord Mayor, were thought provoking.

The Sermon was given by The Very Reverend Dr David Hoyle, MBE, the Dean of Westminster. In a thoughtful and sometimes humorous sermon, the



Dean reflected on the difference between the West (Westminster) and the East (The City). He paid particular tribute to the philanthropic nature of the City Livery Companies and Guilds, who despite the many individual groups represent a single powerful city body and he challenged them to continue to consider 'where next'.

Following the Service, we repaired to a magnificent refurbished Stationers' Hall, along with several other Livery Companies and Guilds. The traditional cheers rang out as the companies were introduced as I think the Engineers were in good voice on this occasion. We had two tables this year, sandwiched between the Fruiterers and the Tobacco Pipe Makers. One of the tables was shared three Fruiterers. We had fascinating conversations on Hops production in Kent amongst other topics over an excellent meal and accompanying wine.

*John Canning*



Above: Clerk, Master and Senior Warden on the steps of St Paul's; below: the Engineers' lunch party. Photos: John Canning

## The Annual Livery Service Church of St Vedas-alias-Foster 14 March 2023



Above: worshippers, including Past Masters O'Reilly, Johnson and Brooks proceed to the church. Below: assembling at St Vedast's

It was only a short walk from Saddlers' Hall to the church, as the back wall of the church is shared with the back of the terrace of Saddlers' Hall. This allows one to see the beautiful stained glass from both sides.

The Rector, Reverend Paul Kennedy, led the service and took as his theme that this is sadly the second year when we have had a special Prayer for Ukraine to close the service, as the fighting is still continuing. He mentioned how he and his wife had taken in a Ukrainian Mother and son. This meant that they had found out a lot more about the people their guests had left behind who are seeing the war at first hand. He addressed this theme in a number of different ways throughout the service.

The anthem sung by the choir was 'Easter' by the priest poet George Herbert, pointing out that there is no Easter without Good Friday, that the resurrection cannot happen without the death and that whilst we are made of dust, we are also full of life.

The opening hymn was "God of concrete, God of steel" with an additional verse by the Senior Warden brining the technology up to date with the line "Lord of PC and i-phones". Linking his theme to engineering, The Reverend Kennedy spoke about how engineers in Ukraine are restoring the infrastructure and so helping the people and rebuilding communities. He finished by urging us all to use our best endeavours to make the world a safer and more peaceful place.

*Penny Taylor*



### Election Court Dinner - "A New Rider to Saddle Up, but the Horse Remains the Same"

Many years ago when my wife and I lived in Japan we were invited to a British Council tour of Eigamura, the "samurai village" used in films. I was asked to produce a write up for their magazine. I did the article in the style of "Mr Ben". I did not realise the readership of the magazine was largely Japanese businessmen aiming to hone their English skills, who were left completely bemused. I received a furious letter from the British Consul and was never invited on a British Council event again\*. This is my second event write up in thirty years, so I may be a bit rusty.

*\*Editor's note: If you can get it past the editor, it's fair game, Stefan.*





*Pre-dinner drinks at Saddler's Hall*

My daughter is in her third year at senior school. You would think, by now, she would know what was going on – but her first two years were during COVID, so there are a raft of things that the teachers expect her to know that she is still completely bemused by. This is, by coincidence, my third year of being a liveryman of the Worshipful Company of Engineers – I know how she feels. However, it does not take any inside knowledge to put on smart clothes, turn up at a beautiful central London location and eat. It is worth pausing a short while before going into Saddlers' Hall. The small garden surrounding the entrance reminds me of Japan, and the fountain, with its echo of a horse trough, and the corner statue, a chess piece stylised horse, picked out by spotlights in an early Spring evening, are welcome touches amidst the surrounding temples to shopping. The socialising aspect, after a couple of years of seclusion, can still be a little tricky – but engineers are, in general, a welcoming group, despite slander from certain groups, probably motivated by envy. Conversations with old hands alternated with ones with new members – and as ever I am stunned by the variety of actual work covered by the term “engineering.”

The dinner was spectacular, both in content and presentation. I am always astounded at the hidden gems of architecture that the livery companies represent, and immensely grateful for the opportunity to see them. The “home turf” of Saddlers' Hall also provides an excuse to bombard my horse mad daughter with pictures of saddles. I resisted the temptation to flood my social media with pictures of

food but will say I thought the starter (Cornish crab tartlet) was stunning.

I was struck by how many partners were in attendance, not just as a “one off”, but as regular attendees. I am hopeful that now my daughter is old enough to not just be left on her own in the evening, but positively look forward to such things, I can persuade my wife along.

This was a meal with a purpose – introducing the livery to the Master Elect, Raymond Joyce, who will be taking office in April. Raymond outlined his plans for the year, including the new Innovation4All Award, aiming at supporting ideas for using technology to alleviate poverty (I have to mention this – I am a trustee of Tech4All, the charity involved), as well as noting the array of events planned. The Worshipful Company name opens doors and has value. Raymond noted the work building on Audrey's review of the purpose of WCE, taking the output from that, and re-focussing the Company on its core goals.

Audrey, the outgoing Master also spoke, and her presentation is reported in more detail elsewhere. I will note that it has been yet another period of change and challenge for us all, and the ship has not just been kept afloat, but steered in a purposeful direction with aplomb and skill. Despite being a “new” livery company, the Company represents a link with traditions that predate it, and that continuity has served it well; the core can stay the same despite the adaptation to events.



New Members spoke to introduce themselves in the segment I like to call “Hello Stefan, this is your imposter syndrome calling.” Another reminder of the breadth of careers within “engineering”, and the talent the Company has within its ranks. The toasts required some calorie burn in terms of standing and sitting. I did wonder whether there was scope to design some sort of “stand assist” for future events, but the risk of projecting members of the Livery into the wonderful ceiling rose of Saddlers' Hall is perhaps too great to risk it. The passage of the stirrup cup is one of those traditions where I feel I missed the habituation, and some commented how using chocolates instead of drink was a shame. Recovering from a particularly snotty cold, I think my fellow diners might have had a lucky escape. I think I got the process right, although there is scope for an explanatory job card, with pictograms. I was not sure

whether it was acceptable to wield a fork to give extra protection to your companion while they “drank” – but perhaps that is only needed if nearby company looks especially shifty.

The last WCE event I went to I had been caught unprepared by the post pandemic cull of late train services and ended up having to catch buses in Croydon in the early morning – a thankful prayer to the “CityMapper” phone app – which was not an experience I wanted to repeat. So, a few conversations, and I was homeward bound, whilst not short-changed in good food or good company.

In summary, the WCE is a friendly but serious modern livery company representing an ancient set of professional skills. Changes to those carrying out the roles, and the environment around us do not change the purpose and passion behind the company. The Election Court Dinner confirmed that the reins remain in good hands.

*Stefan Kukula*



*Above: Master and guests, including the Prime Warden of the Saddlers' Company, Mrs Lucy Atherton, and her consort Mr James Atherton; below: diners stand for the loving cup ceremony.*



## Company News

### The Immediate Past Master's Report



*A summary of this report was presented to the Installation Court on 25<sup>th</sup> April 2023.*

You may remember that my theme is 'Challenging Boundaries', acknowledging that we are in a period of fast changing technology, markets, international allegiances and environmental impacts. And indeed my year has been a time of great change not just in the rapid technology advances, but also within the Company, the Country and the wider world.

Entering my year, many had thought that the disruption of the pandemic was largely behind us, despite the escalating war in Ukraine impacting general confidence and prices in the shops. As the year progressed we saw Covid continuing to impact on city events as well as numbers attending our formal Livery calendar, and even resulting in my missing my own Christmas Carol Concert and dinner! As the year progressed we saw the impact of two hard years of pandemic, with many in the Livery and beyond looking to change their personal priorities, seek new positions and reduce exposure to infection, as well as prioritising their many delayed celebrations and holidays. This was compounded by the steep rise in the cost of living, turmoil on the Stock Exchange and disruption to rail travel from strikes and a surprisingly long snowy winter.

At the start of September we mourned the loss of Her Late Majesty Queen Elizabeth 2<sup>nd</sup>. And throughout the year we have experienced a high level of personal loss, including our Honorary Chaplain the Reverend Peter Hartley and our senior Liverymen; Sir Frank McWilliams, Assistant Emeritus Denis Filer, Sir Robert Walmsley, Brian Nuttel, Robb Eadie and Peter Cullimore.

But despite the many challenges, the Company remains in a strong financial position. Although numbers attending our Formal Livery dinners are down, our Out of Town (OOT) and Mini (regional) OOTs have proved highly attractive, as have our Court dinners and on-line events. Further, economies in the Office have reduced the budgeted labour cost by some £5k. The operating surplus on the year of £17,917 more than compensates for the decrease in invested capital (£12,974), bringing total assets on 31st December 2022 to £190,233, a £5k surplus, despite a below inflation increase in Quarterage.

Although total membership numbers have remained steady, the numbers of members of the Livery have decreased. I am aware of several members who have serious illness and others who have financial challenges and send them my best wishes. Recognising the importance of a thriving Livery to our Company, I have established a mechanism to further the Membership of the Company and I have overseen the procurement of four Livery Gowns for a very modest outlay, increasing the number who can be clothed at any one Court meeting to 10.

In other respects our Company has thrived. When I look back at the achievements of this year I am proud to say that we have been instrumental in the formation of a new inter-Livery initiative, the Green Aviation Task Group, which is exploring how the City (and Lord Mayor) can stimulate the greening of air transport. At the same time this will help the recovery of one of the UK's leading industries worth more than £25 Billion Pounds to GDP. It is hoped that the topic will feature at The City of London Corporation Net Zero Delivery Summit in 2024.

Closer to home, we have reviewed our Strategy and produced a 'Strategy on a Page' document\*, advocating no real changes, but a crystallisation of why we are here and how we can move forward in our three main principles of Fellowship, Promotion of Engineering and Philanthropy. As part of this activity we have developed a strategic plan for both internal and external communications and against which the Terms of Reference for the Marketing and Communications Committee are being reviewed. We have also identified the need for a sustainable plan for engagement with the City and beyond – unfortunately this remains a 'work in progress'!

We have addressed several organisational changes, including recruitment of a new Clerk, reorganisation of the Office and progressed identification of candidates for our next Honorary Chaplain. We have appointed Alderman Professor Michael Mainelli as Honorary Liveryman, who (subject to election) will be the next Lord Mayor and we have appointed our late Clerk Colonel David Swann as Honorary Freeman. David is already engaged with our

Company, organising part of the activities for the Master's Out of Town to Stratford in July 2023. Further, we have refreshed our Court, accepting the transfer to Court Emeritus or deferment of service for those suffering from the consequences of Covid.

We have launched our new website, which better promotes our Livery values and which will be far easier to maintain. We have published 26 'blogs'/news items (including a monthly Master's Blog and news on the extraordinary achievements of three of our women members – Dawn Bonfield MBE, Dawn Childs DBE and Jacqui Murray, appointed COO of the National Manufacturing Institute of Scotland). We have also recorded six YouTube videos during our on-line technical 'soirees' and debates.

We have held two 'PECL' events, aimed at Promoting Engineering in the City of London. The first of these, 'The Future of Air Vehicles', has led directly to our being invited to become a founding member of the Inter-livery 'Green Aviation Task Group'. The second, a Master's Invited Lecture, saw Captain and Barrister Ian Park presenting on the topic of the 'Geopolitical Challenges, International Competition and Trade: The Role of the UK Armed Forces' to an audience of two Aldermen and 29 Masters or Immediate Past Masters of other Livery Companies. Both events have increased our profile in the City.

We have also held four regional weekends, traveling to members in the South (Isle of Wight), West (Cardiff), Midlands (Birmingham) and the Northwest (Cheshire). Each of the weekends has comprised of multiple events, including engineering heritage, technological, philanthropic and social activities. Although the North (Glasgow) proved a step too far for physical travel, one of our 'soirees' came from the University of Strathclyde: yet another came from Google, California. For those unwilling to travel at all, we have continued our 'emerging tradition' of a virtual Burns Supper, ably hosted by Past Master Baxter.

Despite the disruptions, we have held all six of our formal Livery dinners in London, as well as our annual 'Out of Town' (OOT), this year to Cambridge. The formal events have enabled us to dine in some unique spaces, including the Guildhall (for our Awards Celebration), the Girdlers and Apothecaries Halls (for our Court meetings) and, during the OOT, Corpus Christi College and The Imperial War Museum. We have also been privileged to see some extraordinary collections, including the Parker library where we saw books dating back to the 9th century, and the Churchill College archives where, in addition to Frank Whittle's seminary paper on the jet engine, we saw Margaret Thatcher's handbag!

Our formal events have also allowed us to consider some important socio-economic challenges. At my Installation we heard about the need for a level playing field to enable international trade from BSI Director Scott Steedman. At our October Court dinner we were privileged to hear from Oxford Pro

VC Professor Anne Trefethan on the impact of social media on our everyday lives. Dame Professor Sarah Springman and Sheriff Andrew Marsden both recognised the benefits to society of an engineering education at our Awards Celebration and Annual Banquet, and at the Annual Banquet we were privileged also to hear from MP Chi Onwurah on the importance of an Engineering voice in Government. The presentation from Captain and Barrister Ian Park one week before I step down takes us full circle back to the importance of international trade to the UK economy and how the Armed Forces can support it in these challenging times.

Beyond our own Company activities, we have continued to support Inter-Livery initiatives including 'The Livery Climate Action Group' (we are now addressing our own plans to contribute to 'net zero'), 'The Pan-Livery Pro Bono Interest Group' (during the year we have baselined our 'pro-bono' 'giving') and 'The Constructors Livery Group', in addition to our involvement in the new 'Green Aviation Task Group'. We have also instigated an initiative to join the Chamber of Commerce, City Branch (which is considering how to stimulate SMEs and tourism in the City to counter-balance the reduction in footfall since the pandemic) as well as joining the Pollinating London Together initiative, aimed at protecting the population of pollinators (and hence bio-diversity) in the City of London.

Overall we have hosted at least 30 Livery Companies, raising our profile as a proactive member of the Livery, and contributed to several City fund raising events, included the Jailed and Bailed event on behalf of the Red Cross (where we raised £1.4k plus gift aid), as well as supporting the Sheriffs', Treloar's and Lord Mayor's and Lady Mayoress's fundraising activities.

Do I have any regrets? Well, yes! I have not been able to bring you a truly insightful talk on the impact of Artificial Intelligence on our daily lives, although the first international guidance on safety of AI which I initiated in 2020 is about to be published. The awareness of AI has certainly been one of the most significant technological changes of my year. I would have loved to find a speaker who could properly explain the trades between the indisputable benefits (from astronomical research to financial management) with the inherent risks of reasoning from uncertain, incomplete data using algorithms with underlying assumptions that are rarely understood. But that must remain a story for another year.

To conclude, I would like to pay special tribute to my Clerks, Colonel David Swann, his successor Commander Peter Gracey, Assistant Clerk Sandra Watts and Temporary Clerk Adele Thorpe, all of whom have worked hard to ensure this year has been, not only a success, but a joyful and pleasurable reflection of my ideas and priorities. I would also like to thank those members of the Company who

\*Reproduced on Page 41 of this issue.



have worked so hard to ensure the regional events were a success, Jane Forrest, Windsor Coles and Sue Hewerdine, Keith and Janet Williams, Penny Taylor and John Williams, and Jean Billingsley and James Anderton. A special thanks goes to our 'Tech Team' who have ensured our on-line events ran like clockwork.

I would like to record a special thanks to our first male Consort, my husband John, who has dedicated a huge amount of time to Consort activities, both within our Company and in the wider Livery and which has certainly smoothed my way.

Last, but by no means least, I would like to thank my Wardens, the Past Masters who have been a huge source of wisdom and encouragement, the volunteer members of the Court and its Committees, and all the members of the several task groups, some well-established, but many others formed on an 'ad hoc' basis to support my goals and aspirations for our Worshipful Company of Engineers over the past year.

I look forward to a strong and cohesive Livery in the coming years and wish my Wardens the very best for their upcoming years. Thank you for the immense privilege of representing the Worshipful Company of Engineers for the year 2022-23. God Bless.



### Honours and Awards



We warmly congratulate Member of the Livery **Dawn Childs FREng FIMEchE FICE FRAeS FWES** on her appointment as a Dame of the British Empire (DBE) in the 2023 New Year Honours. She joined the RAF from school, studied mechanical engineering at Bath University and was trained as an officer at

RAF Cranwell. In her 23 years in the RAF she was the first female officer in many of her appointments. After leaving the RAF in 2012, she was head of engineering at Gatwick Airport 2012-2016, Group Engineering Director for Merlin Entertainments 2016-2019, UK Change Director at National Grid 2019-2021 and since 2021 CEO (Delivery) of Pure Data Centre Group. She was clothed in the Livery in 2019 and is currently President of WES, the Women's Engineering Society.

### Hon. Almoner's Report, March 2023

I hope and trust that you are all keeping well and are beginning to be more active and able to live more normally now that we have come through the pandemic. We had hoped last year to be able to hold the Almoner's Lunch but felt that it was safer for our Companions to postpone it until this year.

Now that we have turned the corner with the pandemic, we are pleased to inform our Companions and other invited guests that the Almoner's lunch will take place at the RAF Club on the 17 May 2023. This will be the first Almoner's Lunch since 2019.

Invitations are currently being sent out so do, please try to come along.

This year we have widened the invitations to include:

- Companions, Widows / Widowers of Liverymen and a friend – Held by the Office.
- Master and Lady
- Wardens and Partners
- Chaplain and Lady
- Almoner's Group Members
- Invited guests from families needing some respite.

We have tried to keep the costs down as low as possible despite the recent cost increases everyone has been subject to and my thanks go to PM Pat O'Reilly for organising our RAF Club once again. This event provides an opportunity to meet old friends, enjoy each other's company and renew our fellowship after such a long time.

As most members know Peter Hartley sadly died in the Autumn. He and I worked closely together in support of his Ministry and undertaking the Almoner's duties, he is greatly missed and I would like to take this opportunity to remember Peter and thank him for his support and friendship. We continue to hold Fiona and family in our thoughts.

Peter would have been extremely pleased that this year we are able to resume the Almoner's Lunch.

Finally, I would like to reaffirm that the Almoner continues to be available for any Companion, Liveryman or Freeman and Partners who would like to discuss any issues. I continue to be available when required for as long as a situation lasts.

We would like to wish you all good health and happiness, perhaps with opportunity to enjoy some good spring and summer weather and to meet up with friends and family.

*Barry Gasper, Hon. Almoner*

### New Livery Members

We are delighted to welcome the following to the Livery:

#### Professor Dr Michael Mainelli



Professor Dr Michael Mainelli MStJ FCCA FCSI(Hon) FBCS FRSA, Executive Chairman, Z/Yen Group.

Michael is a qualified accountant, securities professional, computer specialist, and management consultant, educated at Harvard University and Trinity College Dublin. He gained his PhD at the London School of

Economics statistics & mathematics applying chaos theory to strategic planning, where he also became a Visiting Professor of Innovation & IT. Originally a research scientist in aerospace (rocket science) and computing (architecture & cartography), he became a senior partner of accountants BDO Binder Hamlyn and a director of UK Ministry of Defence research. During a mergers & acquisitions spell in merchant banking with Deutsche Morgan Grenfell, he co-founded Z/Yen, the City of London's leading think-tank, promoting societal advance through better finance and technology. Z/Yen is renowned for its Global Financial, Green Finance, and Smart Centres indices. Michael's technical claims to fame might be the first commercial digital maps of the world, the early 1980s Geodat and Mundocart, and one of the first high-speed blockchains in the mid 1990s. Michael continues to lead technology and economic research in machine-learning, electronics, health, finance, and other sectors. Michael is Senior Independent Director of the United Kingdom Accreditation Service responsible for ISO standards and regulating laboratories and certification agencies, and non-executive director of a listed mining firm, as well as Emeritus Professor & Life Fellow at Gresham College, Honorary Fellow of King's College London, Fellow of Goodenough College, Visiting Professor at UCL's Bartlett School of Sustainable Construction, and an Honorary Bencher of Middle Temple. As for engineering, he has had some fun developing guidance systems for Pershing and Patriot, running project management for Eurotunnel SA, and creating computer-aided detection of pulmonary cancer, colon cancer, and heart disease, widely deployed in China from 2005. He has been awarded Consigliere del Senato Accademico of L'Accademia Tiberina, British Computer Society Director of the Year, and UK Foresight Challenge & Smart Awards. His book The Price of Fish: A New Approach To Wicked Economics And Better Decisions, won the

Independent Publisher Book Awards Finance, Investment & Economics Gold Prize. He is active in eleven livery companies, an Alderman of the City of London and late Sheriff of the City of London 2019-2021, with charity interests in the environment, education, and care. Michael's wider interests include skiing, woodcarving, bagpipes, glassblowing, shooting, and racing boats & barges, sitting on the world's oldest sailing race body, the Thames Match.

#### Mr Adrian Sims



After leaving school I worked for a variety of building engineering companies before going to university to complete an engineering degree (part time). After graduating I moved into design and manufacture of industrial fans and ventilation systems. Shortly afterwards set up Vent-Tech in 2001 undertaking the design, installation, and commissioning of Local Exhaust Ventilation (LEV) projects.

In 2008, I embarked on obtaining British Occupational Hygiene Society (BOHS) qualifications initially in Control and latterly in Occupational Hygiene to assist knowledge and expertise in the field of LEV systems. I have also been lucky to be awarded:

- 2014: BOHS Certificate of Competence in Control and became an approved lecturer and examiner of the BOHS LEV qualifications and subsequently obtained the status of Specialist Member of the BOHS in Control.
- 2015: Society of Operations Engineers (SOE) – Plant Engineer of the Year for work relating to LEV
- 2022: Building and Engineering Services Association (BESA) – Specialist Group Award for Excellence

I was co-author of BESA ILEVE TR40 LEV Guide to Good Practice and am chair of the LEV Industry Forum Competency Committee.

Keen to raise the standards within the LEV industry, I am currently serving on the Steering Committee of the Institute of Local Exhaust Ventilation Engineers (ILEVE) and a Council member for the BESA (as well as sitting on both their LEV committee and Skills Partnership committee).

Away from work, I am married to Wendy. I am a keen sportsman who in the past has played canoe





The Master and Members of the Livery newly clothed on 10 October 2022.  
 L-R: Professor Simon Jones; Mr Adrian Sims; Professor Mark Jefferies; Master, Audrey Canning;  
 Dr Andrew Banks; Mr Jonathan Wyatt and Professor Dr Michael Mainelli

polo to international standard and more recently rugby union to a rather lower standard. As the rigors of life take its toll, I have moved into competing in Triathlons and managing the garden.

**Dr Alan Banks**

My name is Alan Banks and I'm the Lightweight Structures Supervisor within Innovation and Research at Ford Motor Company. I started work at Ford in 1983 as an apprentice and worked in Chassis Engineering responsible for suspension systems on commercial vehicles until 2019, moving to Innovation and Research to lead projects with light-weighting technologies with mass production capability.



I have a passion for engineering and motor racing in general. I used to co-own a moped racing team that won the 1991 Le Mans Moped Challenge with a home-built bike! I'm extremely passionate about engineering and am a very proud STEM ambassador. I can't wait to have more time for these activities and getting my role in WCE aligned with this.

I gained my first degree, MSc and PhD from the University of Bradford, am a Fellow and Chartered Engineer with the Institute of Engineering Technology and a Fellow of the Institute of Innovation and Knowledge Exchange, as well as a

member of the Society of Automotive Engineers. I Chair the Board of Director for the Composites UK Trade Association, Chair the Vehicular Composites Group and Chair the Lightweighting UK Auto Council Strategy Group

**Mr Suraj Shinde**

I am originally from Mumbai, India but living in Mexico City. I am an established and recognised Innovation Leader, Digital Strategist & AI Expert with around 30 years of international experience working with world-renowned IT companies at different technical, leadership and executive positions from Consultancy Practice Director to Director of Innovation to CIO. I am also an accredited and well experienced Software Engineer and Enterprise Architect, an Inventor with various patents, author of papers and articles as well as speaker at conferences. I am a Chartered Engineer with the Engineering Council, U.K, and recipient of the Membership Award for Engineering from The City & Guilds of London Institute, I also hold an Executive MBA from IPADE Business School in Mexico. I am a Senior Member of the IEEE, a Chartered IT Professional and Fellow of the British Computer Society. I am continually involved in voluntary activities by providing free assessments and consultancy on Smart Cities to municipal governments to conducting free innovation



workshops and disruptive technology lectures to students at public universities. I regularly mentor tech entrepreneurs on a pro bono basis and I have been a UN Peacekeeper at the UNPROFOR mission in former Yugoslavia during the Bosnian war.

**Mr Justin Davies-Trigg**

As Head of Aerospace at Innovate UK I oversee the delivery of the ATI Programme, part of the HM Government's sector deal in aerospace, having joined Technology Strategy Board at the beginning of the funding in 2014 as Programme Manager, during which, I have been party to significant technology innovations and developed a network both within and outside of the sector.



I was always interested in aircraft from an early age, wanting to be a pilot from about the age of 5 and graduating from University of Bristol in 2022 with a Masters in Aeronautical Engineering. Unusually, the first aircraft I worked on was a 1918 RE8. Some of you may have seen this suspended in Airspace, IWM Duxford during last year's Cambridge Out of Town. This led me to independently undertake some courses in the conservation of transport and industrial collections.

Over the first 10 years of my career worked across much of the Airbus product range in primary structures, systems integration, and testing (A400M, A350 and A320 NEO). This was interspersed with experience designing and delivering First and Business Class seating.

**Mr Jonathan Wyatt**

I am A Fellow of the Institution of Civil Engineers who was sponsored at university by W&C French and remained with the French Kier group for 42 years, where I was fortunate to be involved with the construction and successful tendering for a wide variety of projects in the UK and overseas including: Road, Rail, Airports, Water, Power, Marine, Industrial, Nuclear & Tunnelling. I have been mentoring civil engineers for



the last 35 years as they progress to becoming Chartered Engineers.

Highlights of my career include Leading a team constructing a £150m railway and suspended conveyor system for a new bauxite mine in Jamaica. I also led the estimating team that secured the tunnelling contracts for the new Elizabeth rail line from West London to the City, including the station works at Farringdon.

J Wyatt Consulting Ltd was established in 2020 to capitalise on the vast experience I have gained over 48 years in pricing and successfully delivering a wide array of Civil Engineering projects. I am now providing estimating consultancy services for several of the Water companies, as they look into water resilience options for the future.

Any spare time I have is taken up trying to maintain our 700-year-old listed (and listing) property in Suffolk.

**Professor Mark Jefferies**

Firstly, thank you to everyone who has made me feel so welcome in the Company; I am privileged to have joined you as a Livery Member. I started my career as a young apprentice at Rolls-Royce and consider myself very fortunate to have received the support of so many great people in the subsequent years - especially those who encouraged my education, both practical and academic!



From those early days I became a specialist in gas turbine combustion, working on a variety of engines that variously help you go on holiday, or protect our country.

Leadership of national and international Research & Development programmes led me to a most rewarding period of my career working with universities and researchers around the world; some truly amazing people. I get to build world-class award-winning partnerships, help envision and then create nationally important infrastructure, see hundreds of young people develop their skills, and advise public, private, and Government bodies on truly effective collaborations.

It is fair to say though, that despite being close to some incredibly advanced technologies, I still have a love of old machines - particularly mechanical timepieces, early tractors, and the cars and bikes I was surrounded by as a child.



**Mr Steve Harridge**

After graduation from Surrey University, I joined RDL, an international steelwork contractor. There I learned practical steel design, with some mechanical engineering thrown in. I had a year in the fabrication shops, perhaps the most valuable part of my engineering education. Next was to site on the installation of the gates for the Dubai Dry Dock, which initiated my liking for work overseas, and finally read an MSc / DIC at Imperial College.



After ten years with RDL I joined Tony Gee and Partners, a fledgling civil and structural engineering consultancy, my work being the design and construction of steelwork of all types, mostly for contractor clients, often with a significant mechanical content.

After three years in Hong Kong, I became a Partner in the firm in 1984, returning to UK at the end of that year. I took responsibility for most of the firm's overseas work until I retired in 2013.

Most of my work was in the methodology for the construction of complex structures, often employing the use of purpose-built machinery.

Since retirement I co-authored a book on the design and use of Bridge Deck Erection gear and took on a few Expert cases but now try to avoid them as they disrupt our sailing, overseas travel, and the enjoyment of our elderly TR2 sports car.

**Obituaries**

**The Company has been informed about the recent deaths of the following members:**

Livery Member **Robb Eadie MBA FICHEM** died in October 2022 at the age of 55. Robb joined the Freedom in August 2016 and advanced to the Livery the following March. He is survived by his wife Anne. He worked for BP for many years but had been BHP's Chief Risk Officer for the last 5 years. It is notable that Robb twice deployed for REDR UK in support of earthquake disaster relief in Armenia (1988) and Turkey (2001). He was also a supporter of the Movember Foundation (in his own words '10 year a Mo-Bro').

Non-active member of the Freedom **Dr Phil Bennett FREng CEng PhD FIET FICE** died on 1<sup>st</sup> December at the age of 75. Dr Phil joined the Company in October 1990, advanced to the Livery the following January, became a Court Assistant in 1998 but resigned in 2017. He was the long-time Chief Executive and later Chairman of CSE International Ltd (Centre for Software Engineering). He then spent a couple of years as Systems Integration and Technology Director for Crossrail. Latterly he ran his own consultancy and was also an Honorary Visiting Professor in the Department of Computer Science at the University of York.

Non-active member of the Freedom **William (Bill) Edgar CBE FREng FRSE** died on 31<sup>st</sup> December at the age of 84. Bill joined the Company in May 2005, advancing to the Livery the following January, but resigned in 2019. He was a Past President of The Institution of Mechanical Engineers.

Livery Member **Brian Nuttall CEng FIET**, who died suddenly on 16<sup>th</sup> January 2023, aged 78, was an expert in airfield ground lighting.

He worked in the civil service for many years in York, Leeds and Edinburgh. On retirement from the civil service, he ran courses in airfield ground lighting in Brussels and Paris, keeping an apartment in Paris for many years. He and his wife Ann attended many meetings in Paris for members of PEIs.

He was admitted to the Freedom of the Worshipful Company of Engineers in August 2007 and to the Livery of the Company in January 2008. He and Ann attended the 2022 OOT visit to Cambridge and several of the virtual Soirees held in 2010, 2011 and 2022

Member of the Livery **Peter Anthony Cullimore MBE BSc CEng FIET FIMgt** passed away peacefully at home in Beaconsfield on 10 April aged 85. Peter joined the Company in August 1986 and was clothed in the Livery the following January. He was awarded the MBE in the Queen's Birthday Honours List 2021.

Member of the Livery **David James FICE** passed away after a long illness in March. David joined the Company in March 2009 and was clothed in the Livery in March 2013. Before retirement David was self-employed as a Consultant/Advisor to the Secretary of State for Transport and to the Mayor of London.



**Obituary**

**Sir Francis McWilliams, GBE BSc FCGI FEng HonFICE Master, 1990-91; Lord Mayor of London, 1992-93 8<sup>th</sup> February 1926 – 31<sup>st</sup> August 2022**



Photo: Gordon McGowan

Sir Francis (Frank to his many friends) McWilliams GBE was born in Edinburgh to John and Mary McWilliams. He was the youngest of six children and the first in the family to attend university, studying Civil Engineering at the University of Edinburgh. He graduated in 1945 and worked initially for Edinburgh's City Engineer, then on to Staffordshire, then Deputy Engineer for Tyldesley Urban District Council (also becoming Captain of the Tyldesley Rugby Union team). He passed the ICE examination for corporate membership at the minimum age of 23 but was not permitted to use his designatory letters (MICE) until he reached 25. At the age of 26 he became Chief Engineer to Longridge UDC near Preston.

In 1953 he accepted the job of Deputy Chief Engineer in Malacca during the communist "emergency" in Malaya. This soon led to what he termed his 'dream job' as the Engineer for Petaling Jaya, Malaysia's first New Town to the west of Kuala Lumpur. When he began, there were only a few hundred inhabitants in what was otherwise jungle. By the time he stepped down 10 years later it was a thriving town with more than 100,000 inhabitants, built to Frank's masterplan.

Before the roads had been surfaced, one night he heard a car revving noisily near where he lived. Frank went to help and found the car axle-deep in mud. While he sorted out a tractor to rescue the car, he invited the driver to his home, not knowing who he was. It turned out to be the future Sultan of Selangor who was impressed by Frank's eagerness to help and they became close friends. Frank's

contribution to Malaysia earned him the title Dato Seri Selera (a Malaysian 'knighthood'), conferred by his old friend, by then the Sultan, in 1973.

Frank later moved into the private sector in Malaysia as a consultant, also buying a 10-acre plantation near the heart of Kuala Lumpur and developing it for housing.

At the age of 50 he decided it was time for a new challenge back in the UK and having succeeded as an arbitrator for a large dispute in Brunei, he studied and qualified as a barrister in 1978. He then became a full time building and engineering arbitrator inspiring Lord Bingham, the then Master of the Rolls, to invent the strapline "from building sewers to suing builders" when he was accepted in the Law Courts as Lord Mayor. He subsequently used this as the subtitle of his autobiography\*.

Frank was living in the Barbican and worked his way up through the City of London's elected roles initially as Common Councillor, then Alderman for the Ward of Aldersgate, and Sheriff and was elected Lord Mayor for 1992/93. It was this great honour that prompted the Company to present him with a scale replica of Iron Bridge in silver gilt. During his period as Lord Mayor, the 1993 Bishopsgate bombing took place and his subsequent discussions with John Major led to the establishment of the 'ring of steel' around the City of London.

Frank was awarded the Knight Grand Cross (GBE) in 1992 and Honorary Doctorates from City, Kingston and Edinburgh Universities in 1994. Frank and Wyn had a happy retirement in the Borders of Scotland, Frank writing his autobiography there. In 2020 they moved to Tenterden, Kent to be near the family. It was then that Frank and the family returned the Iron Bridge model to the Company, gratefully acknowledged in my blog on the Company website.

Frank was a founder member of the Company joining in September 1983, taking Livery Number 12, becoming a Court Assistant in November 1983, and being clothed in the Livery in March 1984 (the first Court clothing). He served as Junior Warden in 1987-88 progressing to be our seventh Master in 1990-91.

From a tenement in Portobello to one of the highest offices in the land, Frank epitomised the UK post-war ethos of talented and well-rounded individuals with energy and ambition having no barrier to success in business or public life.

Sir Francis McWilliams died peacefully on 31 August 2022, aged 96, survived by his wife Lady Winifred, and two sons Douglas and Michael.

*PM Gordon Masterton,*

\*Pray Silence for 'Jock' Whittington: From Building Sewers to Suing Builders (2002) Sir Francis McWilliams; Malu Publications.



Obituary

Mr Walter Balmford MBE BSc CEng FIET FRSA FIMC FAIA HonFCGI

17 May 1929 - 27 February 2023



Walter Balmford's MBE Investiture with the then HRH the Prince of Wales

In February 2023, aged 92, Walter Balmford MBE Hon FCGI. Past-Master Lightmonger and a member of the Engineers' Livery Company, (Liveryman from 1988 to 2009), died.

Many of us will have enjoyed Walter's tours of Charterhouse where he lived as a Brother for several years.

On 17 February 2017, Walter was invested as a MBE by the then HRH The Prince of Wales for his services to "Training and Education". As he explained to the Prince, his commitment to technical education and training went back more than 65 years since becoming the Training Adjutant at RAF North Coates where Commonwealth officers were taught Bomb Disposal techniques.

A Birmingham University Electrical Engineering graduate, he joined the family electrical wholesaling business after National Service. He became involved in The Electrical Wholesale Federation, rising to President in 1975, having introduced an apprenticeship scheme that remains the model for the industry.

Walter's expertise was recognised by the government, and he was appointed to the Distributive Industry Training Board – a role he held for almost a decade, working with the Director General to coordinate training for trainees in over 147,000 non-food distributors.

Beyond the UK, he spent two years as Director General of the Association of Business Executives (ABE <https://www.abeuk.com/>) promoting British style education in the Far East. And in London, he was the financial consultant to the London Diocesan Board for Schools for 10 years, and Director of Abercorn School for over 13 years.

It is in the City and with the Livery where Walter also made a significant mark. He was Master of the Worshipful Company of Lightmongers in 1987 and was instrumental in activating the support necessary to establish the highly successful Livery Companies Apprenticeship Scheme – which attracted over £1m of government support as a result of his tenacity, expertise and commitment. He continued to be an active member of the Livery and the Livery Companies Skills Council. For his exceptional, lifelong commitment to education and vocational training, and the very high regard in which he was held, Walter was awarded Honorary Fellowship of City & Guilds in 2019.

As a friend of Past Master Barry Brooks for many years, Walter was kind enough to co-sponsor Linda Brooks' Freedom of the City of London in 2019.

PM Barry Brooks



Linda Brooks receiving her Freedom of the City, supported by Walter Balmford and Sir Michael Bear

WCE 5 Year Strategic Plan

Approved by the Court on 14 March 2023

2<sup>nd</sup> March 2023

WCE 5 Year Strategic Plan 2023-2028

CRT-P-23-8

|                        |   |  |   |
|------------------------|---|--|---|
| <b>Objects*</b>        | <ul style="list-style-type: none"> <li>To promote the development and advancement of the science, art and practice of engineering for the benefit of the public.</li> <li>To afford means of professional and social intercourse and the exchange of information between members of the Company.</li> </ul>   | <b>Promoting Engineering in the City &amp; beyond</b>  | <b>Philanthropy</b>   |
| <b>Vision</b>          | <ul style="list-style-type: none"> <li>Building a multi-disciplinary fellowship of senior engineers to promote the engineering profession and philanthropy within the City of London and beyond.</li> </ul>   |  |   |
| <b>Mission*</b>        | <ul style="list-style-type: none"> <li>Promote, support, encourage standards of excellence, integrity &amp; honourable practice in conducting the profession of engineering.</li> <li>Create &amp; accumulate funds for philanthropic purposes, including education related to engineering and the relief of hardship amongst members and beyond.</li> <li>To Award prizes scholarships &amp; exhibitions to persons engaged in engineering and the delivery thereof.</li> <li>To engage with societies connected with the engineering profession.</li> <li>To further interest within WCE of the history, traditions &amp; customs of the City.</li> <li>To support the Lord Mayor, Aldermen &amp; Corporation of the City of London.</li> </ul> |  |   |
| <b>Core Principles</b> | <b>Engineering, Ethical &amp; Civic Fellowship</b>  |  |   |
| <b>Goals</b>           | To maintain an active Company which is welcoming, enjoyable, vibrant, fun and inclusive with enthusiastic participation by the members.   | To inform the Livery, Mayoralty and Corporation on the benefits of engineering to the City.<br>To support the Lord Mayor and City of London within our engineering scope.  | To sustain our philanthropic endeavours through the Trust and Company activities, whether through donations or contribution in kind.                              |
| <b>Benchmarks</b>      | Active participation in WCE activities.<br>Retention of Liverymen, year on year.<br>Sustainable recruitment of Liverymen, Freeman year on year.<br>Member satisfaction indicated through survey response.   | Contribution to LM's Appeal.<br>Engagement with Livery Committee Initiatives<br>Engagement with Civic Programme/Themes<br>Engagement with other Livery Cos.  | Regular giving/year, Growth of Trust funds.<br>Finance and Pro-bono contribution to Livery goals<br>Impact of donations to beneficiaries.                         |
| <b>Action Plan</b>     | Develop a Marketing and Comms plan that inspires and motivates existing & future members to actively participate in the goals of the Company, improves our internal and external communications and our achievements.<br><br>Clerk to lead.<br>Consider:<br>Stakeholders<br>Messaging & Mechanisms<br>Needs of standing committees  | Develop a plan for delivering the above goals through the existing committee structure, making use of the talents, knowledge and connections of Past Masters.<br><br>Master to lead.<br>Consider:<br>Existing intra-livery activities<br>City succession, Wards & themes<br>Who and what to target | Re-affirm that the Company is aligned with the Trust Deed.<br><br>Trustees lead by the Trust Chair.<br>Consider Resource.<br>Consider fundraising and its impact. |
| <b>Stakeholders</b>    | Officers, Members, Office, Companions and Associates  | Officers, Volunteer members, inc. pro-bono Office, City, inc. Livery, Corporation  | Trustees, Volunteer members inc. pro-bono Beneficiaries, inc. LM's appeal, RAEng Partners e.g. Award sponsors   |

\*Objects & Mission Précised from Charter and Ordinances, which take precedence



### *And Finally...*

PM Gordon Masterton attended an HMS Prince of Wales Affiliates' Dinner for two cities (Bristol and Liverpool); three Livery Companies (Engineers, Air Pilots and Farriers); and other charitable organisations with links to the ship. The photograph below was taken on the ship's bridge before the dinner.



Guests L-R in front tow rows: Gordon Masterton, Past Master Engineer; Jonathan Legat, Master Air Pilot; Ailsa Billington, Bristol; Stephen Parsons, Bristol Cathedral Trust; Councillor O'Rourke, Lord Mayor of Bristol; Deirdre Mills, director, Greenwich Hospital; Pamela Brown, Deputy Lieutenant, Liverpool; Ed Skeates, Development Director, BeFirst; Peaches Golding, Lord Lieutenant of Bristol; Martin Russell, Master Farrier; Captain Richard Hewitt, Commanding Officer, HMS Prince of Wales.

The Worshipful Company of Engineers

Saddlers' House, 44 Gutter Lane, London EC2V 6BR

Clerk: Commander Peter Gracey RN; Assistant Clerk: Mrs Sandra Watts

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