The Worshipful Company of Engineers

(Incorporated by Royal Charter 2004)

The Swordsman Newsletter

Issue 30, May 2013

CONTENTS

COVER PHOTOGRAPHS

Top	The Company Officers for 2013-4, Master Air-Vice Marshal Graham Skinner, Senior Warden John Baxter, Middle Warden Air-Vice Marshal Pat O'Reilly, Junior Warden Isobel Pollock, Clerk Wing Commander Tony Willenbruch and Chaplain Peter Hartley
Middle Left	Master, Wardens, Principal Guest and their Ladies and the Chaplain at the Installation Dinner
Middle Right	The 2012-3 Master and new Liverymen at the Installation Dinner
Bottom Left	The Master David Scahill and Gillian at the Mansion House
Bottom Middle	The new Master modelling the Company Apron at the Brooch Luncheon
Bottom Right	The new Master Graham Skinner and Margaret at the New Members Evening

FUTURE EVENTS

23rd May 2013	Visit to RAF Museum	Hendon
12th June 2013	Warden's Lecture	National Physical Lab
18th June 2013	Visit to Brooklands Motor Museum	Brooklands
24th June 2013	Election of Sheriffs and Luncheon	Guildhall
9th July 2013	Awards Dinner	Merchant Taylors' Hall
23rd July 2013	Golf Day	Beaconsfield GC
25th July 2013	Visit to Marshall Aerospace	Cambridge
30th August 2013	Informal Midlands Dinner	Hampton in Arden
26th to 29th September 2013	Out Of Town Meeting	Belfast
30th September 2013	Election of Lord Mayor	Guildhall
9th October 2013	Ladies Luncheon	RAF Club
18th October 2013	Annual Banquet	Mansion House
9th November 2013	Lord Mayor's Procession	The City

EDITORIAL

The Immediate Past Master continued his busy programme of mini out of town meetings throughout the second half of his year in office. The visits showed some excellent new infrastructure and technology and fascinating insights into older technology and the importance of engineers and scientists in the war effort. Although we, as engineers, would always like more money spent on infrastructure to improve the Country's ability to compete at least the Government seems to be moving in the right direction. Once again there are fascinating reports and some stirring speeches within this edition of the Swordsman and I would like to thank all the reporters for their contributions.

Raymond Cousins
Cyril.blumfield@btinternet.com

VISIT TO HMS SULTAN
4th October 2012

On Thursday the 4th October Liverymen of the Company visited HMS Sultan accompanied by members of the Plumbers, Founders, Blacksmiths, Turners, Shipwrights and Fuellers Companies. Seven Liverymen, including the Master, attended which was largest group from any Company.

Welcoming refreshments of tea, coffee and a delightful selection of shortcake biscuits in the Pillar Atrium, gave us the opportunity to meet other liverymen and our Liaison Officer and visit organiser Lieutenant J Tweed RN and many of his Royal Naval colleagues.

The Visitors to HMS Sultan with Steam Lorry 'Super Sentinel'

We then spent the rest of the morning in the Lecture Theatre where we were first welcomed by the Commodore of HMS Sultan, Mark Slawson. The Commodore gave us an understanding of the base's history starting as a Naval Air Station in 1914, becoming RAF Gosport in 1918 and then Naval Air Station HMS Siskin in 1945 and finally, since 1956, HMS Sultan. As well as talking about the military significance of these changes Commodore Slawson also spoke about the establishment's role in the local community together with the emphasis given to the personal development of the trainees.

The next address was given by the Head of Defence School Marine Engineering Training Royal Navy, Captain Trevor Gulley who described the training that is offered to junior rating entrants right through to that offered to engineering officers and returning officers. He spoke about the Defence College of Technical Training and the Defence School of Marine Engineering, including its structure, and the career paths for Officers and Engineering Technicians. He finished on the note that "We must continue to make learning interesting and stimulate a thirst for knowledge in a 'Military Context'".

The third address was given by Commander Nick Bowser RN who is the head of the Royal Naval Air Engineering and Survival Engineering School. He passionately believed that the aim and mission of the School is to deliver the Best Aeronautical Engineers in Defence and outlined the range of the training that is required for the repair and maintenance of all the naval aircraft in use today.

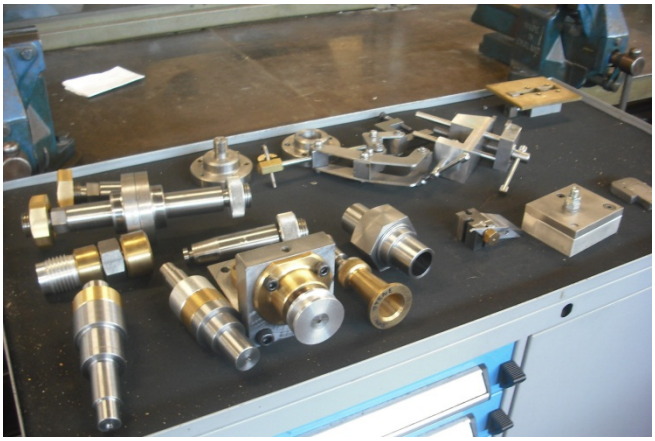
Next two warrant officers shared their personal experiences which brought the whole learning process to life.

To complete the morning a new talk was added this year and this was given by two young Wren Officers from the Royal Navy Presentation Team. They delivered an impressive presentation, supported by a video that demonstrated the relevance of the today's Royal Navy. Most inspiring!

Over lunch in the Wardroom the visitors had a chance to chat with an array of naval officers gaining further knowledge of what it is to be like in today's Royal Navy before gathering outside for the traditional photograph in front of HMS Sultan's steam lorry. This was followed by the opportunity for everyone to enjoy a ride on the lorry between the three training facilities we visited in the afternoon.

The Master with Other Liverymen Visitors

These were the Watt Hangar where we were walked through all sizes of diesel and gas turbine engines actually experiencing one of the "big beasts" being fired up, the 754 Squadron Newcomen Hanger housing the naval helicopters workshop and finally the Engineering Machine Shop. For me the Engineering Machine shop was the most interesting, talking to the young cadets and seeing their handiwork making engineering items of the highest standard.



Machine Shop Items Made by the Cadets

After the tours we returned to the Pillar Atrium for Coffee and Tea and a Question and Answer Session during which several Liverymen raised interesting questions about the day's events which were answered by Commodore Mark Slawson and his Staff Officers Captain Trevor Gulley and Commander Nick Bowser.

We left giving our thanks to the Commodore Mark Slawson and all his Staff for making us so welcome our visit so informative and entertaining.

Ian Watson

VISIT TO THE EMIRATES AIR LINE CABLE CAR 13th October 2012

To me the word 'Emirates' conjures up a vision of a hot, flat desert with distant buildings outlined through the temperature haze, the words 'Cable Car' a vision of the snow covered Alps. Thus an invitation from the Livery Company to visit the Emirates Cable Car conjures up a very conflicted vision, and was clearly a visit not to miss.

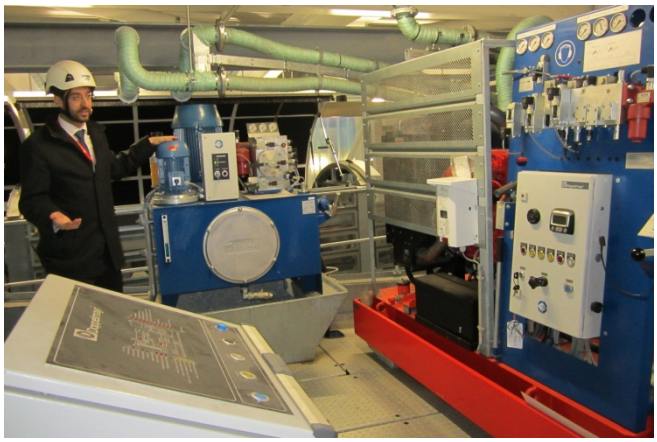
View of The Towers and Cables but no Cabins

The Cable Car or, to give it its formal name, the Emirates Air Line, runs between the Greenwich peninsula, on the eastern side of the O2 arena, across the Thames and Royal Dock to a point just south of Royal Victoria station on the DLR, a total distance of 1,100 metres (3,600 ft). It crosses the river at a height up to 90m (300ft) and is capable of carrying up to 2,500 passengers per hour in each direction, equivalent to the capacity of 50 buses.

A party of nearly thirty of us assembled as instructed, on a wet Friday afternoon, at the south side terminal where we were met by our guide, Assistant David Cooper, who gave an introductory explanation of the history and building of the cable car, and then Stacey Smith, from Mace, who built the Cable Car and who are currently responsible for operating the service, talked about the experience to date.

With Emirates as the sponsor the whole experience is themed around air travel, so we were issued with our Boarding Card, which allowed us to go through the barrier to Airside. We then went up the stairs to the passenger embarkation platform where the cabins are boarded and exited. We split into three parties and then rotated through three areas.

I went first to the service area where the Cabins can be maintained. The main purpose of this large area is to park the Cabins at night. We were also taken through the schematic of the overall system, and the various safeguards as well as the emergency rescue systems. This at least reassured me prior to travelling on the Cable Car although being lowered from a stranded Cabin to a waiting ship below would tax my vertigo!



Inside the Control Room

I then went to the control room where all the parameters for the Cable Car are displayed on computer screens; the system runs automatically needing no direct operator control. It was also interesting to see the video feed from each individual Cabin; the Controller can talk to the Cabins, all at once or an individual one (no misbehaving during the journey!).

Then it was time to don hard hat and fluorescent jacket, dodge the passing cabins, and ascend a steep

ladder to the machinery platform. Here we were shown how each Cabin came into the terminal on the single cable, was automatically disconnected from the cable, and then put onto rails. The cabins then travelled slowly round on the rails allowing passengers to exit and enter, before being re-attached to the cable and sent off on their way north.

Examining the Hooking 'On and Off' Mechanism

The cable car was designed by an Austrian company and its control and power mechanisms are state of the art showing how modern technology can create something both effective and efficient. The final part of the tour was the journey north-bound in a Cabin, each of which can take up to ten passengers. The Cabins edge forward while being boarded and exited, but there was plenty of time to embark. This was reassuring, having previously looked at the video tour on the excellent Emirates Air Line web site where there seemed little time for entry and exit, until I realised the video played at four times normal speed!

Unlike most mountain cable car systems, where the route just clears the local features, and altitude is only the result of the contours, the Emirates Air Line has to clear the Thames with adequate height and thus climbs very rapidly to the first pylon. This we were told is the fastest climbing Cable Car in the world. The height of the cable is a compromise between being above the tallest ships and below the approach path to City Airport, just!

The web video tour had given me an idea of the view from the cable car, but it totally under prepared me, even on a wet misty evening, for the vast panoramic view of London at night. The journey took just less than 10 minutes which on a clear day would be too short to take in everything. Having passed two more pylons, the Air Line plunges back down to ground at a serious rate. Then it was time to get out of the cabin and look at the northern terminal.

It's a Long way Down

Here we were taken into the engine room to see the huge electric motor which powers the system via an equally large gearbox. Alongside the engine and gearbox is a spare of each connected up ready to be pulled across on a hoist and connected should either fail. Our guide said they had practised this and they had changed the motor in less than 30 minutes.

Since we were dining on the north side I reluctantly declined the offer to travel back on the Cable Car. I entrust my dining arrangements for Livery Company visits to the excellent Barry Gasper, and again he came up trumps having booked a table at The Narrows at Limehouse where many of us had previously eaten after the Hydraulic Accumulator visit in August 2012. Seventeen of us sat down to eat and as before the food and service were very good, and the dining company was outstanding! I was told off by the Master for raucous behaviour so this may affect my outlook with the Company; perhaps it is fortunate the Master changes every 12 months!

Overall it was a great visit with the tour and explanation of the Air Line engineering, the journey across the London sky, and a great dinner. I will certainly be going back on a dry clear day and if you missed this visit I would suggest that, if you are in the area, it would be worthwhile taking a trip on the Air Line.

Simon Howison

MANSION HOUSE BANQUET 26th October 2012

The Annual Banquet in the Mansion House was addressed by the Master, Mr David Scahill, the Late Lord Mayor, Sir Michael Bear and, as guest speaker, Professor Sir Mike Gregory, the Head of the Institute for Manufacturing, at the University of Cambridge.

The Master and Wardens before Dinner

The Master drew on his experience in manufacturing first at GEC and then TT Group making and selling HV switch gear around the world. He reminded the Company that though manufacturing is now only 10% of the economy it is 50% of UK exports. Manufacturing has the ability to fill the current export gap just by 10% growth, plus 10% import substitution. This is dependent on new innovative products such as his experience of the spin out from Plessey which designs and makes IR security cameras. Starting from some military technology this company is now a world leader.

Alderman Sir Michael Bear the Late Lord Mayor standing in as Locum Tenens for the Lord Mayor commented as both an engineer and an advocate for the City of London. He brought up to date his time as Lord Mayor with light hearted comments about some of the more public events of 2012. First, we had the budget which through a number of slips turned into what was called an 'omni-shambles'. Next there were the shifting positions of the Government over Energy and Europe with accusations of 'Romnesia'. Finally, we have just had the 'wrong type of government on the line' with the West Coast - Virgin Trains debacle.

Sir Michael talked about the work of the current Lord Mayor in promoting both the City of London and UK Financial Services which are much more highly valued abroad than at home. He has visited 30 countries including providing advice on, amongst other things, how to establish Moscow as a financial centre and the ways of trading the newly convertible RMB currency of China. He has also visited the rapidly growing country of Brazil and the city of Rio de Janeiro as it took over the role of host city for the Olympics from London.

Sir Mike Gregory gave a clarion call for engineers to take a lead in creating a new industrial revolution based on innovation. Sir Mike gained his industrial experience in machine tools before returning to Cambridge to lead the Institute of Manufacturing. This was established in 1998 and now has 400 staff and students in total. He was knighted in 2010 for services to science and engineering and he serves on the Government's Manufacturing Stakeholder Group.

Sir Mike pointed to the connection between science and manufacturing observing that Babbage, on inventing the mechanical computer, realised that it would need the best engineers in the UK for its manufacture and he toured early Victorian Britain in 1832, commenting on the then disdainful attitudes towards manufacturing.

Now after the rise and fall of a great industrial revolution and more recently many decades of neglect in the UK, manufacturing is back on the agenda. New manufacturing is not about a return to smoky old factories and mindless work, but the modern application of science in creating innovative products and services.

This future will be more about iPads than blueprints, communities not hierarchies and operating with openness rather than secrecy.

The modern, often virtual, factory is a productive progressive community of people with a wide range of skills and a common purpose. In the UK we have, in abundance, the capabilities which are necessary for success in this new world of enterprise, inventiveness, innovation, global reach, science and entrepreneurial spirit.

The Master, Wardens and their Ladies

The prospects for engineering and manufacturing in the UK have never been better in his working lifetime, he claimed. There is a renaissance in engineering and manufacturing before us which is more than factories, craft and metal. Rather, it is a systematic way of

addressing and organising the world which will change lives, bring health, promote opportunity, ensure security, and provide more leisure for all.

The UK still has world class manufacturing companies like: Rolls-Royce, BAE Systems and JCB. But we should also look to companies like Tesco as examples of organising a complex and responsive supply chain focused on their customer. The new manufacturing age will be broader and require more skills than in the past. Sir Mike called on engineers to create the conditions, the language and the excitement which will attract the next generation of innovators to this enterprise. He urged us send the next generation around the world to see what others are doing and achieving.

The last industrial revolution was created in the UK, and he urged us to stimulate young engineers to create this next industrial revolution with its new jobs and greater prosperity, to have the UK as one of its centres. Just as the University of Cambridge has grasped the future to become an acclaimed world-class institution, Sir Mike, a Cambridge professor, provided an uplifting vision of the UK gaining a world-class position in new manufacturing.

Tony Roulstone

(Thank you Tony for your excellent digest of the speeches. For more details read on. Ed)

The Master's Speech

The Master, David Scahill relaxed before Dinner

Welcome to our Annual Banquet in the splendid Egyptian Hall of the Mansion House. The wonderful ambience and superb food and wines served in such excellent style have been complemented by the music of the Live Brass Quintet, so to all those who have contributed to this special event; thank you! I would particularly like to welcome members of the Zurich Guilds who, as guests of the City of London wished to attend a Livery Dinner here at the Mansion House. I am delighted to say they are attending ours! This is especially pleasing as a group of 100 Liverymen and guests recently returned from our own trip to Switzerland for this year's Out of Town Meeting in Basel. So this in many ways could be described as the return leg!

This is the most important event of our Company's year, where our Livery meets The City. With the Lord Mayor Locum Tenens, being both City and Engineer and a fellow Master; and The Aldermanic Sheriff representing the Ward in which we are domiciled - it feels like a real family gathering tonight. As my fellow Liverymen already know, the two themes for my Master's Year are "Friendship and Fraternity" and "Manufacturing Engineering".

I was told a long time ago that the key to public speaking is: "tell 'em what you are going to tell 'em; tell 'em; and then tell 'em what you told 'em". So, as this is my third and final after dinner address as Master, that is exactly what I will do.

At my Installation Dinner I spoke about "friendship and fraternity" with my good friend Tony Collins providing the personal, if not embarrassing, response by recalling our time together when we were colleagues in a manufacturing engineering company, and I am delighted to say that another member of that management team is here tonight, Bernard Snape. You may recall Tony Collins is CEO of Virgin Trains, so you can imagine that he has had an interesting time since the Installation Dinner!

At the Awards Dinner Sir Alan Rudge gave the signal clarion call of the need for a joined up government approach to support manufacturing as a credible solution to our nation's international trade imbalance. Remember the statistics, manufacture is only 10% of GDP but represents 50% of all exports, and just a 10% increase in manufacturing output for export and a further 10% increase in manufacturing output for import substitution would balance the Nation's books. Generating those additional jobs in UK manufacturing would employ UK employees who would pay UK tax. Hardly rocket science is it? So, having done been through the first two phases, this evening I would like, in welcoming my Principal Guest, Professor Sir Mike Gregory, to move into my "tell 'em what you told 'em!" phase and to focus on the final bit of the manufacturing equation: that is that 50% of all UK Manufacture is from SMEs – small and medium enterprises employing less than typically 250 people. The UK has long since lost competitiveness in a number of heavy engineering areas, such as large

shipbuilding and the like, but it continues to excel in high technology application businesses such as Rolls Royce, BAE Systems, JCB, and in SMEs all of which Sir Mike's Institute for Manufacturing at Cambridge University encourage and nurture, together with likeminded organisations many of whom are linked through the UK Manufacturing Professors' Forum which Sir Mike also chairs.

The Master in full flow

So I would like to mention two case studies of SMEs, both of which have gone from inception to maturity in little more than a decade, and both of which are now multi-million pound companies exporting the majority of their products. Both involve personal guests of mine tonight.

The first is Irisys a company effectively masterminded by a former senior manager, David Clayson, at the GEC-Plessey laboratories at Caswell which, with a small group of like minded experts, bought the rights to an unsponsored idea to commercialise the use of multi-element infrared detectors which at the time were being developed for large military applications. They applied them to hand held thermal imaging cameras for utility, security and military applications, and sensors for people counting and queue monitoring from Wembley Stadium to supermarkets such as Tesco and Morrisons in the UK and Kroger in the USA. This company was acquired earlier this year by the $6 billion American company Danaher to exploit the technology further in order to expand its product range but with the company and all its manufacturing, development and sales activities staying firmly rooted in Northampton.

My second example is Ubisense and is even closer to home. The company, which is an AIM-listed company, started out with four Cambridge University researchers developing and bringing to market a unique tracking and location system using ultra wideband communications and intelligent location sensors to monitor movement, content and location in real time. The system is used by the likes of BMW to kit marshal and deliver to line components to produce cars to "batch size of one" specifications, and in similar tasks with Airbus and Eurocopter, or to track and analyse US soldier battlefield tactics, or to monitor and schedule the movement of capital plant in diverse industries. Ubisense again exports the majority of sales from its Cambridge factory. By the way, the key researcher in the start up team and now CTO of Ubisense is one of my sons in law, Dr Andrew Ward.

So from little acorns big oak trees still grow, which reminds me of a colleague who dammed a stream running through his garden to form a crystal clear pond with trees and shrubs and flowers surrounding it so that he and his family could enjoy a private natural swimming pool in the privacy of his own garden. One day when he went down with bucket and trowel in hand to tidy the borders, he came across a dozen or so young ladies skinny dipping in his pond and who refused to get out whilst he was still there. Lifting the bucket and the trowel.... OK by me he said, I'm not going anywhere; I've just come down to feed the crocodile!

My Lord Mayor, I know as Lord Mayor you have promoted as much as anyone the cause of UK manufacturing abroad. But now, I would like to pay tribute to you Sir, for your tremendous achievement in raising £4 million in your Mayoral Year, which has benefitted RedR (of which our Livery Company is a Patron) and CORUM the first ever UK charity for the benefit of children founded in London over three centuries ago, and of which you have recently been elected President.

Presenting a Cheque for the Lord Mayor's Charity

I would like on behalf of all here to thank you for the warmth of your reception and to present you with a cheque from The Worshipful Company of Engineers

as a contribution to the current Lord Mayor's Appeal and to the Mansion House Scholarship Scheme.

Please rise for a toast to The Lord Mayor, the City of London Corporation and the Sheriffs.

The Lord Mayor Locum Tenens' Speech

I am delighted to respond to the civic toast and to thank you for your excellent hospitality this evening. And to welcome you all to the Lord Mayor's council house on Walbrook. As a bear and as the late Lord Mayor I can surely say: "who's been sleeping in my bed?"

I know the Lord Mayor is very sorry not to be with us this evening. But it means that I have the great pleasure of doing so, especially as a Court Assistant of the Worshipful Company of Engineers.

I have fond memories of addressing this dinner as Lord Mayor last year. It was the 28th October and I said then that I only had 13 days 6 hours and 30 minutes until I would gain that unfortunate title of 'late Lord Mayor'. I now have more or less the same time until I change titles yet again from 'late Lord Mayor' to 'Former Lord Mayor', a title which needs much less explanation especially to foreign guests!

Master, it is now just over eleven months since I left the Mansion House. It is striking how little the political and economic debate has moved on. In Europe, Greece has achieved a temporary reprieve in rolling over their loan, but we face similar problems in other Eurozone economies, they have persuaded the Banks that a rolling loan gathers no loss. Let's hope the Greeks don't continue to make a drachma out of a crisis. I am reminded of the story of two counterfeiters. One said to the other: "if I'm arrested for counterfeiting Euros I can always plead insanity!"

The Lord Mayor is having a very busy year especially in this year, the year of the Dragon, breathing fire into the two key events of the year, - The Diamond Jubilee Celebrations and The Olympics. What great opportunities to showcase the 'great' in Great Britain!

The Olympic and Paralympic Games particularly showed what we are capable of with a bit of self-belief, time, a decent budget and the advantages of harnessing the expertise of our industry, the Engineering industry. The success of the Games has resonated around the world and even on our recent holiday in Mexico we heard nothing but praise all around. We were lucky to be blessed with good weather in Mexico, we only had two very un'bear'able hot and humid days, but then we Londoners are well equipped to deal with this, a bit like the Central Line on a bad day!

Restoring trust and confidence in the City continues to be *paramount*. So I am delighted that the Lord Mayor has continued the initiative I started on "Restoring Trust", with a major conference recently at Mansion House on "investing in integrity".

Lord Mayor Locum Tenens Sir Michael Bear

This has shown that the City knows there are issues to tackle – and is tackling them. It is looking at clear and transparent common standards across the professional bodies, and a panel to oversee and enforce them. The City is also continuing to show that it is at the forefront of supporting those in need, not only through the livery companies, but also in business. So last month in this Hall we marked the 25th Anniversary of the Lord Mayor's Dragon Award Scheme. This celebrated the fantastic work business does through its corporate social responsibility programmes. The City Corporation itself has earmarked £20 million of its own resources to support social enterprises. Philanthropy is in the DNA of the civic City and the business City alike.

We have been lucky to have the current Lord Mayor as a champion for the UK's financial and professional services industry, he has made a measured and thoughtful contribution to a debate about the City in which those qualities are often absent. I know what has struck him is that there is little if any criticism of the City abroad, in fact the reverse. The reputation and quality of the City is much admired. It is domestic criticism of the City that is so counterproductive – because the services and resources of the City are crucial to the recovery, especially in the creation of much needed jobs. The Lord Mayor's overriding objective is relationship building – as was the case when he visited Russia and Kazakhstan earlier in the

summer. The City is working with the Russian authorities to build up Moscow's capacity as a financial centre.

During his recent visit to China, he explored London's role in the international use of the Chinese currency, the RMB, which was not convertible until recently, and has been used just within China. This will mean that what is likely to be the world's largest economy in a few years' time will be better integrated into the global economy. This will benefit us all. In Vietnam the Lord Mayor strengthened our partnership on the major infrastructure projects, airports, roads, railways, ports and energy. These are critical for the development of Hanoi and Ho Chi Minh City, utilising British expertise along the whole supply chain in design, engineering, project management, construction, operation and maintenance, as well as finance and legal services. He is currently in Brazil, promoting our Financial Services Industry and British Engineering Services, showing that Financial Services and Engineering are wholly entwined. And that's just mentioning 5 of the 30 countries in his "action packed" year!

The Lord Mayor has also championed the Livery in a brilliant year for the Livery Movement as a whole, especially the hugely successful "Butcher, Baker, Candlestick Maker" Exhibition at Guildhall Art Gallery.

Now Master, as you know, each Lord Mayor is of course very different. In fact we chose the 685th, on the 1st October and who was given the Queen's approbation on Mondays this week. I am sure the Lord Mayor Elect, Alderman Roger Gifford will be a fine Lord Mayor, the first banker to hold the office since the financial crisis. This is to our advantage, as he is a man whose integrity and trustworthiness shines through, just as it does with the current Lord Mayor.

Now, I have learned that all speech-makers know that the rule for a good speech is a beginning, an end and not much distance in between. And you'll be pleased to know that I intend to observe this, especially after making over 900 speeches last year! But in recognition of a wonderful evening, Master please accept this pen of British manufacture from Yorkshire, where the Lord Mayor comes from. And, an innovation this year, something for your Clerk. Master, Clerk, please accept these gifts on behalf of the Lord Mayor, and from a grateful Lord Mayor Locum Tenens.

And now, can I ask you to rise while I propose a toast. The Worshipful Company of Engineers and the Master.

Sir Mike Gregory's Speech

It is a huge honour and indeed a delight to be invited to address you this evening; the opportunity to talk about manufacturing is always welcome. It is particularly agreeable to be speaking to such a distinguished assembly – and one which will certainly recognise much of what I'm going to say. That of course has its downsides: I can't get away with simply repeating that engineering and manufacturing are at the heart of turning ideas and opportunities into products and services, the way we create real rather than illusory wealth, and I don't want to bore you with the fact that we are rather good at engineering and manufacturing in this country because you know that already. So I'm denied my usual easy wins and I fear you are going to expect something original which is rather daunting, not least in this grand setting.

It turns out of course that we are not the first people to appreciate that engineering and manufacturing are important. Charles Babbage, you will recall, is credited with designing the first practical computer. In those days it was of course a mechanical device and in the pursuit of precision production for his invention he toured the factories of the UK and Europe and wrote about them. He developed a deep understanding of, and respect for, engineering and manufacturing and railed against the separation of science from practice. It was Babbage who wrote the first book on manufacturing operations and an extract from his foreword bears repetition: *'Those who possess rank in a manufacturing country can scarcely be excused if they are entirely ignorant of principles whose development has produced its greatness. The possessors of wealth can scarcely be indifferent to processes which, nearly or remotely, have been the fertile source of their possessions. Those who enjoy leisure can scarcely find a more interesting and instructive pursuit than the examination of the workshops of their own country, which contain within them a rich mine of knowledge, too generally neglected by the wealthier classes'.* That was written in 1832!

But my job is to talk about the future not the past, though I have belatedly come to the view that it is dangerous to do the one without the other. As for my

past I had the huge privilege of working in the machine tool industry in my early career. Babbage would easily have recognized the workshop and the machinery, the skilled craftsmen and the reluctance to write things down! 'Real men remember what's important', I was told scornfully, and they don't need all those words and bits of paper. Now more than ever we need people of action and resolve to get stuff done rather than endlessly publishing investment reports on matters about which they may have rather limited understanding. But I'm afraid the fact is we have not been sufficiently skilled in explaining what we do to others. How can it not be exciting to turn dirt into cars, aeroplanes, televisions etc., but sometimes we manage to make it sound dull and inaccessible?

More importantly however, technology is now allowing us to turn ideas and opportunities into products and services more directly. Many of the things that used to get in the way of that translation from idea to product are evaporating as knowledge becomes freely available, the secret skills, the private knowledge, the hidden processes, are all being revealed by the internet. And the UK is leading the way in this new world. We make most of the world's best racing cars, and can redesign and rebuild cars within 2 weeks between races. Rolls Royce make the world's best aero engines, worth more than silver weight for weight and they can monitor their engines in flight and plan maintenance for when the aircraft lands. Tesco orchestrate the production of goods from vegetables to washing machines from around the world, a brilliant example of modern manufacturing, which for me is *the whole cycle of understanding markets, design, production, distribution and service.*

At home I'm inclined to say whenever the opportunity presents itself, which is quite often, 'you realise that this is a triumph of production engineering'. This used to be met with howls of derision, and then pained looks, but now it's met simply with resignation. But they know I'm right which I have been known to point out from time to time. Frankly that doesn't help! Last week a young man was talking to me enthusiastically but rather reluctantly I thought about how he was helping to improve hospital efficiency using, guess what, manufacturing principles! It was the last straw!! It was my son!! So where does all this get us? I would like to persuade you that engineering and manufacturing are not just about craft and metal, important as those things remain. Rather they are about a systematic way of addressing the world which can change lives and bring health, security, opportunity, leisure, indeed all the things we value in modern society and of course generate the wealth that we need to fund them.

So what of the future? I'm afraid I'm not going to paint for you a picture of a future factory full of robots. You know the old story, 'there is only a man and a dog; the man is there to feed to dog and the dog is there to bite the man if he tries to touch anything'! There may be some of those but that is not the big challenge. The challenge for the future is instilling manufacturing thinking much more broadly. I listened to a talk in Stuttgart last week. The home, as you will know of Mercedes, Porsche, Bosch and many more great manufacturing companies. The Mayor, yes the Mayor, was explaining that he was using the wealth created through manufacturing to build a City where everyone lived within 300m of Green space and that he was bringing factories back into the City to form an integral part of the community. That for me is thinking about manufacturing in a modern, progressive, 'big picture' way. The modern factory is typically a clean, productive and progressive community of people with a wide range of skills and a common purpose.

The outlook for engineering and manufacturing has in my lifetime has never been brighter. We have the capabilities which are necessary for industrial success in the modern world in abundance, inventiveness, innovation, global reach, science and entrepreneurial spirit. The task is to marshal them. It is down to us in this room to raise awareness of the excitement of engineering and manufacturing but in a modern idiom, with iPads not blueprints, in communities not hierarchies, and with openness not secrecy.

Ladies and gentlemen it is our responsibility to do this. It cannot safely be left to others. Let us create the fora and the debates and the excitement and the opportunities to attract the next generation who want to make a difference. Let us send them around the world to see what others are doing, there is some catching up to be done, and then let us encourage them to create the next industrial revolution.

Let me close by reminding you about the Lunar Society. These Birmingham men (I'm afraid they were all men) Boulton, Watt, Wedgewood, met monthly to discuss nothing less than the first industrial revolution. Why don't we inspire the next generation to meet, imagine, invent and most important of all deliver a new society built perhaps on natural energy and renewable resources? Let us make the UK the place where these conversations go on. Let us reclaim our role as thought leaders in manufacturing and make amends for decades of neglecting our duty. Let us sponsor a renaissance of manufacturing in the UK, and most importantly, the young people who can deliver it!

LORD MAYOR'S SHOW
10th November 2012

Sabine and I had not been to the Lord Mayor's Show before. The previous few days had been cold and wet and the forecast for Saturday was for rain. So we rose before dawn to catch the train up to London suitably attired and prepared for the worst.

The Lord Mayor Rt Hon Roger Gifford

We need not have worried. A tremendous bustle greeted our arrival at St Paul's tube station but, once at street level, there was an atmosphere of quiet calm with no cars in sight. We made our way to the North grandstand close by St Paul's and were soon shown to our seats by friendly, uniformed staff. Though there were grey skies above and it remained cold, it was still dry and was to remain so. A boisterous crowd were blowing whistles and waving all manner of flags and contraptions as police and Show officials made last minute checks to the route. The cheery atmosphere was infectious and we soon forgot about the weather.

Shortly after 11 a.m. a cacophony of sound, music, the beating of drums, marching people, slowly grew into a crescendo heralding the approach of the great procession. In accord with hallowed tradition the Hon Artillery Company were in the vanguard, followed by an eclectic mix of military, (Royal Navy, Royal Marines, many branches of the Army, RAF), Local Groups, Volunteer organisations, Businesses, Universities and Colleges, Country groups, Livery Companies, other City dignitaries and of course new Lord Mayor, the Rt Hon Alderman Roger Gifford, bringing up the rear in the 18th Century gold State Coach preceded by a detachment of Household Cavalry.

The parade was a gripping spectacle of sights and sounds from down the ages, 156 groups in all. Many had an obvious City connection; others were linked in some way with the new Lord Mayor including a number of Scottish groups as well as delegations from Yorkshire, Trinity College Oxford, Skandinaviska Enskilda Banken (where Roger Gifford is the Bank's senior UK Representative), Sweden, and the Worshipful Company of Musicians. Other groups had associations with Sheriffs Jeffrey Evans and Nigel Pullman.

Harps on The Musicians' Float

Even allowing for 800 years' practice, it must nevertheless be said that the Lord Mayor's Show is a masterpiece of organisation. A huge amount of artistic energy had gone into the floats and costumes, some modern, elaborate and colourful, others more an expression of living history. Control of the 6,500 strong parade and the crowds of onlookers was discrete. Those marching were the happy recipients of an outpouring of goodwill from the crowds, cheers going up repeatedly as particular groups passed by.

The Lord Mayor and Lady Mayoress Receive a Blessing from The Dean on the Steps of St Paul's

When the Lord Mayor's magnificent gilded coach came to a stop right in front of us we felt for a moment as if transported back through the centuries. Guarded by severe-looking Pikemen and Musketeers of the Hon Artillery Company, the Lord Mayor and Lady Mayoress Dr Clare Gifford briefly got out to receive a blessing from the Dean of St Paul's before continuing their journey to the Royal Courts of Justice, where the Lord Mayor pledged his allegiance to the Sovereign.

The Engineers' Company was represented by Master David Scahill, Colin Newsome and Audrey Canning who, splendidly turned out in ceremonial dress, walked with other Modern Livery Companies. They were clearly enjoying the Show and the universal bonhomie which greeted them on their promenade through the City, as Audrey confirmed over supper.

The Engineers Greeting the Crowds

Until the last float had gone by there were so many impressions to take in that Sabine and I barely noticed that we were chilled to the marrow. Now, the warmth of Wax Chandlers' Hall beckoned. We were greeted by Clerk Tony Willenbruch who cheerily assured us that, in some years, the Show had taken place in far more severe weather. This put things into proper perspective.

It was clear that Lunch had been going on for some time. How had all these people managed to get here so quickly? Any concerns we might have had were quickly dispelled, however, as fresh supplies of food and drink kept appearing. After receiving a welcome glass of wine from Stephen Grundy we joined a convivial gathering of Engineers, Wax Chandlers and their families for lunch.

Thus fortified we then treated ourselves to a second viewing of the parade on its return to the Mansion House. This time we found a good roadside vantage point at street level near Blackfriars Bridge.

Later in the day, as is now customary, Engineers and their guests convened for supper at the 'Wharf' restaurant close by the OXO Tower on the opposite bank of the Thames. Apparently, this venue was originally chosen because it provides an excellent vantage point from which to watch the fireworks display which normally follows the Lord Mayor's Show. However, following the summer's Diamond Jubilee and Olympic Games festivities, the City fathers had decided that there would be no firework display this year. We did not feel aggrieved, the food and company at the 'Wharf' were excellent, and on a clear night there is a stunning panorama of the City skyline, all lit up, dominated by St Paul's.

The Master, His Family, Liverymen and Guests in the Wharf for a Well Earned Supper

It was over supper we learned that, after we had left the procession, the State Coach had broken down and that the Lord Mayor had had to complete his journey back to the Mansion House by car! A timely reminder, perhaps, how much we tend to take the reliability of modern road vehicles for granted, thanks to the insidious progress of *Engineering*. Altogether a most enjoyable and uplifting day!

Michael Purshouse

As Michael mentions above Audrey Canning walked in the procession, with the Master, David Scahill, and Colin Newsome, in the section reserved for the Modern Livery Companies. David invited her to record the experience and her story follows.

I don't think I have ever experienced a day so full of simple joy! It didn't begin well. Getting up on a Saturday morning for the 7o'clock train is surely no-one's idea of fun. The promised rain was falling, softly but surely, and Network Rail had decided, in its familiar inscrutable fashion, that today was the right sort of day to dig up the Line to London Bridge. Two hours later as we emerged into a silent and deserted City the rain was still falling and, except for a few policemen, armed to the hilt, there was no-one to be seen in the closed highways.

But in Gresham Street there was coffee, and biscuits, and gossip to be had. Opposite, the leaders of the procession were beginning to assemble, and the horses, standing so patiently in the falling rain, were a silent inspiration to us more hasty folk. Soon, we were all assembled and 'The Clothing' could begin. Clearly the

WCOE, being an egalitarian Company, had decided that 'One Size Fits All'. In this, let me assure you, they are sadly mistaken. Neither was it clear on which side the cap tassels should be worn. There was concern (mainly from our honourable Beadle) as to the potential for rust on the Master's gold chain. And the significance of the date, falling as it does immediately before Armistice Day, necessitated a scramble to find the necessary number of poppies and pins. Finally, there was the vexed, and, as it turned out, significant, question as to whether or not umbrellas were the order the day.

Suitably clothed, we emerged from the Hall to clear Security, I was told, and proceed to the Gathering. There we met up with the 'Modern Companies' Bus and fell into talk with many of our fellow walkers. There were the 'Tobacconists' Company', which on closer acquaintance turned out to be mainly manufacturing engineers, and the 'Fuellers Company', which turned out to be oil, gas and coal professionals. Not to mention the 'Scientific Instruments', the Accountants and by this time I was feeling quite at home. Probably just as well, as we were destined for a 90 minute wait in the softly falling rain.

Before long there were signs that the sky was clearing. Colin and I, who had decided we couldn't man-handle both umbrellas and Company banner, were much heartened, but for the Master there was a challenging problem, where to put the aforesaid umbrella? Clearly our Master had a 'Master Plan' having devised a cunning contraption for hanging said article from the rear of the waist (note to future Masters, ensure umbrella has a suitably curved handle). But this plan, it turned out, did not prevent him from leaving it in inconvenient places (note to future Acolyte, ensure Master does not detach from umbrella, even over lunch or at the WCE, until safely delivered back to his Lady's keeping).

There were other challenges to perfect, how to safely stow one's banner in a moderate breeze (it turns out up-side-down is the most energy efficient and stable approach), how to fit eight people onto a road island as the emergency vehicles squeeze between floats, and most important of all, how to right one's banner ready for departure. The latter manoeuvre, as Colin was to discover, is particularly fraught, and should on no account be attempted within five metres of another living being. The banner, being somewhat top heavy, is inclined to execute an unexpected acceleration on approaching the horizontal position. In the immortal words of the actor Clive Dunn, who sadly passed away the same weekend, it turns out Masters of other Livery Companies do not like it up…But let's not go there.

The Master, David Scahill, Colin Newsome and Audrey Canning Walking in the Procession

A quick pep talk from the Master's grandchildren and the Procession was ready to depart, at least the first half of the procession started to advance. And what fun it was to watch them, the volunteer services, the youth workers (my goodness, what energy, were they going to dance the whole way?), the older City Companies, we cheered, we clapped, and their procession was off. Then it was our turn, we started to march, uncertain at first, round the bend to acknowledge the cheers from the early arrivals in our own Livery Hall. Then past the Guildhall, there was Jean, there was John, and round the corner to 'doff caps' to the new Lord Mayor. There we were, walking up Cheapside. The crowd was cheering. We waved, they waved back. We smiled, they smiled back. There was Gillian, there was Barry…. Just then an altercation broke out behind me, had I so miss-judged the crowd? Was the population of London rising against us? I wheeled round ready to defend, but no, there was Colin executing a pirouette, somewhere between a prima ballerina and a base-ball player, the banner flailing spectacularly as it sought to minimise entropy. And there was the Master, arms aloft, defending the

Masterly head and the Livery regalia. Up to this point we had all assumed that the taller the Engineer, the more adapted to banner wielding. But no, possibly due to unexpected air currents at higher altitudes, or possibly due to the greater distance of the fulcrum between the shoulder and the wrist, it seems that the safest banner carrying Engineer is one of naturally small and solid stature and with an inherently low centre of gravity…..

The Master Hits the High Fives

Rescuing Colin from the Banner (and the Master from Colin), our attention could once more turn to the crowd. Maybe the Master is a Natural, maybe it was due to those last minute tips from the grandchildren, but the Master turned out to be a hit with the 'High Five'. The children stepped forward, faces alight, arms held high, then the young people came forward, keen to be part of the action, lastly the grandmothers, eyes creased with delight to see us fielding a 'mixed' team. 'It's the Engineers' they cried, 'Hey-yaa' we replied. We walked past Bow Church and the bells started to peal. The other City bells replied, their voices ringing out clear and strong. The sky lightened, the whistles screamed, the flags waved and in the faces all around was joy …….

But it could not last. We approached the Law Courts and the Modern Companies' bus peeled away from the crowd. The Modern Companies members behind started to press forward, lunch was in the air. Entrusting the banner once more to Colin, the Master and I made a dash for the sandwiches. Again smallness of stature turned out to be an unexpected advantage, dodging under taller companions, I triumphantly secured a sack of lunch for ten! But there our luck ended. Turning round, not one Modern Company Member was to be seen. Where had they gone? We dillied… we dallied… we asked a policeman the way to lunch …. No-one could help. Well, an invitation from the Master Mariner had to be close to the River, so we headed that way. And there was the H.Q.S. Wellington glinting in the sun ahead of us, with a warm welcome and an abundance of Champagne. And best of all there was Colin, well installed, warm, at ease, champagne glass in hand. No longer need we feel guilty for abandoning him to that Banner in the myriad streets of London Town.

The Lord Mayor, The Rt Hon Roger Gifford

Uniting Colin with his cheese and pickle sandwiches (an act for which I know he will be forever in my debt), we fell once again into conversation with our fellow Livery members. There were tales to tell of professional activities and processional mishaps. There were new tips to pick up from veteran walkers and half eaten lunches to abandon. Then those at the front of the procession started to leave, and we must follow suit. But where was the Bus? And where was that Umbrella?

Now Colin came into his own. Gathering our belongings from amongst the empty glasses, guiding us unfailingly through the streets of London, we quickly reached the Gathering point. Colin, meanwhile, went to retrieve the Banner. Not quickly enough. Already it had escaped its leather holster, threatening us with splinters all the way back to the Guildhall. Another foray and Colin emerged successful, and we were ready to depart.

For us the return journey was uneventful. Less deep were the crowds perhaps, but of very good voice. 'My son wants to be an Engineer' cried one Mother, 'That's the Stuff' we responded back. 'My Dad's an Engineer' cried another, 'He's the Best' we agreed. And the 'High Fives' and the whistles and the smiles and the cheers went on, and on, and on. It seems the Engineers are of the people, and the people were pleased to see the Engineers. Others, it is rumoured, may have been less fortunate, that will be a tale for another day, but for today I am content to relate the Engineer's tale.

Back once more at the Hall, we veered away from the procession to cheer the tail-enders from our steps. Weary now were the youth dancers, but they still raised a leg to our cheers. Weary too the volunteer services, but they bowed and waved to our applause. When the last tired stragglers were through we entered the Hall to disrobe. Quick, quick check in, check out, depart, the Master to say goodbye to the grandchildren, we acolytes to the 'firework' dinner.

But I lingered till the end, who knows why, and there on the table, abandoned at the last, lay the Master's Umbrella.

Audrey Canning

CAROL SERVICE AND DINNER ST PETER AD VINCULA AND CLOTHWORKER'S HALL 12th December 2012

We absorbed the atmosphere of the Tower of London during our short walk in the freezing cold clear night air from the main gate to the Chapel Royal.

Old Houses within the Tower Walls near St Peter Ad Vincula with the New Shard Building Behind

We could just hear the final rehearsal of choir as we waited for the Chapel Royal doors to open. Then the warmth of the Chapel was really welcome as we came in from the cold. Meeting and greeting as everyone arrived created a swell of conversation until the moment arrived – the poignant solo voice delivering the opening line of 'Once in Royal David's City' reminding us of the choral excellence we were about enjoy. Little did we know the extent of the choral extravaganza that lay ahead?

The Chaplain to the Tower, Reverend Roger Hall, briefly reminded us of the significance of the Chapel Royal as the final resting place of the monarchs of England and also that 1,500 traitors buried in the surrounding grounds. He also told of his busy schedule of 23 carol services and that this was the Choir's third performance today, the first of which was a recording, completed despite the noise of an untimely helicopter flypast, to be broadcast on Christmas day on Radio Four.

The service was, as always, excellent. The Choir sung a particularly interesting selection of carols. Amongst them was the very beautiful 'Three Kings from Persian lands afar'. The readings by The Master, The Master's Lady, the Chaplain, The Clerk and the Senior, Middle and Junior Wardens of our Company were all thought provoking and included two poems. 'BC-AD' is a fitting tribute to the versatility and wit of the poetry of Ursula Fanshawe. 'A Christmas Landscape' epitomised the evocative poetry of Laurie Lee. During the service a collection was made for the Company's charity.

The Choir singing at the Reception before Dinner

The Chaplain of the Worshipful Company, the Reverend Peter Hartley, gave a succinct sermon on the themes of both the religious and human aspects of Christmas. He pointed out that giving is a more rewarding aspect of the exchange of gifts than

receiving and also urged us to open up our hearts at this season of goodwill.

The full congregation ventured briefly out into the cold night air but soon reached the warmth of the Clothworkers' Hall, marking the return to dry land after several previous occasions aboard the PS Dixie Queen. The Choir then unexpectedly delighted us as we enjoyed our glass of champagne. And then, in a third performance, they sung a choral grace before a most enjoyable dinner.

The Master reminded us of the informality of the occasion and limited his comments to reading out the 'Parish Notices'. He also emphasised our appreciation of the singing of the Choir and then announced that he had generously supported the sale of their recently recorded CD by funding the raffle of ten copies. He thanked the Governor of the Tower for the special privilege of allowing the event and also thanked the Choir, their director of Music, Colm Carey, and Reverend Roger Hall, Chaplain to the Tower. He concluded by proposing the Loyal Toast.

The Clerk, Tony Willenbruch, told us that it is said that an angel kisses at birth the place that will make the individual famous. He then mused about where that place was in the case of the Master! He finally proposed the Toast to the Worshipful Company of Engineers.

We all enjoyed an evening of good fellowship and participation in a very special celebration of Christmas.

David Lamb

VISIT TO CUMBRIA
10th January 2013

Thursday 10 January 2013 dawned cold and slightly foggy in the south of Cumbria. The fog lifted quite quickly and revealed a bright and pleasant day, so the journey between the southern Lakes and Morecambe Bay to Barrow-in-Furness was accomplished without difficulty and by two o'clock the whole party had arrived at the very large gates of BAE Systems shipyard.

HMS Ambush, the Second Astute Class Submarine

The first presentation introduced us to the "Astute" class of submarines, the current product of the shipyard, and described their construction. These are nuclear powered vessels but with non-nuclear armament, being equipped to fire torpedoes, ship-to-air missiles and normal guns. Fierce enough one would think! The BAE Systems employs a total of 5000 workers on the submarines, of whom 4450 work in the Barrow yard. Fabrication of all the very heavy steel items that form the hull and some of the interior parts is carried out in the yard while specialised items, such as the nuclear power unit, electronic controls, armament systems and much else is fabricated elsewhere and transported to Barrow for incorporation in the vessel. Building the submarines takes place in the massive Submarine Hall. The Hall, 265 metres long, 65 metres wide and has 40 metres high was built some twenty years ago to provide a covered building equipped with heavy overhead cranes and handling equipment for moving enormous parts of submarines, with a shiplift at the end capable of launching the nearly finished submarine. The submarine is built 'in slices' which enables the insertion of prefabricated items such as the power plant and the control room into the appropriate slice of the hull and allows access for all the fittings for all piping and cabling required. Once all this work is complete the slice is butted up to

the end of the next slice, cables and pipes are joined up, and the two slices are welded together. Since the hull is made of three inch or more thick steel, this welding, and its non-destructive checking, is a prodigious job in itself.

'Astute' itself was not only the first of the class to be built, but was the prototype. It was therefore the subject of many extra tests and sea trials to prove the whole design and concept, and although it has been handed over to the Royal Navy and was commissioned, it still has one or two trials yet to accomplish. The second submarine HMS Ambush was commissioned on 1st March 2013 and construction of the rest of the class will each take about two years. The third submarine 'Artful' is almost complete in the Submarine Hall, and should be launched in September this year. The fourth, 'Audacious', is currently being assembled in the Hall, and the fifth, 'Anson' has parts being prepared in the Fabrication shop. Further submarines are planned to keep Barrow busy for at least fifteen years.

The Submarine Hall, 'Devonshire Dock Hall'

After the presentation we were taken outside and across to the Submarine Hall built on the site of a former dock which was filled in by pumping sand from Morecambe Bay, topped off by a two metre thick heavily reinforced concrete floor. The building provides space for the two submarines and one of these appeared close to completion whilst the other vessel was still in slices. Our guides led us down the whole length of the Hall looking at particular items and then outside to the shiplift. This consists of a very large dock covered by a flexible wooden platform on a steel frame. The completed submarine is run out on to the platform, and then lowered by winches until it floats free when it is towed to a quay for final fit out before sea trials.

We then visited the Fabrication shop where steel plate is cut, rolled into curved pieces and difficult shapes, and welded into rings to form the slices, nose cones and other pieces that form the Submarine's hull. (Readers will probably remember that in "The Wizard of Oz" Dorothy was instructed to "follow the yellow brick road". For safety reasons we were similarly instructed to walk only on the green painted paths on the shop floor. Sadly one of us did not do so, and was suitably admonished!) Amongst many interesting tools and gadgets we were shown a computerised system for planning the cutting of the steel plates so as to minimise wastage.

A Submarine under Construction in the Hall

Back to the lecture room and we had a presentation on the technology and design of the submarines which involves eleven different branches of Engineering and the parts each discipline plays to produce the total design. Many people might find it hard to think of so many different types of engineers but I am sure they are all represented in our Company

The managing director of BAE Submarine Solutions, John Hudson, gave an over-view of the pleasures and problems of being the sole suppliers of submarines to the Royal Navy. The major problem lies in the fact that there are no standards for submarines. Obviously the standards of design and construction that apply to each branch of engineering involved are adhered to, but the lack of an overall set of standards leaves BAE Systems carrying various risks and responsibilities not usually the role of the contractor. MOD undertakes to carry some financial risk, but that is all. Another worry for the future is that the submarines are planned as a complete group, but commissioned one by one, leaving BAE Systems to start preliminary work before being given the financial go ahead in order to keep continuity in their works.

After thanking our hosts we left BAE Systems at about half past five. It was dark and there was a fair amount of traffic and we made our way to the A595 to go north to Trout Hotel at Cockermouth, some 75 miles away. For those who do not know it, the road is narrow with a multitude of corners, steep climbs and sharp descents. Furthermore patchy fog had come down on west Cumbria and the idea of drinks and dinner grew

more attractive. However after a long time, we all made it and the Trout which, in spite of having been totally flooded two years ago, was as nice and welcoming as ever. We were joined at an excellent dinner in a private room by George Beveridge, the Deputy Managing Director of Sellafield Ltd. who would be our host for next day's visit.

Friday started very early. Breakfast was arranged for six-thirty and, at seven-thirty, a bus was ready to take us to Sellafield. We started the visit in Yottenfews Farm House just outside the boundary of the site where we were cleared for security and issued with passes with dosimeters attached to them, a reminder, if we needed it, that we were entering a nuclear establishment.

The Sellafield Site

George Beveridge gave us a very full introduction to Sellafield. The site is now in its sixty-fifth year as a nuclear establishment. The site is owned by the Nuclear Decommissioning Authority, (NDA), but since 2008 the actual running of the site has been privatised and is carried out by "Sellafield Ltd", a company formed and owned by three contractors, UK Company AMEC, American Company URS and French Company AREVA. The role of Sellafield Ltd is the safe decommissioning of the UK's nuclear legacy, fuel recycling and the management of low, intermediate and high level nuclear waste activities. NDA remains the client. Sellafield Ltd employs some 10500 people, and the investment in the work this year is £1.7 billion, making it the largest nuclear activity in the UK. The site is served by trains on branch lines off the Carlisle to Barrow coastal railway which currently bring in spent fuel for recycling from UK and foreign power stations.

We were shown an aerial view of the site and the earliest structures are the Windscale piles. These were built to provide plutonium for the 1950s weapons programme which they did until the fire in 1957. Decommissioning started in the early nineties, one chimney has been demolished, but will continue for many years. A waste storage pond and a silo which dealt with the nuclear waste from the piles are also extant, very contaminated and in the case of the pool, which is open to the air, full of all sorts of other unpleasantness. Planning is in hand to decommission these but will be a very long job. Another major plant is the former Calder Hall power station. This has four magnox reactors and was the first nuclear power station in the world to be connected to a public grid, which it was in 1956. A great triumph in its day, it was shut down in 2003. So far decommissioning has been confined to demolishing the cooling towers. Other "legacy" items include the "Golf Ball", a prototype AGC reactor which ran from 1963 to 1985 and is just starting to be taken apart. Clearly there is plenty of legacy!

Aerial View of The Sellafield Site

The fuel recycling facilities represent the on-going commercial activity. The is little recycling of the spent fuel from power stations with Magnox reactors left as most of these power stations have closed down. On the other hand the Thermal Oxide Reprocessing Plant (THORP) deals with fuel from AGR and Light Water reactors which form the bulk of all working UK power stations and the need to deal with this fuel is likely to continue until 2018. The THORP process produces plutonium on the side which is stored in a particularly safe building until decisions are made as to its future disposal. Both recycling systems produce nuclear waste of all levels, and modern plants exist to handle these and provide for their safe disposal.

We were then divided into two groups, and taken into the site to see two working units. My group went first by bus to the Thermal Oxide Reprocessing Plant, where we saw the facilities for the reception of the flasks and other containers as they were delivered. We looked down, through glass, from a gallery onto the facilities at each stage of operations. Luckily enough our arrival coincided with that of a flask, so we were able to watch as a crane was to pick up the flask and move it (gently!) to the deep pool of water in which it is prepared for the removal of the spent fuel cells. Eventually the flasks are taken to the end of the building and lowered into a deep storage where they remain for some years until they can be safely taken

out. The gallery contained an exhibition showing how the nuclear waste is dealt with, and these were explained to us by our guide. The treatment of high grade waste consists of mixing it with glass pellets in a circular mould which is then subjected to intense heat. After cooling, the mould is removed and the result is a solid glass disc. Discs are loaded into steel tubes which when full are lowered into a hole in a concrete block which is then capped. This block of concrete can accommodate many tubes and will do so until such time as the UK possesses a suitable permanent deep resting place at some time well into the future. The intermediate nuclear waste, most of which consists of the metal tubes in which the spent fuel arrives, is washed, chopped up and put into steel circular cans and grouted into concrete blocks. These blocks are stored on site in safe buildings until they also have a permanent resting place. The low level nuclear waste, which is mostly derived from the cleaning out of the various pools used for processing or storage, is taken to special slow sludge treatment beds. The water element, when it is deemed to be really clean, is discharged to the sea. In the past this has caused objection from the Irish and bodies such as Greenpeace. We were assured that current practice is so good and the water so clean that no one now objects.

Sellafield Visitor Centre

After completing our tour of THORP, our bus took us to the Waste Encapsulating Plant. Unlike THORP, there was no sealed off viewing gallery and we moved into a working area dealing with the intermediate level nuclear waste, even though it was not actually in use. This entailed us removing our outer coats and shoes, putting on heavy cotton overcoats with our dosimeters clipped outside and heavy socks. Then we passed over a low bench and put on shoes. Thus safely attired, we entered the working area. We walked through to see the methods of handling, moving, sorting and chopping up the waste. On our return journey we were able to look through very thick windows into the adjacent area where the chopped metal is put into containers and grouted. Being able to see all stages of the process one could easily understand it. Then it was back to the changing room to remove coat, socks and shoes before crossing back over the bench. Then hands had to be scrupulously washed, hair, face and clothes 'hoovered' with some sort of magnetic instrument and one's arms thrust into a machine for further cleaning before checks on one's nuclear cleanliness and resuming one's own apparel.

The final part of our visit with both groups now united on the bus was to drive around the whole site, with a commentary from our guides, so that we could see all the buildings and plants that had been mentioned earlier. The final building that we passed was described by the guides as being the highest risk place of all which was fortunately next door to the medical centre. It was the works restaurant!

We, however, returned to Yottenfews Farm House for an excellent buffet lunch. It had been a great visit leaving us full of interesting facts and gratitude to George Beveridge and our guides as well as to John Baxter and the Master for organising both the visits.

Michael Muller

Photos taken from the BAE and Sellafield Web Sites

VISIT TO BLETCHLEY PARK
22nd February 2013

The Mansion, very different to the working huts

A former home to GCHQ, and a place where many secrets still remain, Bletchley Park proved to be a fascinating location for our Mini Out Of Town visit in February. This once forgotten nationally-important site is slowly being revived, revealing a story of courage, intellect, determination and brilliance in the process.

Bletchley Park is home to the National Code Breaking Centre and it was here that the world's first large-scale code breaking operation took place during WWII. Fifty Engineers and their partners visited on a bitterly cold day, heading past boarded-up bomb proof huts to the comparative warmth and splendour of the mansion at the head of the site.

We were fortunate to have Joel Greenberg as our guide for the day. His expertise on Bletchley Park helped all of us to understand the complexity in deciphering the thousands upon thousands of coded messages which were sent by the Germans and Japanese during WWII. Joel had interviewed many former Bletchley Park workers about their roles and interjected his tour with snippets of these revelations; including a meeting with one lady and her daughter he had met a couple of day's previously at a reception for the Duchess of Cornwall at Bletchley Park. This lady had worked on one of the Japanese decoding systems, and when prompted by Joel, revealed that she spoke fluent Japanese, a fact which astounded her daughter because her mother had never previously discussed this in the past 70 years.

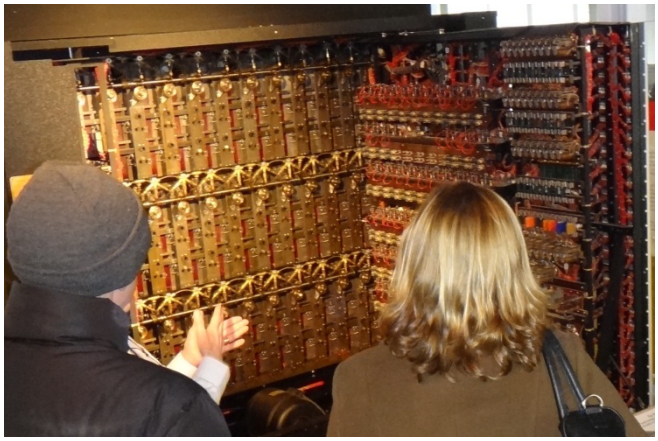
Our tour started inside with a description of the Enigma machine *(left)* which produces a poly-alphabetic substitution cipher. This is an electro-mechanical device, which was modified from its commercial original by the German military. A combination of a re-wirable plug board and a moving interchangeable set of rotors alter the electrical path for each input character. This constant altering of the electrical pathway produces a virtually random key sequence which the Germans believed could only be deciphered by an identically set up machine. The encoded message would be sent by Morse code.

Combining 3 rotors from a set of 5, each rotor having 26 positions and working with a plug board connecting 10 pairs of letters led to the Enigma having a staggering 158 million million million (1.58×10^{20}) settings.

Armed with this information we toured around the Mansion grounds, ending up at a memorial to 3 Polish cryptographers who shared their knowledge of the Enigma machines with the British Government Code & Cipher School (GC&CS), the forerunner to GCHQ. Their collaboration with GC&CS meant that there was a good understanding of how Enigma worked at the outset of WWII, but further work was needed as modifications to Enigma meant other code breaking methods needed to be used.

We learnt that around this period, Bletchley Park was purchased by MI6 and was given the cover name of Station X. GC&CS moved to Bletchley Park from London and became the workplace of renowned codebreakers Dillwyn Knox, Gordon Welchman and Alan Turing amongst others. Many thousands of Morse signals were intercepted across the country at Y Stations and sent to Bletchley Park by dispatch motorbike riders. During the war period Bletchley Park was home to around ten thousand people working around the clock; none of whom lived on site, many being billeted in the Milton Keynes area.

Enigma's weakness was that it would not code a letter to itself ie an A would never become encoded to an A. Building on their knowledge from the Polish cryptographers, Welchman and Turing exploited the machine's weakness and human failings such as starting messages with common phrases, and developed a machine called the Bombe.



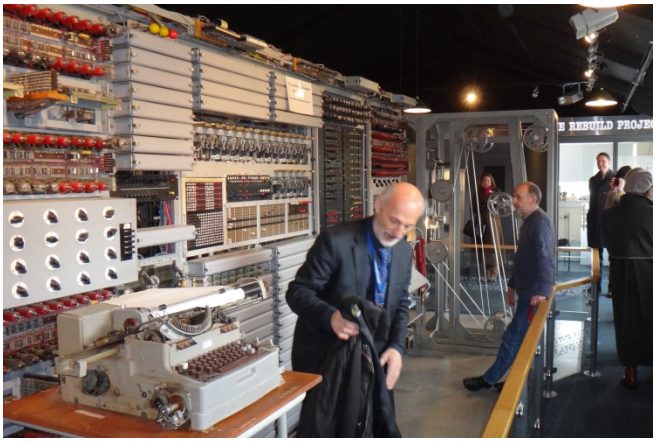
Admiring The Bombe

The Bombe used a series of guesses, known as cribs, based on a sample of the daily messages starting with known phrases. Before running the Bombe, its wiring needed to be configured to a design drawn up by the codebreakers based on cribs. The Bombe found potential Enigma settings not by proving a particular setting but by disproving incorrect ones in turn. The results of the Bombe runs were then fed into a checking machine where the wrong settings first had to be identified and rejected before determining the correct setting. Once the correct daily settings were established, intercepts were sent to the Decoding Room where all of the messages in the corresponding

batch could easily be deciphered. The volume of traffic in the Decoding Room was eventually so great that hundreds of women were needed to work the deciphering machines.

Engineers were taken to the working re-built Bombe housed at Bletchley Park which is operated by a team of volunteers. Last year, an experiment was conducted by GCHQ at the Cheltenham Science Festival to see if the re-built Bombe could decipher Enigma messages sent by students. The messages were sent by Morse for the first couple of days but then modern technology was used in the form of Twitter! Volunteers devised cribs from the messages, fed these into the Bombe to obtain different settings and after checking the settings were able to decode the messages.

We visited another code breaking machine, Colossus, which had been rebuilt over a 15 year period. Colossus is the world's first semi-programmable computer which was used to work out Lorenz-encrypted messages, and is thought to have shortened WWII by many months, saving thousands of lives. The original design by Tommy Flowers was an engineering marvel, kept highly secret for many years after the war. It's rebuild started in 1992, with a team led by Tony Sale piecing together its design from scraps of diagrams, old pictures and engineering principles.



The Rebuilt Colossus

In 2007, the re-built Colossus was again used to crack a Lorenz coded message, succeeding in 3.5 hours. However, we learnt that Joachim Scheuth had written a program for his PC which cracked the same cipher text in a mere 46 seconds, demonstrating the advance in technology and computer processing power in the last 60 years. Colossus was rebuilt in the same position in H Block where it had resided during wartime years, and this building now houses The National Museum of Computing (TNMOC). A tour of TNMOC revealed a huge variety of machines used for calculations and operations, from slide rules and calculators, punched card systems, the world's oldest original working digital computer – the Harwell Dekatron (WITCH), right up to handheld PDAs and mobile phones using today's technology.

The Harwell Dekatron (WITCH)

Our group ended their tour in the Education Suite, encircled by a ring of BBC Micro computers. On the day their annual results were published, all were reminded that these computers are fitted with ARM processors, a British firm still continuing to make advances in the world of computing. With computer programming making a return to the school ICT syllabus, the hope is that students will be challenged by designing and implementing applications as well as spending their time playing on games.

At the conclusion of our visit, we heard that in many ways, today's security operations at GCHQ are similar to the work that took place at Bletchley Park. There is an amassed intellect working incredibly hard to protect our nation, using equipment which is often based on commercially available versions. All of this is underpinned by the same standards of secrecy shown by Bletchley Park staff, with workers operating under the Official Secrets Act.

The Master Engineer, David Scahill, had visited Bletchley Park a few years previously and commented on how well the facilities had been improved and exhibits developed since receiving extensive funding.

Bletchley Park is still revealing its wartime secrets and is a humbling and wonderful environment to visit whether you are interested in history or technology or both. This visit provided Engineers with a taste of the wealth of information Bletchley Park offers and many have already commented that they will return independently to learn more, perhaps in warmer weather!

Bjorn Conway

ELECTION COURT, SERVICE AND DINNER
St Vedast and Wax Chandlers' Hall, 5th March 2013

The Election Service is memorable as a reflective prelude to the joyous and celebrative Election Dinner that follows.

The venue for the service is the Parish Church of St Vedast Alias Foster, traditionally claimed to have been established by 1170, altered, enlarged and restored many times and probably rebuilt at least twice, the last time by Christopher Wren, after the Great Fire of London in 1666; completely burnt out during the Blitz of World War II, and restored under a very influential Parochial Church Council that included Poet Laureate John Betjeman and master organ builder, Noel Mander. One cannot but be reminded of the changing times the Livery Companies have encountered and endured.

The Master, Master Elect and Middle Warden Elect Setting off from Wax Chandlers' Hall to St Vedast

The theme of this year's service was set by the reading by the Master of the 'Parable of the Prodigal Son'. Our Honorary Chaplain, Reverend Peter Hartley, using the most wonderful painting of the subject by Rembrandt, enriched our understanding of the parable, and asked us to reflect on how we saw ourselves in each of the three characters.

The simplicity and beauty of the building is most conducive to singing, and we all did our best to do justice in the rendering of three great hymns of praise.

The service ended with all those present affirming 'Let us go out and renew the face of the world', an inspiring challenge indeed to our engineering profession.

After the service, we followed the Master and his Wardens to the Wax Chandlers Hall for a reception followed by Dinner. When there are no pre-arranged seating arrangements you never know who you are going to join in conversation, and it can be so much fun, prompting some amusing dialogue.

This year's menu referred to a constituent called *Cardamom*. This was new to us and subsequently turned out to be an aromatic spice indigenous to south India and Sri Lanka. Apparently it is world's third most expensive spice by weight, outstripped in market value only by *saffron* and *vanilla*. So now you know.

Our little group had a heated discussion on what constituted a reasonable length for a sermon. A learned colleague said that like a ladies dress 'a sermon should be long enough to cover the essentials but short enough to be interesting!'

When dinner was over, the Master announced the results of the Election of Master and Wardens for the next year held at the Court Meeting earlier. As Master, Air Vice-Marshall Graham Skinner CBE RAF: As Senior Warden, Mr John Baxter FREng FRSE: As Middle Warden, Air-Vice Marshall Patrick O'Reilly CB and as Junior Warden Professor Isobel Pollock

The Master shared the Loving Cup with each of the electives to great rounds of applause from those present. Unfortunately Mr John Baxter was unable to be present.

As an aside, the Master referred to a delicate moment in the afternoon's Court Proceedings when it was realised there was not a quorum to enable the election of Master and Wardens. The situation was recovered by the breathless arrival of Professor Isobel who had been delayed in fulfilling her duties as President of the Institution of Mechanical Engineers in the presence of Her Royal Highness, The Princess Royal.

Next it was the turn of the newly invested Liverymen to be welcomed into the Company. They were David James, Bill Grose, Stephen Burgin, Michael Napier and Yuli Doulala-Rigby. Their CVs and photographs are in the Company News Section of this edition of the Swordsman.

As was the custom, each person was asked to talk about themselves for two minutes. Whilst those assembled listened intently to some very interesting personal histories the Master kept a watchful eye on his stopwatch to compare the timings. It certainly worked in producing conciseness yet not lacking in mirth and merriment.

The Master Displaying the Time to Ensure no Overrun

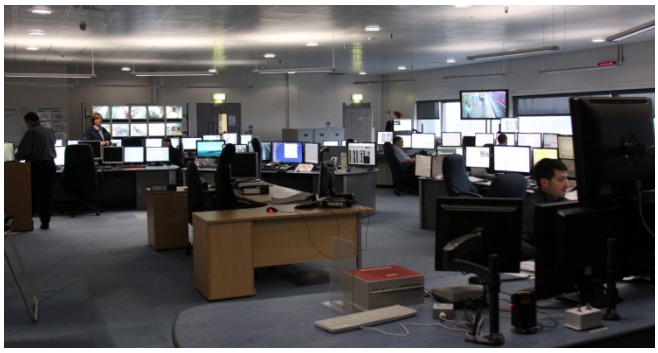
The Master drew the Dinner to a close with his thanks to all who had made his year of office so pleasurable and productive.

John Russell

VISIT TO THE DOCKLANDS LIGHT RAILWAY 8th March, 2013

Liveryman David Cooper was able to use his good relationship with Transport for London and Serco to arrange a very privileged visit for a small group to the operations centre and maintenance base of DLR at Beckton. DLR had a key role to play in serving the 2012 Olympics and was extended to serve the games through Stratford International station. As part of the necessary upgrade, the new operations control room was opened in February 2012, to replace the original, more cramped, location at Poplar. The maintenance facility was also extended.

Serco have held the contract to operate and maintain DLR for almost 20 years; a rebidding round is imminent. Their record is good, and the reliability during the Olympics was outstanding – over 99% achievement of scheduled departures. Having proved it possible, this has now been set as the new regular service standard to be met continuously. The notable feature of this contract, as opposed to other arrangements on national rail and London Underground, is that both the trains and the infrastructure are Serco's responsibility. Judging by DLR's success, it is an example worth extending.



A general View of the Spacious new Control Room

For two of our party, it was a sentimental journey. Peter Gray had provided consultancy services from G. Maunsell & Partners during the construction and afterwards, and Ken Fergusson was appointed as Managing Director of DLR when the railway was a year old. For both, it was greatly satisfying to see how the original modest concept had gone from strength to strength, without losing its pioneering character.

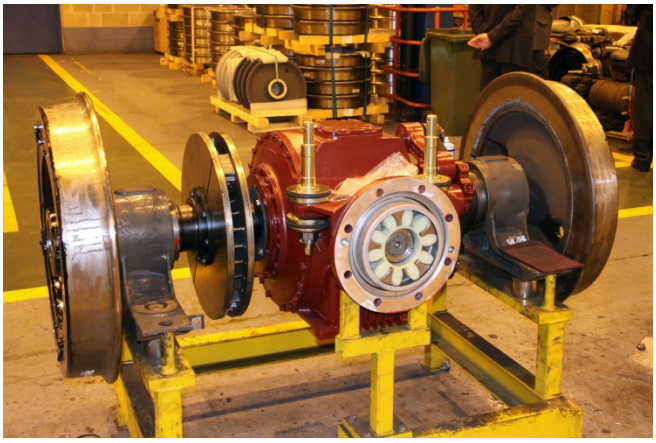
The Control Centre Duty Manager, Adrian Austin, took us in to the control room, from which the entire system is directed and supervised. The trains operate fully automatically, on a "moving-block" system, to a timetable programmed into each unit at dispatch from the depot. The settings can be adjusted by the three controllers if required or manual intervention can be made in case of problems, by the on-board member of staff, "passenger service agent". (Why the original simple term "train captain" was changed was not questioned!)

One of the Banks of Monitors

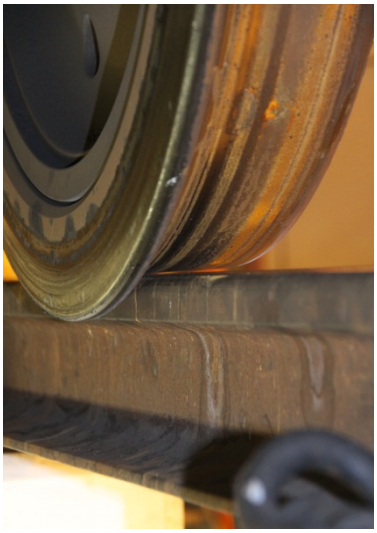
Other sections of the control room house the desks and screens of two information systems operators, controlling and making service announcements, and two operators on power supply and other systems. The final desk was of the operator controlling the disposition of the train fleet. Trains comprise mostly 3 articulated units, but some are of just two. There are a total of 149 units; 55 units had been added to the fleet

in time for the Olympics. At the time of the visit on the Friday evening peak, 140 were available for service (in accordance with Serco's contract with TfL) and 131 were out on track.

We were then handed on to Richard Sykes, General Manager Rolling Stock, who has been Depot Manager since 2010, but also had experience with DLR earlier in his varied engineering career. In a packed hour, we were told how maintenance and reliability standards have been progressively improved; from one failure per 8000km run, the figure is now one per 25,900km, with an aspirational 50,000 target. Routine planned maintenance intervals are 13,500 and 43,200km. Each vehicle averages 111,000 km/year, more than 10 times the distance run on the initial railway in 1988.



One of the Axles During Maintenance



A visit to the maintenance shed followed. Wheels are a critical item on a light rail system like DLR, with tight curves, steep inclines and heavy acceleration and braking. There have to be compromises in wheel profile to match all that with a top speed on the straight of 50 mph. We spent time looking at the wheel lathe – a heavily-used item, potential bottleneck, and an obsolescent design with potential service problems – so this capability is being reviewed. Bogies under maintenance, and the construction of the rubber-buffered wheels, were of great interest. There was the chance also to walk under a train in the maintenance pit.

The flow of questions was copious and answers readily forthcoming, to make the visit a great success.

Ken Fergusson

VISIT TO CAMBRIDGE
20th April, 2013
The Last Hurrah

The Master's last informal event for the year was a most enjoyable evening in Cambridge in the chapel of Gonville and Caius College, one of the oldest colleges parts of which date back to 1390.

Gathering for the Recital in the Chapel

The Master, David, and Gill in front of the Klais Orgelbau Organ

A recital was played on the Klais Orgelbau organ by Sam Hays the very talented Director of Music at Great St Mary's the University Church in Cambridge. The

organ was built in 1981 and is a versatile 3 manual 37 stop instrument.

The programme, chosen by Gill and David from some of their favourite compositions included items by Handel, Wesley, Vaughan Williams, Bach, Rutter and others.

The combination of the wonderful music and beautiful surroundings created an inspiring evening.

Members all transferred to the College to partake in an excellent four course dinner held in the Egyptian inspired dining room. Chicken salad, Grey Mullet, tender spring lamb and raspberry crème brûlée all assisted with a glass or two of very pleasant College wine completed an excellent finale to the Master's social year.

Almost Dinner Time in Gonville and Caius College

In a short speech David thanked the guests who had given him their regular support at the various social occasions throughout his year as Master.

David Everington

COMMON HALL AND INSTALLATION COURT DINNER, PAINTERS' HALL 23rd April, 2013

This year the Installation Court Meeting was held on St George's Day in the home of the Painter-Stainer's Company in Little Trinity Lane. The present Hall, which houses a magnificent collection of paintings, was completed in 1961 after its partial destruction in the Blitz.

After the private Court Meeting for general business, the Court reconvened with guests and members of the Company for the investiture of four new Liverymen who are welcomed in the Company News section.

The Clerk explained the mechanisms of the Company to the new Liverymen including the progression to Master. He explained that we don't operate "Buggins' turn", election is based on merit which adds "a frisson of uncertainty" to the process.

The Court Meeting then closed and the Master, Mr David Scahill opened Common Hall, the Company's Annual General Meeting, and gave his report on the year and presented the accounts. The Master was in a very jovial mood referring to the evening as "falling off his perch" and as the Master Elect becomes Master, he moves from Master to "Master Eject"!

The Master referred to his blog compiled during his very active year, which is printed elsewhere for all to read. Past Master Mr John Robinson FREng described the Annual Review 2012 and its new glossy booklet format befitting of the "significant and growing charity our Charitable Trust Fund has become". Past Master Mr Richard Rooley FREng detailed how the Company intends to be more proactive with our communication and support of widows and dependents of deceased Liverymen.

Past Masters John Robinson and Richard Rooley talking about the Charitable Trust and the Role of the Almoner respectively

The Master then described the accounts which were in excellent state. A detailed risk review had been undertaken of various scenarios including embezzlement by the Clerk and so the target reserve is now set at £100,000. The Master then installed his successor for the coming year Air Vice-Marshal Graham Skinner CBE RAF. The new Master referred to his background in the RAF and as they would say "you have control".

The Master AVM Graham Skinner presenting the Immediate Past Mater David Scahill with his Past Master Certificate

The New Master congratulated David Scahill on an excellent year which amongst many highlights had seen the creation of many mini out of town meetings. He stated how proud he was to be Master and how he knew what the role entailed, having served eight Masters as Clerk. One of his objectives in the coming year would be to create a new role of Father of the Company. The new Master then invested Mr John Baxter FREng FRSE, Air Vice-Marshal Patrick O'Reilly CB and Professor Isabel Pollock as Senior, Middle and Junior Wardens, respectively.

The New Master then announced that Dr Clive Walker, Mrs Audrey Canning and Mr Jan Lewis had been elected to the Court and they were duly installed as Court Assistants.

After closing Common Hall the New Master and Wardens received the Company guests which included Mr Martin McCann, the CEO of RedR and the Masters and Clerks from eight City Livery Companies. All the ladies present were given a beautiful rose as a present from the Master and his lady Margaret. The Company and guests were entertained with lively music during dinner, ranging from military marches to the score of Les Misérables by the Live Brass Quintet.

During dinner, the new Master thanked the immediate Past Master, David Scahill, for his leadership of the Company during the year and presented him with the Past Master's Goblet.

After a fine meal, the Master proposed a toast to the Guests to which the Principal Guest, Air Marshal Sir Robert Wright KBE AFC responded. Their speeches are reproduced below. *Jan Lewis*

The New Master, Air Vice Marshal Graham Skinner CBE, RAF and Sir Robert Wright KBE, AFC and their Ladies before Dinner

The Outgoing Master, David Scahill's, Report on His Year

Members have received the Court's Report to the Livery for 2012 and also my personal report for my Master's Year 2012/13, so I will not go through them again here, but rather try to weave a few threads of what to Gill and me has been a special year, and I hope in some way for the Livery as a whole. It is a sort of blog on my Master's Year and the things that Livery Masters get up to! It was a Diamond Year in every respect; Her Majesty's Diamond Jubilee illuminated so many of the events in the last 12 months, and is a recurring theme in this blog.

Not in order of importance, I would first like to mention the Livery Masters' Association, which is formed each year when all Livery Masters are invited to attend a Masters' Weekend in Ironbridge. This year's Association, not surprisingly is called "The Diamonds", and forms an informal but enduring bond between each Livery Company and the City, under the Presidency of the then current Lord Mayor, in my case, Alderman The Right Honourable Sir David Wootton. The majority of Masters also attended the Diamond Jubilee Luncheon in Westminster Hall which was watched on television by over 19 million people in the UK and a reported two billion worldwide, all of whom

had the opportunity to see me blowing my nose shortly before greeting Prince William, Duke of Cambridge as my principal guest!

The Lunch was covered in detail in Issue 29 of the Swordsman, so I will not repeat it here, but simply say that this one event linked our involvement with the other Liveries, our charitable activities, our links with the Military Services and The City. Having referred to The City, I will talk briefly of the events where I was privileged to represent you at Mansion House. Certainly our Annual Banquet is known and enjoyed by many here this evening.

But there were three other Mansion House events I would like to mention. First there is the annual Lord Mayor's Banquet attended by all the Livery Masters and their Ladies – a truly splendid affair full of pomp and circumstance. Secondly, Gill and I were guests at several other Livery Company Banquets, with the same sense of occasion as ours, but without the personal pressure of having to make a speech! The third and probably most unusual Mansion House event in a Master's Year is the Lord Mayor's Christmas Party for grandchildren of Masters which included, amongst other bizarre events, a line of a couple of hundred children doing the conga throughout the Mansion House from the splendid Egyptian Hall down to the kitchens and back again - lead by the Lord Mayor, Lady Mayoress, Sheriffs and their Ladies. As a grumpy (but proud) Grandad I was happy to leave this one to Gill!

But returning to the Diamond Year, one event which we missed was the Royal Garden Party because it coincided with Past Master Sir William Barlow's Memorial Service which was attended by a number of our Livery, and which exemplifies to me another important priority of our Livery: maintaining appropriate and caring relationships with the widows and widowers and members of our Livery, and for which we are most grateful for the quiet efforts of our Honorary Chaplain Peter Hartley, and Honorary Almoner Richard Rooley.

Here it is only right to remember with affection the friendship and past association of our late Liverymen and in many cases the legacies they left to the benefit of our Charitable Trust. I know The Chairman of the Trust will want to comment on this in his summary report later. But I feel privileged to be able to announce that at our final Informal Event, last Saturday - the Organ Recital and Dinner at Caius College Cambridge - Rita Hanford gave me permission to announce a £50 000 joint bequest from her and John to the Charitable Trust Fund, £25 000 of which will be paid following the recent death of John; I hope it is a very long time before the Trust Fund receives the second £25 000!

Having just mentioned our last Informal Event in Cambridge, there were 10 informal events in all – organised by fellow Liverymen who all know how grateful I am for their support. 150 members and guests joined in, and topping the attendance, Past Master Ted Willmott, Court Assistant Penny Taylor and her partner John Williams each attended six. In total there were over 250 attendees. But back to the Diamond Jubilee, there were two occasions when, as Master Engineer, I met HRH Princess Anne, the Princess Royal. The first was two months ago when the inaugural Queen Elizabeth Prize for Engineering, (first suggested by Liveryman Keith Millard) was announced. The £1 million Prize was awarded jointly to Marc Andreessen who wrote the Mosaic browser which enables easy access to the Internet, to Robert Kahn, Vinton Cerf and Louis Pouzin who devised the protocols which make up the Internet's fundamental architecture and to Sir Tim Berners-Lee who created the whole thing with his World Wide Web.

During our Out of Town Meeting in Basel, our visit to CERN was hosted by Mick Storr - Head of the Visitor Centre - who for several years shared an office with Sir Tim who asked him about his new idea "What do you think of the name: The World Wide Web?" So, a personal, if indirect link. And to be in touching distance of the Large Hadron Collider a few hours before it was due to be re-energised after maintenance, as an engineer, was amazing. My more recent meeting with the Princess Royal was in her capacity as President of RedR at its Annual Reception held to thank all its Sponsors and Supporters – including our Company – for providing the support and finances for the amazing work the expert volunteers do around the world at times of crisis which speaks louder than words but which still, sadly, goes unheard of by the majority. I have already thanked - in my report - all who serve our Livery in their various roles, but I would like to add a special thanks to Senior Warden

Elect John Baxter for his unstinting work as Vice President of RedR.

Our involvement with RedR once more reminds us of what we, as a Livery, are all about. We meet as engineers to enjoy each other's friendship and to help make the world a better place by caring for each other, helping those close to us in trial or adversity, and those unknown to us through our charitable giving.

I am so proud to be have been given the opportunity to lead the Worshipful Company of Engineers for the last 12 months. I wish Master Elect Graham and Margaret every success in his year, which promises to be a delight.

And as Graham moves from Master Elect to Master, so I move from Master to Master Eject!

Acceptance Speech by The New Master, Air Vice-Marshal Graham Skinner CBE

Thank you for your generous acclamation and for your unreserved welcome to my new role in this Company. I said at my Election Court that there was only one thing better than serving this Company for 7 years as your Clerk and that is the opportunity to serve it as your Master. Margaret and I are joyfully looking forward to the year ahead – I hope that you are too.

I am especially pleased to be here with two firsts: to have eventually made it as a member of the junior Service and the first aeronautical engineer in this post. You will not be surprised to know that as well as continuing with the universal object of 'friendship and fraternity' for my year, I wish to bring a consistent engineering excellence theme of 'Aerospace' to the Company for its guests, events and outings – taking care, as Margaret has pointed out, to have alternative non-engineering programmes wherever sensible. So for example, our technical visit in July to Marshall Aerospace at Cambridge followed in the afternoon to the University Engineering Department, will be counterbalanced with a unique tour of the world famous medieval Parker Library at Corpus Christi before a joint lunch there followed by the Fitzwilliam Museum. Hopefully all those participating will find something of interest to encourage them to attend. Overall, in the year I would hope in accordance with objects of our Royal Charter to improve your knowledge and advance the science and practice of engineering – in this case, within my special interest area, aerospace. As well as state-of-the-art technology in the industrial sector at Bombardier Aerospace in Belfast, Marshall Aerospace, BAe Systems at Warton and Salmesbury there is the academic area at Cambridge and Warwick Universities too. There is an outing to RAF Benson in the autumn plus heritage items with plenty of general interest included at the RAF Museum Hendon, the Brooklands Museum Weybridge, and the Vulcan to the Sky Project at Doncaster. I have had great fun putting this together and you can rest assured that Margaret has been there to hold me back realistically on my boyish enthusiasm for all things 'aviation' to produce a sensible balance. I hope you will find space to enjoy at least a few of the planned events.

As Clerk I served and worked very closely with 8 Masters and Mistresses, all of whom became good friends. These, together with other members of the Livery, were particularly generous at the time of my retirement with both personal comments and gifts. I thank you all and especially for your subsequent encouragement to go forward within the Court. Here it has been good to help the delivery of Past Master Chris Price's well articulated Strategy for the Company and the restructuring of the Charitable Trust Fund under the Chairmanship of Past Master John Robinson. It has also been good to see the continued underpinning of the Company by the activity in the Engineers Office and the sterling efforts put in by The Beadle and The Clerk.

I must say that when I became Clerk my first Master was Past Master Raymond Cousins who with Ruth I cannot praise too highly for helping Margaret and I find our feet in my early days. If you follow these things there is a list of consecutive membership numbers in our Company's documents. Raymond Cousins' membership number is the lowest and most senior that we have at 9 - mine by contrast is 492 - and our newest Liveryman clothed today is number 741. Not a bad score of members for a modern livery Company founded 30 years ago. This success has been achieved on the shoulders of the experience and foresight of our founding members. In the coming year I will be asking the Finance and General Policy Committee to consider the introduction of the idea of an acknowledged 'Father of the Company' - in similar

manner to other Livery Companies - to recognise the debt we all owe to our long-standing leaders.

Overall then with your help, Margaret and I are looking forward to serving you in our principal office for the coming year. As my first official act it is with great pleasure that I turn to my predecessor, David Scahill. Firstly, to thank him personally for installing me in accordance with your wishes and, secondly, to thank him, on your behalf, for the massive personal contributions that he and Gill have made in the last year to the well-being of the Company. He has had plenty of champagne moments to share with us in that year. I hope that replacing his Master's Badge of Office with that of a Past Master can be considered by him to be one of those champagne moments in recognition of a job well-done.

The Master presenting the Immediate Past Master with his Past Master's Goblet, A Champagne Moment?

The Master's Speech after Dinner

Welcome to Painter's Hall. I am really pleased to be here to enjoy the elegance and ambience of this building and to feast on the outstanding art collection around us.

Talking of feasts, this is St George's night and, as well as some aviation melodies there has been a liberal sprinkling of English airs from our band, The Live Brass Quintet. Our caterers here, Life's Kitchen, have given us a delicious meal of traditional English fare. On this special night, I trust the meal and music allowed you to contemplate the life of St George who has passed through the centuries growing in legend and myth. However, whatever the truth, he must have been quite a character in his lifetime to have a reputation to have survived for over 1700 years. The widely accepted facts are that he was born to Christian parents in Cappadocia, Northern Turkey. He became a Roman soldier, obtaining high rank, but eventually rebelling against a pagan Roman Emperor who was persecuting Christians. His rebellion failed, he was imprisoned and tortured for his faith, being eventually beheaded on 23rd April 303AD in Nicomedia, Turkey. The earliest recorded reference in Britain to St George is from the Abbott of Iona in the 7th century and in due course, as crusaders returned from foreign shores, there were tales of St George's heroic deeds. He became the Patron Saint when English soldiers and bowmen won the Battle of Agincourt in 1415 and was immortalized in Henry V by Shakespeare whose birthday is also today. Of course you will all know the coat of arms of the City of London combine the sword of St Paul and the Cross of St George. So it is a good night to be about in the City to celebrate our Patron Saint even if we don't get a bank holiday off to do so! I also hope our ladies here will accept a personal gift from Margaret and me of a red rose, not only as a recognition of their delightful presence with us this evening, but also as a memento of this special occasion.

Before moving on, please can I reiterate what I said at Common Hall and give our thanks to the Immediate Past Master, David Scahill, and his wife Gill for their year's contribution. David certainly delivered what he set out to do in terms of 'friendship and fraternity' in his Master's year. He also introduced a new word into the Company vocabulary - this was MOOT - standing for mini-out-of-town event. These were prolific and were coupled with a memorable maxi-out-of-town meeting in Switzerland. I know his year gave him, and us, many cherished champagne moments. David and Gill, you clearly both enjoyed the whole period, especially that wonderful Queen's Golden Jubilee and Olympic year of 2012. Thank you for sharing your enjoyment with us and for handing on the Company in its 30th year in such good order.

For my own year, I will continue incorporating 'friendship and fraternity' within a programme of 'aerospace engineering' experience. As a current Non-Executive Director of Bombardier Aerospace Belfast and a retired RAF Officer, I am well aware of the importance of this sector of engineering to the well-being of this nation. For the record, UK aerospace has a 17% global market share, making it number one in Europe and second only to the United States. The sector creates annual revenues of over £24billion and exports 75% of what it produces. For the future there is a challenge to sustain this position but there are huge opportunities, particularly in civil aerospace.

With that background, I am pleased to say that the UK Government recently announced the Aerospace Growth Partnership - a joint programme with industry

to deliver an Aerospace Industrial Strategy. This will include splitting the cost of a £2billion scheme to maintain this country's lead in aerodynamics, propulsion and composites. Under the plan, a new Aerospace Technology Institute will co-ordinate and fund research at existing laboratories and universities. At the other end of the spectrum, aerospace skills for individuals are absolutely crucial for the industry to thrive and it was most pleasing to see a £6M pot of cash available to recruit talented engineers who want to build careers in the aerospace sector. This initiative, which is being run by the Royal Academy of Engineering in collaboration with the Royal Aeronautical Society, is aimed at helping the sector to develop the skills it needs to continue to compete globally with bursaries for MSc students up to a maximum of £9500; it will encourage a more diverse range of people to reach Chartered Engineer status and, perhaps, to join us in due course.

At last it is really pleasing to see a co-ordinated, strategic and long-term initiative underwritten strongly by government. I hope that during my Master's year we will have a chance to follow progress on this plan directly during our visits to some of the companies involved. Clearly there is a great deal going on in this sector to keep the UK in the forefront of the business and although today the closest we can get to Concorde might be during our Brooklands Museum visit in June and although there are no longer lines of new aircraft prototypes every year at Farnborough Air Shows, I think that there is still a lot in aviation to excite the younger engineer as it did for me over 50 years ago now.

Coming down to earth and turning now to a little internal business - can I congratulate our Wardens on their installation into their new offices and especially welcome Professor Isobel Pollock, currently the President of the Institution of Mechanical Engineers, as our first lady warden. We have some new Court Assistants, another lady in Mrs Audrey Canning plus Mr Jan Lewis, himself until recently President of the Institute of Materials, Minerals and Mining, together with the re-election of Dr Clive Walker, who has been performing a sterling role as the Company archivist; welcome to you all on the new Court. I would also wish to welcome the newest Liverymen of The Company who were clothed this evening at the Court Meeting.

I would like now to turn to our guests for the evening and to welcome them all on behalf of the Company. We greet our fellow tenants of Wax Chandlers' Hall with The Master of the Plumbers Company and his Clerk who is also a retired RAF officer. Additionally we have The Masters and Clerks of The Paviors Company, the Tin Plate Workers, The Master Mariners, The Chartered Architects, and The Constructors Company. The Master Mariner is here as well. Finally, I am especially pleased to greet another RAF officer and colleague from Marshall Aerospace, Group Captain Gerry Bunn, a former Clerk and now Master Coachmaker to this event.

We are also joined by a number of other official guests. The Dean of Engineering from City University is with us and I look forward to planning our biannual Bridge Lecture with him during my year. Additionally, we have the CEO and Chair of RedR the charity which provides people and skills for disaster relief anywhere in the world and we are one of their patrons. We also have seniors from our professional engineering institutions of Engineering and Technology, the Civil Engineers, and the Chemical Engineers. Our guest list also includes Mr David Edwards our financial adviser and Mr Paul Windmill, from our Accountants and Auditors.

I would also welcome my personal guests. Firstly my son Adam who is not an engineer but a management

consultant within WS Atkins Engineering and, because of living with an engineer-father, understands us all well. My daughter Arabella, is here too with her husband Peter who is a most successful publisher in the London and world-wide reinsurance sector. Bella is not an engineer either, in fact she read Theology at Oxford, but combing her peripatetic experience as an RAF child with that as a marketing executive with the BBC, our principal guest was instrumental in selecting her as the youngest Trustee ever for the RAF Benevolent Fund. This charity is well-supported by Assistant Emeritus Ken Fergusson and his wife Beryl and together we extend a warm welcome to my principal guest tonight, Air Marshal Sir Robert Wright.

I knew Sir Rob during our time together in the RAF where he was a fast jet pilot and later had many successful staff tours culminating as the UK Military Representative to NATO and the European Union in Brussels. However, I got to know Sir Rob even better in his role as Controller of the RAF Benevolent Fund. Together we were able to engage Alderman Nick Anstee with supporting the Fund during his mayoral year and, in particular, organising a tribute in St Paul's Cathedral from the City of London for the RAF on the 70th Anniversary of the Battle of Britain. During his time as the Controller Sir Rob brought the Fund up-to-date magnificently as the needs of RAF personnel injured and serving in Iraq and Afghanistan presented different challenges from those traditionally associated with RAF veterans. I welcome Sir Rob here this evening, with his wife Maggie, to speak to us in a moment as our Principal Guest.

Finally, in recognition of all our honoured guests here, can I ask the Members of the Worshipful Company of Engineers to stand and join me in a toast to welcome our guests**.**

Air Marshal Sir Robert Wright's Speech

Master Engineer, members of the Worshipful Company of Engineers, honoured guests, ladies and gentlemen thank you for that generous introduction, and for the excellent hospitality tonight. It is a pleasure to respond on behalf of your guests, indeed it was also a pleasure to accept the personal invitation from you, received some 2 years ago, showing great forward planning from the new Master.

As a liveryman and a member of the court of the guild of pilots and navigators I am well aware of the demands that will be placed on you over the next 12 months but also of the great honour that comes with the responsibility. So congratulations from us all.

The link with the royal air force was a major theme of your speech and a very welcome one. All of the armed forces are used to being in the public eye but as we drawdown to an air force of 30,000, when Graham and I joined in the 60s it was 150000 and probably more when Pat O'Reilly joined! There is a danger, because size matters, that our profile becomes much reduced despite our ongoing commitments. I refer here to the Falklands, our search and rescue role, soon to be privatised, quick reaction alert fighters, frequently engaging Russian bombers as they exercise what I call 'Putin muscle' as they probe our air defences. Special forces, supported by RAF helicopters and tactical transport, are as engaged as ever, and of course there is Iraq, Bosnia, Sierra Leone, Libya and currently Afghanistan, All part of our high profile over the last two decades but a profile that will recede as we move on from Afghanistan next year, unless of course something else happens!

I am often asked what do I expect to happen next. The answer is simple, what will happen next will be completely unexpected! So the importance of the message tonight is a long standing one –we all need profile and partnership

Within the RAF there has always been a respectful partnership between pilots and engineers, flavoured

with some rivalry, easily explained, engineers like to work on aeroplanes and pilots like to fly them- sometimes compatible sometimes not!

I never fully understood why upon taking delivery of a new aircraft off the production line engineers immediately put it in the hangar and dismantle it, to see how it works they say. But I began to understand when my engineering neighbour at RAF Bruggen in Germany, who was the officer commanding the engineering wing, did exactly the same with his brand new VW Personally Ii prefer to rely on the warranty but we are all different.

You have heard of my relationship with the Skinner family but our air force connection began with the air force's need for mobility which is a huge logistical problem. I exclude the move of furniture from his headquarters in Brampton to my residence in Belgium! A large part of our careers was spent in the cold war era, one that has yet to be fully analysed by historians, which encompassed many a crisis but it was a critical time in our history and when it finished, rather abruptly in 1989, I recall our surprise and relief, followed by the inevitable call for a peace dividend. Almost immediately the RAF had to look beyond its fixed bases and look for the unexpected, all of which required mobility and greater flexibility which was a dramatic change for us all.

As air commodore operations I was tasked with taking these concepts forward by forming a mobility task group consisting of experts from all branches; my engineering and logistics expert in the group is now your Master Engineer.

All this bought about a major culture change, bunkered down in hardened bases one day and then almost overnight we were escorting MIG 21s to the Fairford air show. All this preceded the conflicts that I mentioned earlier and all this as peace reigned. Briefly!

Our more mobile approach, ultimately successful, took the collective talent and efforts of all branches, with a heavy burden falling on our engineers and logisticians emphasising the importance, that word again, of partnership.
Looking outside of the RAF I believe that the role of the engineer has never been more important, look at the impressive engineering in the Olympic Stadium, St Pancras and Kings Cross, Crossrail, Thames Sewer, roads, airports, and many more infrastructure projects, a focus on infrastructure that must become a key element of our economic recovery.

As to the aerospace industry, there is no better example of British inventiveness than at the cold war museum at RAF Cosford. I took a group of businessmen there last month and they saw at first hand the V bombers, and many other iconic aeroplanes all built by the aviation legends of the 50s, Avroe, Hawker, English Electric, Handley Page and Vickers. All consigned to history but, in just one example today, in the strike fighter programme with the USA, there is over £8bn of value, British value, which will be accrued through the production and service life of the aeroplane. Contracts won with British engineering teams and unique technical solutions, against tough competition, include Smiths electrical power and control electronics Rolls Royce TWR aero systems at Wolverhampton and the highly classified weapons bay actuation system (but 50 years before in the buccaneer- bomb bay story)

I was instrumental in selecting Arabella Hastie nee Skinner as a trustee of the Royal Air Force Benevolent Fund partially because we needed a younger contribution to the board, and another woman of course! This is not political correctness, it is about a different perspective, and I do note that only 9% of engineers in this country are female, but I also note that you have elected Isobel Pollock as a Warden to your court. This is progress. We needed to recognise twitter, facebook and the different perceptions of the younger generation. Once we had managed to get Stephen Fry on board, by praising our RAFBF Battle of Britain blog, our twitter hit went to 10000 in one day! Through this we gained a huge number of young supporters which is vital to survival. When Trenchard, with great foresight, formed the benevolent fund in 1919, one year after he formed the RAF, he said that 'many if not most of those in trouble will go looking for help but that the finest would not', the finest being his Royal Air Force.

In the modern era we had to find those in need and, with operations underway, we needed a broader spectrum of support to underpin our cradle to grave philosophy. We did this with a younger support base, raising our profile, and in partnership with other charities, industry, the city and politicians in Westminster, all of whom wanted to be a part of something forward looking and dynamic, which placed the RAF Benevolent Fund at the centre of change.

Youth partnership and profile are also key to the future in engineering. The recently introduced, far sighted, incentive scheme, the Queen Elizabeth prize for engineering will raise the profile of engineering and inspire a new generation of young engineers. This award is the first of its kind this first year prize of £1

million has been awarded to the international team of engineers. Where would we be without engineers?

Partnership, teamwork, innovation, youth and infrastructure. All these things will help ensure our economic survival, and much of that is in your hands. Master Engineer, your year has commenced, we wish you and the Company continuing success. On behalf of all your guests we thank you all for the exceptional warmth of your welcome and may the Worshipful Company of Engineers flourish root and branch for ever.

LADIES' BROOCH LUNCHEON
Wax Chandlers' Hall
24th April, 2013

The Brooch Lunch, following the Installation of Air Vice-Marshal Graham Skinner as the new Master Engineer, was held in the lower Court Room of Wax Chandlers' Hall.

Gillian Scahill speaking Before Luncheon

The Lunch was hosted by Mrs Gillian Scahill, wife of Immediate Past Master David Scahill. She welcomed 16 Ladies, the wives of Past Masters and those of the newly installed Senior and Middle Wardens and, of course most importantly, the new Master's Lady, Margaret Skinner

The purpose of the Lunch was the presentation to Margaret of the Master's Lady's Brooch for the year ahead and secondly the presentation of a Past Master's Lady's Brooch to Gillian. As recognition of Gillian's term of office during the Diamond Jubilee of Her Majesty the Queen, her brooch was specially embellished with a Diamond jewel.

The speeches of both ladies were very entertaining, Gillian mentioning that there were many great experiences and highlights during her year including a visit to the Mansion House with her Grandchildren for the Lord Mayors' Christmas Party.

Margaret made mention of the difficulties which can arise when you are called the Mistress of The Master, even of a Past Master and we all understood what she meant.

Gillian had taken great care in deciding the menu and we enjoyed a splendid lunch, including asparagus, Lemon Sole with Cromer Crab and a beautiful dessert comprising Panacotta, fruit basket and sorbet. Wines accompanied the lunch which were well suited to the food.

Within the delightful surroundings of Wax Chandlers Hall and the shared interesting conversations we enjoyed a very convivial experience. Many thanks to immediate Past Master David and Gillian for their generous hospitality at the Lunch and for their superb efforts throughout the past year.

Best wishes to new Master Graham and Margaret for a success in the year ahead. *Jeanette Roche*

COMPANY NEWS

January Court Meeting

We welcome one new Liveryman invested at the Court Meeting on 7th January

Paul Golby CBE, FREng, BSc, CEng, PhD, FIET, FIMechE, FIEnergy

After graduating and studying for a PhD at Aston University Paul joined BTR and held various management roles in the Company until 1986. Since then Paul has followed a very successful business career mostly in the Energy Industry and from 2002 to 2011 was Chairman and Chief Executive of E.ON UK plc (formerly Powergen). Paul has been Pro Chancellor of Aston University since January 2009, Chairman of Engineering UK since September 2010, a member of The Prime Minister's Council for Science and Technology since June 2011, a Non-Executive Director of National Grid since February 2012 and Chairman of Engineering and Physical Sciences Research Council since April 2012. Paul is married with three grown up children.

March Court Meeting

We welcome five new Liverymen invested at the Election Court Meeting on 5th March 2013

David Stuart James BSc, CEng, FICE

David is a Chartered Engineer who was awarded the Miller Prize by the Institution of Civil Engineers. David has worked at the leading Consultancy, Atkins for over 20 years and he was a Main Board Director when the Company was floated holding various positions including being Deputy Chief Executive. David was a member of the Balfour Beatty plc Executive Committee and was Chairman of ABB between 2003-2010, a joint venture between Atkins and Balfour Beatty undertaking the complex major improvement project of Kings Cross Station for London Underground (TfL). As Chairman David was responsible for creating and directing Connect Plus, a DBFO joint venture Company between Balfour Beatty, Skanska, Atkins and Egis. In 2009 it was awarded the £6bn M25 contract for carrying out improvements and operations on the M25 (including the Dartford Crossing) until 2029. David is presently Chairman of the Independent Investment Programme Advisory Group working to the Mayor of London and the Secretary of State for Transport.

William Jeffrey Grose BSc, CEng, FICE

William is a civil engineer born, living and working in London for most of his life. Paul studied civil engineering and theology at King's College London, where William has a keen interest in encouraging young people to enter engineering careers, and an interest in sport as part of a healthy lifestyle and work/life balance. William started Arup's tunnelling business and grew it to a global leading position and took the lead in Arup's planning and design work on London's Olympic Park. This work was probably the highlight of my career so far as it is unusual for infrastructure providers to work on a project that is eagerly anticipated and culminates in a party seen all over the world! William has been Chairman of the British Tunnelling Society and is a Member of Council at the Institution of Civil Engineers. William's interest in sport leads him to take the senior role in running Arup's relationship with SportsAid and they give financial support to a number of athletes who, in return, engage actively with staff to raise money, awareness and contribute to our business.

Stephen Rex Burgin BSc Hons, CEng, FIET, FIEnergy

Steve started as a student apprentice with GEC in 1975 and has worked in the electricity transmission and distribution industry for most of his career. Working across a wide range of disciplines and management roles he became Commercial Director of GEC

Alsthom T&D Distribution Switchgear in 1993. Steve moved to ABB in 1996 as General Manager ABB Power T&D Ltd managing their High Voltage business

in UK before moving to the headquarters in, responsible for T&D projects and renewable energy worldwide. Steve moved back to Alstom in 2001 to lead the global project management business for electricity distribution systems, based in Paris. Following Alstom T&D's acquisition by Areva S.A in 2004, Steve became Country President and Director of Areva T&D UK Ltd and then Regional Vice President NW Europe, Areva T&D. He rejoined Alstom as UK Country President in January 2008. Steve is Chairman of the Governors of Staffordshire University and is married with 3 daughters and enjoys skiing, sailing, walking, golf and generally keeping fit.

Michael Allen Herbert Napier BSc, CEng, ACGI, FICE

Mike graduated from Imperial College and, other than a couple of years working with youth and music for his Parish Church, he has worked for Costain for his whole career. A decade in management of UK infrastructure projects and then similar work in Nigeria on rural water supply and major process plant was followed by a move into strategy and business development, leading this for Costain's infrastructure business. His career has spanned the collapse, rebirth and renewed flourishing of the Costain business. Participating in the rebirth was challenging, but hugely rewarding; there's an MBA textbook in that story somewhere!

Work interests include nuclear, procurement strategy and multi-disciplinary work. So there was a serendipity in becoming a Liveryman at the same time as Alstom's Steve Burgin, with whom Costain have a successful rail JV.

Outside work, Mike enjoys travel – especially to Asia; making and listening to all sorts of music, and has sung in and conducted choirs; dog-walking (currently a chocolate lab and a border collie); good food and wine; mentoring young people; and promoting redr within the workplace.

Chaido (Yuli) Doulala-Rigby BEng, MSc, CEng, FICE, MIMMM, MHKIE

Yuli obtained her first degree in Civil Engineering in Greece and came to the UK to attend a Master's Degree in Rock Mechanics and Foundation Engineering in the University of Newcastle upon Tyne.

Following the successful completion of her MSc in 1994, she worked for the Jubilee Line Extension project in London as a junior tunnelling engineer.

She later moved to Hong Kong where she spent almost half of her working career as a Geotechnical Engineer, before returning to the UK in 2005.

After a short period working for Mott MacDonald as a Principle Geotechnical Engineer, she joined Tensar (Polymeric Geogrid Reinforced/Stabilised Soil Structures) in 2006 as a Senior Civil Engineer. In 2009 Yuli was promoted to her current post of the Chief Civil Engineer. Yuli is based in Tensar's UK HQ and holds the overall responsibility of the Tensar Global Design Team with offices in Germany, Holland, France, Russia, United Arab Emirates, Saudi Arabia, Malaysia, Indonesia and China and representatives in Africa, Australia and New Zealand.

Yuli's career highlight, so far, is managing her team of engineers in delivering one of the tallest geogrid reinforced soil walls in the world with a cumulative tiered height up to 60m. The wall is located in the UAE and was successfully completed in 2011.

Yuli is a member of the Committee of the International Geosynthetics Society UK and is actively involved with the ICE and supports many charities.

Yuli is married with two children, Anna and Alexios, Yuli and her husband Chris enjoy travelling overseas,

good food and spending time with close family and friends.

April Court Meeting

We welcome four new Liverymen invested at the Installation Court Meeting on 23rd March 2013

Robert Taylor BSc, CEng, FICE

Bob Taylor first entered the construction industry in 1965 joining Sir Alfred McAlpine and Son after completing his Civil Engineering Degree at Aston University.

From 1970 until 1983 Bob was with Tarmac PLC, initially in the Construction Division for nine years in senior roles, and then as Business Development Director of the Industrial division.

Between 1983 and 1989 Bob was Managing Director of a thermal, fire, and acoustic insulation manufacture and installation business, Insuwall PLC, which operated in the construction sector.

In 1989 Bob joined Ennstone PLC (formally Albrighton PLC) as Group managing Director. Ennstone was a conglomerate of six specialist building materials and service companies operating in the quarrying and construction sectors.

In 1996 Bob joined Thames Water as their Business Development Director establishing and growing their non regulated business activities until it was eventually sold on to Veolia in 2008. Bob then acted as a consultant to Veolia until 2010.

Currently Bob is Non Executive Chairman of Auriga Ltd and a Non Executive Director of Taylor Osborne Ltd as well as running his own Consultancy business, R.Taylor Solutions Ltd., which was established in 2008.

From 1987 to 1996 Bob was the Chairman of the Shropshire Enterprise Trust and continues to be a founder Governor of Thomas Telford School Trust in which was set up in 1989.

Dr Russell Bailey Gilbert BSc, Msc, PhD, CEng, FIMechE

Russell Gilbert graduated from Bristol University while an apprentice with the British Aircraft Corporation. BAC subsequently funded his PhD work into carbon-fibre structures at Cambridge. After a period with a construction company Russell joined Shell, initially working as a mechanical and project engineer on the design and construction of offshore platforms in the UK North Sea, becoming a Fellow of the IMechE. In 1992 Russell transferred to Shell International, where he held technical, commercial and operational management roles in The Netherlands, Nigeria, China and Malaysia. Russell's final position was Engineering and Projects Director of Shell Nigeria, managing its £1.5bn/pa project portfolio in the Niger Delta.

Since retiring from Shell, Russell has completed an MSc in renewable energy systems at Loughborough, and works with students at City University and with Helios, a social enterprise developing rural power systems in sub-Saharan Africa. Russell is a trustee and Treasurer of the Royal Free Hospital Charity.

Eur Ing George Roger Dunn BSc, CEng, FIMechE, FIET

Roger Dunn read Mechanical Engineering at Bristol University. After graduating, Roger joined the engineering division of the Tube Investment Group where he was involved with the design and manufacture of a wide range of heavy engineering equipment from rolling mills to pressure vessels. Roger then moved to AIC, a leading firm of management consultants, before starting his own engineering company, Hornet Engineering Limited, in 1975. Roger built the company into a leading supplier

of electrical switchgear, packaged substations and electrical equipment modules to the process and nuclear industries. Roger sold the trading business to Terasaki of Japan in 2000, but retained the property, which he has since developed into a small trading estate.

Roger has served on the Council of the CBI and as chairman of the BSI Smaller Firms Policy Committee. He has had a lifelong passion for aviation and is a current instrument rated private pilot. He operates a Mooney aircraft from Biggin Hill and is a Liveryman of the Guild of Air Pilots and Air Navigators.

Professor William Bonfield CBE, FRS, FREng, FMedSci, BSc, PhD, DIC, DSc, CEng, FIMMM

William Bonfield was educated at Imperial College, receiving a BSc(Eng) degree with First Class Honours, the Perry Memorial Medal for distinction in Mathematics and Mechanics and the Bessemer Medal for distinction in Metallurgy. This was followed by research for a PhD. Bill then worked as a Senior Research Scientist at the Honeywell Research Centre in Minneapolis, before returning to the UK as Reader in Materials Science at Queen Mary College. Subsequently he became Professor of Materials, Head of the Department of Materials, Chairman of the School of Engineering and Dean of Engineering. At Queen Mary, he created and became Director in 1991 of the University of London Interdisciplinary Research Centre (IRC) in Biomedical Materials, which was the first of its kind in the UK. In 1999, Professor Bonfield was elected as Professor of Medical Materials in the University of Cambridge, where he established and directed the Cambridge Centre for Medical Materials and the Pfizer Institute of Pharmaceutical Materials Science.

William is now the Emeritus Professor of Medical Materials in the University of Cambridge. He is internationally recognised for his pioneering research contributions to biomaterials for medical devices, with awards including the Royal Academy of Engineering Prince Philip Gold Medal, the Royal Society Armourers and Brasiers Company Medal, the Kelvin Medal, the European Society for Biomaterials George Winter Award, the Japanese Society for Biomaterials Medal, the Institute of Materials Griffiths Medal and Chapman Medal, the UK Society for Biomaterials President's Prize, the Acta Metallurgica H.H.Holloman Award and the International Union for Physical Sciences and Engineering in Medicine Award of Merit.

Bill has published 450 research papers and has 80 patents on biomaterials, biomechanics and materials science. From his innovative research on synthetic bone grafts and cartilage repair scaffolds, he founded two successful Med Tech companies, Apa Tech Ltd (now Baxter) and Ortho Mimetics Ltd (now TiGenix). A distinguished editor, Bill was Editor of Journal of Materials Science from 1973 to 2002, Founding Editor of Journal of Materials Science, Materials in Medicine, and the first Editor of Journal of the Royal Society, Interface.

Bill is a Past Master of the Worshipful Company of Armourers and Brasiers.

At Common Hall on 23rd March 2013 the first Lady was Invested as Junior Warden, one Assistant was re-elected and two new wardens were Elected

Junior Warden Professor Isobel Pollock BSc(Eng), FCGI, Hon DSc, CEng, FIMechE

New Assistant Audrey Canning CEng, FIET

Re-Elected Assistant Clive Walker, CEng, FIMMM, FInstP

New Assistant Jan Lewis BEng, CEng, FIMMM

MEMBERS' NEWS

Congratulations to Assistant Ric Parker on the award of a CBE in the New Year's Honour's list

Congratulations also to Assistant Tony Best on his award of an Honorary Doctorate by the University of Bath.

Obituaries

We are sorry to have to report the deaths of five Liverymen since the last edition of the Swordsman.

Alex Moulton CBE, FREng aged 91 who was a Founder Member of the Company in 1984. Alex was Managing Director of Moulton Developments and was famous for his revolutionary small wheeled, full suspension, bicycles in the 1969s the forerunner of many specialist bicycles since.

James McHugh CBE, FREng aged 82 and another very early member of the Livery having also been invested in 1984. James was a Past President of the IQA.

John Hanford aged 80. John joined the Livery in 1985 and was a very regular supporter of Livery functions from that time and will have been well known to many Liverymen. His funeral in March was very well attended by Liverymen and their ladies in a large congregation. John and Rita have left the Company Charitable Trust £50,000 in their wills, half now and the other half when Rita dies which we hope will be in a very long time.

Sir Philip Foreman CBE, FREng aged 89. Sir Philip joined the Livery in 1992 and was the 100th president of the Institution of Mechanical Engineers in 1985. He was Chairman and CEO of Short Bros before his retirement.

Professor Maria Petrou FREng. who was only 59, and joined the Livery in 2010. Maria was Professor of Signal Processing at Imperial College and was the Director of the Informatics and Telematics Institute in Thessalonika in Greece.

Golden Wedding Anniversary

Many congratulations to Past Master John Robinson and his wife Doreen who celebrated their Golden Wedding Anniversary in March

John and Doreen hosting the Company Golf Day in July 2010

Post Script

Liveryman Brian Cook has reminded me about a 'Dick Whittington' book written by Claire Gifford, the wife of the Lord Mayor. Brian tells me he bought copies (£10.99) for his grandchildren and would like to commend the book. It begins with the traditional story well told and at the end it also tells the true story of the real man, a great benefactor whose gifts still help today and whose statue stands at Guildhall.

Further details can be obtained from the website www.thelordmayorsappeal.com where Brian also saw that there is a new guide to the Samuel Collection of pictures at the Mansion House. This is another fine book explaining the background to the collection – how it was built up, how it reflects Samuel's personal taste, how the display is arranged in the Mansion House etc. and then illustrates and describes each painting.

Profits from both publications go to theLord Mayor's Appeal if you would like to support that.