

# The Worshipful Company of Engineers

(Incorporated by Royal Charter 2004)

## The Swordsman Newsletter

Issue 31, November 2013



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Top Left	Sopwith Camel in the Hanger at RAF Hendon
Top Centre	The Master and team preparing to Tee Off at Beaconsfield GC
Top Right	Margaret Skinner and Gillian Scahill relaxing at West Wycombe Park
2 <sup>nd</sup> Row Left	Gathering in the Entrance of Corpus Christi College
2 <sup>nd</sup> Row Centre	Engineering Maintenance at Bekonscot
2 <sup>nd</sup> Row Right	The Dome of Belfast City Hall
3 <sup>rd</sup> Row	The Peace Bridge
Bottom	Bombardier Challenger 350 Business Aeroplane

## FUTURE EVENTS

18 <sup>th</sup> December 2013	Annual Carol Service and Dinner	Tower/Clothworkers Hall
16 <sup>th</sup> January 2014	January Court Meeting and Dinner	Skinner's Hall
30 <sup>th</sup> January 2014	Flight Simulator Visit	Warfield
12 <sup>th</sup> February 2014	The 14 <sup>th</sup> Bridge Lecture	City University
26 <sup>th</sup> February 2014	Visit to Warwick Manufacturing Group	Warwick University
11 <sup>th</sup> March 2014	Election Court, Service and Dinner	St Vedast/ Wax Chandlers
27 <sup>th</sup> to 28 <sup>th</sup> March 2014	Visit to Aerospace Manufacturer	BAES Warton
4 <sup>th</sup> April 2014	United Guilds Service	St Paul's Cathedral
29 <sup>th</sup> April 2014	Installation, Common Hall and Dinner	Mercers' Hall
30 <sup>th</sup> April 2014	Brooch Luncheon	Wax Chandlers' Hall
18 <sup>th</sup> June 2014	Warden's Lecture	
24 <sup>th</sup> June 2014	Election of Sheriffs	Guildhall

## EDITORIAL

The Company seems to become busier and busier. The new Master, Graham Skinner, has continued to provide a very full and enjoyable programme of events mostly with an aeronautical interest. Once again my thanks to the reporters who write such interesting stories about the events. The Awards Dinner shows off much of the Charitable support which the Company provides and the Visit to Northern Ireland gave us a cultural experience of another area of the United Kingdom as well as interesting technical visits.

*Raymond Cousins* [Cyril.blumfield@btinternet.com](mailto:Cyril.blumfield@btinternet.com)



## **NEW MEMBERS' EVENING WAX CHANDLERS' HALL 8<sup>th</sup> May 2013**

As I was walking towards St Paul's, first I heard the band of the Royal Marines. Then I saw the sailors who had taken part in the service to commemorate the Battle of the Atlantic marching towards Mansion House escorting the Lord Mayor.

After passing this reminder of how the City supports the Armed Services, my wife and I continued towards Wax Chandlers' Hall. On arrival we were greeted by our Beadle and guided towards the Court room and a glass of wine. During the reception there was the opportunity to meet some of the other new Liveryman and a few old hands. Our attention was drawn to the Engineers' Company Grant of Livery and Royal Charter; on the opposite wall is the Wax Chandlers' Charter, bearing possibly the only known surviving seal of Richard III.

The Beadle had also arranged a magnificent display of the Company's silverware, including the Iron Bridge replica, a set of 24 goblets with silver gilt sun presented by past Masters, and loving cups with handles which are replicas of the Iron Bridge.



*Some of the Company's Silver*

On the dot of 7pm 42 of us, including partners of new Liverymen, were called to the Livery Hall. Following the Master's welcome, the Clerk explained in his introduction that the last similar event had been 5 years ago. He explained the aims of the Livery were Fraternity, Friendship and Charity, and in furthering these aims seeking to emulate the traditions of the ancient Livery Companies. Our Livery differentiates itself from the engineering institutions by providing a forum to engage with fellow professionals in a social context.

After a history of the Livery movement from the Clerk, the Beadle explained how his role had evolved

from that of a Roman temple officer via parish constable to today being the guardian of our traditions, decorum and discipline.



*The Master Welcoming the New Members*

The Clerk returned to the stage to explain the basic cycle of the Engineers' Livery year, based around 5 "quarterly" Court meetings with other major events such as our Annual Banquet and Carol Service.

Ruth Cousins, past Mistress of the Company, followed on with a partner's perspective. In earlier generations, wives were less involved in Livery but the Engineers have made a particular effort to ensure the programme appeals to all and includes Ladies' lunches (eg the Brooch lunch) and separate itineraries for the out of town meetings. In future we are concerned to secure a proper place for women engineers and their partners.



After some further history from the Clerk, this time of the Wax Chandlers' Company and Hall, the Chaplain, the Revd Peter Hartley, who is also a professional engineer, explained the four aspects of his role; ceremonial, spiritual, pastoral and ethical. We were then invited to enjoy an excellent buffet supper, during which the staff of Life's Kitchen wore Engineers' Livery aprons.

The next section of talks began with the Clerk talking through the Court and Committees structure, explaining that the Master immediately becomes incredibly wise when the chain is put round his neck! Unfortunately as Past Masters know, we return to being mortals as soon as this is removed. A feature of the Company's organisation is that the Master will

## *The Swordsman*

have sat on, and chaired, all Committees by the time he or she reaches that position.

Ray Cousins, third Editor of the Swordsman, said that normally two issues are produced a year, in May and November, and the magazine aims to provide a full report on all Company activities. The first issue of the Swordsman was merely a collection of A4 sheets which were printed in-house until 2009. As you can see from the edition you are holding, this has now evolved into a premium publication.

John Robinson, Chairman of the Trustees, talked about the Charitable Trust, whose dual aims are the advancement of education and the relief of poverty generally and in particular for those in the profession of engineering. 19% annually is given to RedR. Some 48% of donations go towards civilian awards and prizes. Although the funds spent on military awards amount to only 9%, these are seen as very prestigious. Income from recent legacies will significantly enhance the ability of the Charitable Trust to achieve its aims in years to come.



Before he brought the evening to a close the Master spoke with pride of all the Engineers' Livery has achieved since its foundation in 1983. He also emphasised its distinctive democratic approach to appointments and that everyone contributes to the cost of running the Company.

At the end of the evening we left the Hall filled with fine food, many facts and a few new friends.

*Richard Nevard*

## **CLAY PIGEON SHOOT HOLLAND AND HOLLAND, NORTHWOOD 22<sup>nd</sup> May 2013**

The Senior Warden, John Baxter, led a team of guns in the annual inter livery clay pigeon competition organised by the Worshipful Company of Environmental Cleaners. A hundred livery teams entered demonstrating the serious nature of the competition in the event.

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The team representing the engineers comprised Liverymen John Baxter and visitor Peter Hannington, and Liverymen's ladies Margaret Baxter, and Lynda Dean with Dave Cooper as spare gun.

The annual event is held in the splendid setting of the Holland & Holland shooting ground near Northwood, London.



*The Engineers' Team with a Supporter*

The stands were laid out with two matching courses and ten stands at each of which eight birds were offered up. The stands were arranged as an English Sporting layout to represent some of the more common birds seen in the UK. In addition a "flush" stand of 80 birds was set up where all guns go for anything in the air!

Even though this was the first time the engineers have entered the event we came through with our heads held high coming an equal 40<sup>th</sup> out of the 100 teams and considering the Worshipful Company of Gunmakers fielded 8 teams above us we can be rightly proud of our performance. Our score of 230 out of 320 gave us a hit rate of 72% and 53 out of 80 on the flush represented a 66% hit rate. Our star gun was Peter Hannington who individually scored 65 out of the 80, a hit rate of 81%. On one stand our Senior Warden scored a 100% hit of all eight birds!

The event finished with a superb buffet lunch including two very large pig roasts! The Senior Warden has written to the Master of the Environmental Cleaners on behalf of the Engineers to thank them for such a splendid day and to indicate our interest in entering the competition again next year. Please can any Liverymen advise the Senior Warden if they are interested in participating in 2014.

*Dave Cooper*



## VISIT TO RAF HENDON 23<sup>rd</sup> May 2013

This first visit of our Aeronautically-themed year took place on a bright spring day with only a light sprinkling of hail. For myself, having been an aircraft-mad youngster and a graduate apprentice with the British Aircraft Corporation at Filton in the late 1960's it was a most rewarding and instructive visit.

The Director General of the Museum, Peter Dye, who had been an Air Force colleague of the Master, welcomed our party of 29. He explained the three aims of the Museum, which are to

- a) explain the role of the RAF and air power in the defence of the UK;
- b) to provide information to serving members of the RAF and partner air forces;
- c) to bear witness to the achievements and tell the stories of veterans.

The two Museum sites, at Hendon and at Cosford in the West Midlands, receive some 600,000 visitors (including 30,000 students) a year.



David Keen, (left) the Access Development Manager, gave a masterly and at times moving, presentation of Operation Chastise, the 'Dam-Busters' raid on the Eder, Sorpe and Möhne dams. He very effectively balanced the technical details of the development of the 'bouncing bombs', the formidable challenges to the aircrews and the contrasting personalities of the main protagonists. To an engineering group, Barnes Wallis' contribution was of course of great interest. The Museum has acquired the contents of his office at Brooklands from his family, including many mementoes of the raid, and these are displayed in the galleries. Wallis' career ran from his early work on the 'geodetic' structure of the early rigid air-ships, through the Wellington bomber to the bouncing and 'earthquake' bombs to work on hypersonic transports in his final years with BAC.

After this talk, the group split in two, with a choice between a more technically-focussed tour led by David, and the other being guided by Squadron Leader Roger Wilkins, who described his experience in flying a number of the aircraft types represented in the collection.

The technical group first visited the reconstructed offices and a hangar of the Graham-White Aviation Company. Claude Graham-White was a notable (but now rather forgotten) pioneer, establishing a flying school at Hendon, which later became RAF Hendon.



*Claude Graham-White's Restored Office*

The hangar houses one of the most complete collections of WW1 aircraft in the world, and we were treated to a series of brief talks about both the aircraft and their engines. Notable examples of the engines were a number of 'rotary' designs, a Rolls-Royce 'Eagle' the first aero-engine built by that company, and an innovative engine with aluminium pistons, designed by W O Bentley. The tour continued into the Milestones of Flight building, which contains examples of several early jet aircraft, including a Meteor and an ME-262, surely one of the most elegant (and shark-like) aircraft ever built.

After an excellent buffet lunch, the party were at liberty to stay for the rest of the afternoon, and many continued the visit until closing time.

*Russell Gilbert*



*After lunch I was privileged to be taken on a personal tour of the hangars by the Master, with many aircraft on display, and this photograph shows Graham in front of a Provost T.5a Trainer which he flew whilst in the Royal Air Force. This particular aircraft, one of two Golden Eagles was used for HRH Prince Charles' pilot training.*  
*(Ed)*

## THE WARDEN'S LECTURE NATIONAL PHYSICAL LABORATORY, 12<sup>th</sup> June 2013

Peter Hartley, the Honorary Chaplain writes I wasn't sure what this lecture given by the Junior Warden Isobel Pollock would really be about – as a civil engineer, I tend to think about 'dumpy' levels and 30m tapes when contemplating measurement! However, as a Clergyman, it was useful to learn the origin of the 'cubit' – Noah used these for his ark!

In the event, it was a fascinating address, for which the 30 or so members who came are very grateful. It was stimulating, informative and fun! So thank you, Isobel! We liked the photo of yourself inspecting a pressure vessel in your earlier days! An edited version of the Lecture, with some of the slides, is reproduced below.

Following the lecture and lunch, we were given a guided tour of two of the Labs at the NPL – the 'Mass' lab and the 'National Freeform' lab which specialises in co-ordinated 3-D measurement. In the first, Research Scientist, James Berry, told us about, and showed us, the definitive NPL 1kg measure (a block of metal alloy of platinum and iridium) which is calibrated from time to time against the 'real' definitive version kept in Paris. We were impressed with the care that is taken to remove traces of pollutants from the atmosphere which can affect the weight; interestingly, earlier in the day, there had been a discussion on Radio 4 about the benchmark kg in Paris gaining or losing atoms over the years, thus varying its weight by infinitesimal amounts.



*The Master's Lady is probably less baffled than most of us were at this weight calibrating machine*

In the second laboratory Dr Michael McCarthy introduced us to sophisticated measuring equipment for 3-D measurements of complex surfaces, such as car doors and 'Pandrol' rail clips. Contact measurement, which is very susceptible to thermal changes, is now

largely superseded by laser and optical measurement techniques and much of NPL's work is in verifying 3-D measurement software used in manufacturing industry as well as finding new applications for their measuring devices, even, for example, in measuring denture moulds as a first step in computerising the whole of this process.



*We can measure all this kind of stuff!*

## MEASURING SUCCESS PAST, PRESENT AND FUTURE BY ISOBEL POLLOCK



The National Measurement Office (NMO) ensures that the systems of weights and measures are fair, accurate and legal. This is a fundamental part of a sustainable trading economy and enables consumers and businesses to be confident they are getting what they pay for thus facilitating business growth.

Each year in the UK, over £200 billion worth of retail goods are sold on a basis of the measurement. In addition, £300 billion of products are weighed and measured within industrial & business processes. Measurement is a vast subject, and my intention today is to take you through some aspects of measurement relating to the past, the present and the future.

Measurement is everywhere. It is at the heart of everything we do every day. Throughout our daily lives, we are constantly measuring, consciously or



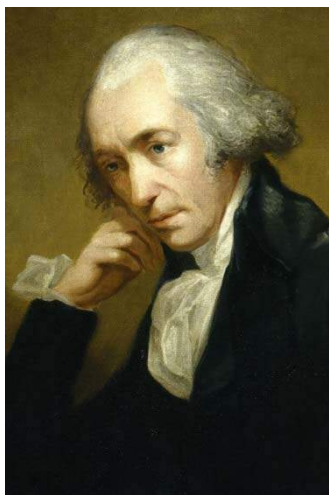
unconsciously. From first thing in the morning, when that noisy time measuring alarm clock wakes us up, through to the end of the day, when we measure out teaspoonful's of cocoa, or a wee dram of Bushmills whiskey. Throughout my career as an engineer, I have always been keen on using data and accurate measurements.

I spend a lot of time in museums, antique shops and on ebay hunting out items for my personal collection of traditional antique measurement tools based on linear measurement.



*Isobel Studying a Collection of Measuring Tools*

As you may know, I have been promoting examples of great engineering to the public through the IMechE Heritage awards – now standing at 84, well on the way to the target of achieving 100 awards by 2014, the 30<sup>th</sup> anniversary of the awards.



One person whose achievements are well represented in the Heritage collection is James Watt, (left) one of the most illustrious names of engineering. The Institution's Heritage scheme has recognised five Watt engines, including his oldest surviving beam engine from 1781, which is in the Science Museum in London.

Watt and his business partner, Matthew Boulton, became aware of the benefits of standardising operations and components through accurate measurement. But it took nineteenth and twentieth century engineers, from Joseph Whitworth through to Henry Ford, to make this the norm in manufacturing.

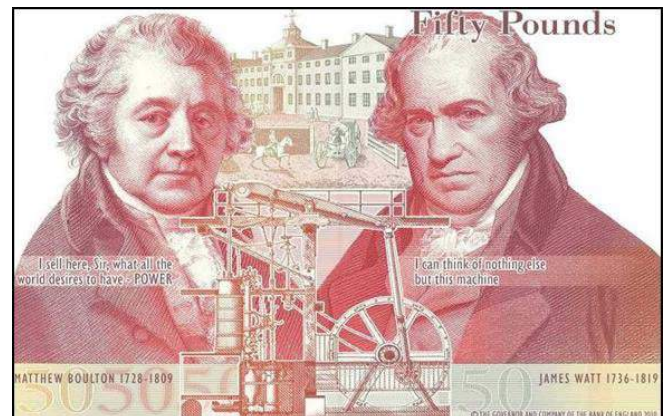
It comes as a bit of a shock to realise that some of the measurements that we now see as standard and commonplace – such as current, voltage – were entirely unknown in Watt's day.

In terms of measurement, James Watt is forever commemorated in the unit of power. And this is entirely appropriate, since it was Watt who first determined 250 years ago that the measurement of power and the development of a unit were needed. Watt introduced the term "horsepower" and though that term is generally now overtaken by the SI unit of Watt. Horsepower still remains in widespread use, and many of us would recognise the power output of, say, our cars much more easily in horsepower than we would in Watts.



But perhaps some engineers prefer the very useful unit of measure the Thou, a thousandth of an inch which is a derived unit of length. The introduction of the thousandth of an inch as a sensible base unit in engineering and machining is generally attributed to Joseph Whitworth (left) who wrote '*instead of our engineers and machinists thinking in eighths, sixteenths and thirty-seconds of an inch, it is desirable that they should think and speak in tenths, hundredths, and thousandths*'

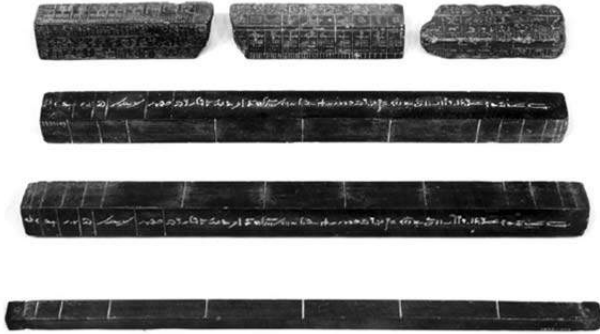
It is great when engineers are recognised on our currency. From 1990 to 2003, George Stephenson, founding President of the Institution of Mechanical Engineers, was on the £5 note. Boulton and Watt now feature on the £50 note (below).



Humans have been evolving since the dawn of history. Measurements too evolve to meet new technological

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and scientific demands and applications, while the technology used to measure them is becoming ever more precise. Mankind has been measuring distance using the human body or with grains of wheat. Ancient records refer to units such as the cubit which is the measure of a man's arm from the elbow to the end of the middle finger, a length of about 18" to 22". Precision in measurement came a little bit later!



*Early measurement of a Cubit*

The idea of standardisation in terms of the units used in different places goes back many centuries. As early as the tenth century, the Anglo-Saxon King Edgar of England kept a yardstick at Winchester as the official English standard of measurement. In 1196 during the reign of Richard the Lionheart, the Assize of Measures stated that: "Throughout the realm there shall be the same yard of the same size and it should be of iron."

During a recent visit to Italy, I was interested to see a sculpture incorporating a measuring tool. The sculpture was commemorating Filippo Brunelleschi, one of the foremost architects and engineers of the Italian Renaissance. He is perhaps most famous for his discovery of perspective and for engineering the dome of Florence Cathedral. On the same visit to Italy I saw public reference standards for a brick, a roof tile and for a metre length on the wall of the town hall in Assisi.



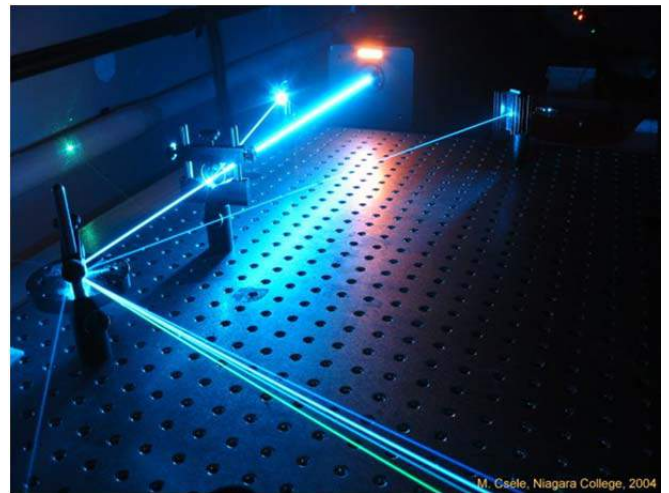
*Early Measurement Standards*

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Until the 19th century, it was rare for anyone to travel distances greater than 20 miles from where they were born, and distance was indicated via milestones beside the roadway. The first organisations to understand the importance of journey planning were the navy and the military who began to develop charts and maps.

Initially, mapping techniques were very basic but thanks to technology, there has been a huge change in how we see "maps and plans". There are Intelligent Transport System technologies such as GPS systems. Add to this the images from Google earth, and Google mapping where you can take the man to street level and move along the street.

Engineering has been central to the development of length and distance measurement. It is only just over 50 years since the first lasers were developed. Yet by the mid-1970s they were already being used in engineering systems to standardise length – once length was defined in terms of the wavelength of light it could be reproduced in any well-equipped laboratory. The current definition of a metre is 'The Length of the path travelled by light in a vacuum in  $1/299792458$  of a second'.



*Electric Measurement of 1 Metre*

Measurement has been at the core of my own engineering career ever since my first job after graduation as the first ever female engineer at ICI in Huddersfield. ICI enrolled graduates on Monitored Professional Development Scheme and therefore provided an excellent training ground for young engineers. The ICI site in Huddersfield made plant protection products, basic chemicals such as nitric acid and colours in one of the first computer-controlled plants. Most of the chemical process was just like making a cake which took me back to my mother's skill in domestic science, with ingredients measured out, mixed and then cooked in a high pressure steam-



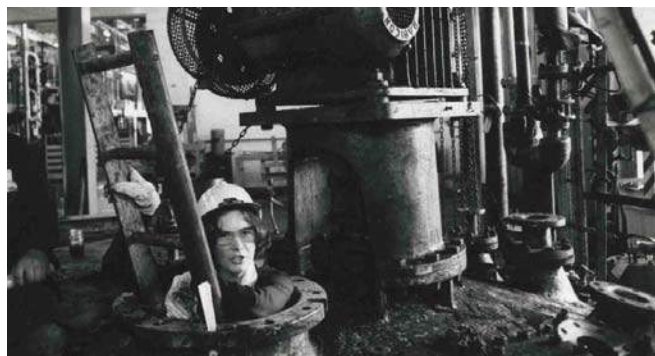
jacketed vessel. These reaction vessels need accurate



measure devices and control systems to ensure product quality and safety. One of my jobs was to inspect the enamel lining of the vessels and I am sure this method of inspection (*below*) would not be allowed today.

A significant challenge during my time with ICI at Huddersfield was the need to save energy.

Energy had been cheap until the early 1970s. By the early 1980s it was considered expensive and savings had to be made. We were set the challenge of reducing the energy bill by 12.5%. All of this would seem very commonplace today, but at that time energy saving and measuring the energy that was being used or wasted were very new concepts. It meant that there were some easy wins. Lighting and heating was left on 24 hours a day. Pipes leaked. There was insufficient monitoring of energy use across the site and we spent a lot of time manually reading meters.



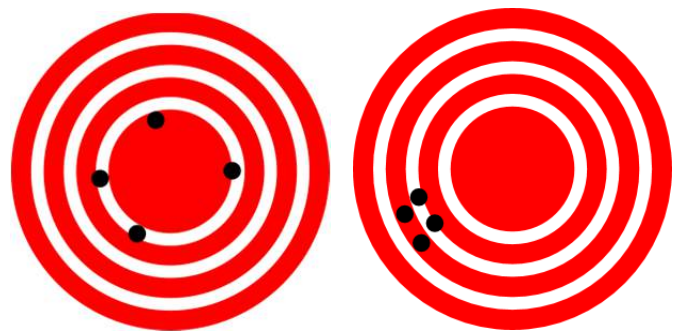
*Health and Safety!*

After 10 years at ICI I joined DuPont Howson in Leeds which made lithographic plates used to print our daily newspapers. I was responsible for the design and installation of a new plate production line which was to be a step-change in process technology and increasing the speed of producing lithographic plates from aluminium from 10 m/min to 25 m/min. There were innovations in terms of the size and in the control systems on the guillotines that cut the plates.

Measurements were vital to the quality control system. This required every plate to be monitored to ensure that they were the right size, shape, flatness and edge finish. There was to be no upward or downward lift at the edge, no deviations on the edges and no burrs.

Burrs would produce black marks on newspapers, and would mean black marks for the engineer too. Measurement was key to quality control, but there were other benefits too. An effective Statistical process control methodology was established.

Increasingly as my engineering career has developed, I have been involved in areas where the disciplines of measurement, accuracy and precision are vital, and I have come to regard these not just as tools for engineers and others, but as an engineering philosophy that can be applied very widely. The illustration below helps to show the difference between Accuracy and Precision.



*High Accuracy, Low Precision*

*Low Accuracy, High Precision*

I am delighted that there is continuing support for improved measurement in manufacturing. NPL has recently opened a new state-of the art laboratory at the University of Huddersfield's 3M Buckley Innovation Centre and is launching a free measurement consultation service for local businesses. The new laboratory is equipped with a wide range of the most modern inspection equipment, including its latest coordinate measurement machine equipped with tactile probing and a high specification laser scanner.

The opening of the new laboratory provides easy access for companies based in Yorkshire and the north of England. The region is responsible for a significant proportion of the UK's manufacturing and Yorkshire makes the second largest manufacturing contribution to the UK economy and examples may well be included in a possible Out of Town event to be held in the Yorkshire area in 2016.

I am also delighted that The National Physical Laboratory and the Institution of Mechanical Engineers have jointly launched the 'Beginner's Guide to Measurement in Mechanical Engineering' and is freely available to download from the website.

Measurement has many dimensions including a political one. The guardian of the National Measurement System is the National Measurement

Office (NMO), an agency of the Department for Business, Innovation and Skills. The NMO's mission is to support a measurement infrastructure which enables innovation and growth, promotes trade and facilitates fair competition and the protection of consumers, health and the environment. The NMO has a clear role to play in advancing innovation by exploiting the link between measurement science and technological development. New measurement techniques and technologies stimulate investment in products, processes and services and also help develop new skills in the workforce.

I have two roles for the NMO. In my role as Chairman of the Electromagnetics and Time working group on behalf of the NMO and NPL, I have had the opportunity to experience an insight into a world of even more accurate measurements. Secondly through my new appointment as Chairman of the NMO Steering board, I look forward to new challenges of a wider perspective on measurement and the developments here at NPL including the new £25m Advanced Metrology Lab which was announced earlier this year.

Measurement is an evolving discipline and let me illustrate this with examples from the measurement of time. Consider the time ball at the Royal Observatory, Greenwich installed in 1833. It was designed to drop daily at exactly 1pm, letting nearby ships set the hour on their ships clocks before long voyages. It is still functioning every day.



In our practical, daily lives, our household clocks and watches provide suitably accurate timekeeping and are probably set to the chimes of Big Ben. But even in our domestic timepieces, there have been developments. Today, the typical quartz clock keeps time to within a second over ten days, a huge improvement over the clocks of 100 or even 50 years ago.

In time, the everyday common units of time are seconds, minutes, hours, days, months and years. We are so conditioned to the way time is measured that we scarcely consider that this is probably the last measurement that has resisted the 'rationalisation' of metrication.

Sixty seconds a minute and 60 minutes an hour are still based on astronomical units and subdivisions that have been in place for millennia.

However, the decimal system does intrude into the measurement of time when considering the size of time – whether very large or small. As a consequence of modern demands, we now have the exasecond, or  $1\text{s} \times 10^{18}$ , which is about 32 billion years, and the yoctosecond –  $1\text{s} \times 10^{-24}$ , which is very small indeed.



Today, there is no single master clock for the whole world. International time standard is maintained by some 260 atomic clocks around the world giving reliability and access to all of the major industrial nations who contribute to the standard. In the UK, it is the group of caesium fountain clocks (left) at

NPL that keep the UK's time accurate to within one second in 138 billion years.

On 29 March 2012, the NPL announced that it had succeeded in making a frequency measurement of the octupole transition in an ion of ytterbium. That may mean little to most people, but in time measurement it is a significant breakthrough. The ytterbium ion exhibits an uncertainty of one in  $10^{-15}$ . This is significantly better than the current generation of atomic clocks based on caesium and gives confidence that this may be the way forward to even more accurate timekeeping in the future.

Satellite telecommunications and our use of the internet demand accurate timing, to ensure that the switches routing digital signals through networks all run concurrently. It is not difficult to imagine that the world economy would face considerable issues if we did not have trust in the technology that accurately measures time. We would simply be unable to do business in the way that we do.

Another question I want to propose today is this: where else do we see the need for new kinds of measurement? What other information would become more easily accessible and be more helpful to decision-making? In the same way that new ideas in energy monitoring and measurement were needed to help ICI save money in the early 1980s, what are our next priorities?

Climate change is one of the most challenging issues



facing society today. It is a global challenge which has the potential to radically change the way we live in the future. Related areas of energy efficiency and the low-carbon economy need better information in order to make the best policy decisions that we can.

Our politicians, media, industries and the public have many questions on climate change. We need to be able to predict the extent and impact of climate change through improved accuracy of climate data. Furthermore, engineers need to discover new ways to harvest solar, wind and wave power and their relative merits and we need to know how to optimise our use of current carbon-based technologies and alternatives such as nuclear and hydrogen. Corporations, large and small, need timely information about their energy usage and their carbon footprints. Such measurements will enable them to make informed decisions to comply with mandatory EU Directives on emissions and carbon reduction programmes. We currently measure our global warming as tonnes of CO<sub>2</sub>. Yet how many of us know what a tonne of CO<sub>2</sub> looks like? That may not matter, but it would be helpful to know which of our daily activities contribute to a tonne of CO<sub>2</sub>.



*One Tonne of CO<sub>2</sub>*

It is reassuring that this is an issue that the NPL and the NMO are taking very seriously. They have launched the Centre for Carbon Measurement with the aim of reducing the uncertainties in many of these types of data and providing robust measurement practices to inform national and international action. By having an increasing and reliable body of knowledge, gained through relevant measurement practices, we can have more informed debates on climate change and its consequences.

Measurements that are meaningful and understandable have the potential to change the conscious and unconscious decision-making of our society. If, as an example, we knew the real 'cost' of driving compared

with the cost of travelling by train, would this influence the decision-making process on what transport method to use? Would people become more conscious of their carbon output if all cars had a display on the dashboard, or all train and aeroplane journeys had a carbon count printed on the tickets?

In 2010, I participated in the first RAC Future Car challenge driving the 57 miles from Brighton to London. It was interesting to experience low energy driving styles and realise how much more effective one could be with the right instrumentation, especially if it gives you instantaneous feedback. A formal report has been published by the RAC Foundation showing the 2011 energy usage results for the 35 different low- and ultra-low carbon vehicles.

It shows the favourable low energy consumption of electric vehicles to hybrids with higher results for the internal combustion engines in kw/km. I know that 35 low energy cars is miniscule amongst the 28 million cars presently on the UK's roads but it does show the direction of innovation.

Recently, I visited the UK Ford research centre and saw the new award-winning 1 litre engine with 3 cylinders which has significant power output. How have we made such progress? Much of this success has been achieved by industry guiding Government to better understand where and what it should focus its time and efforts on. In these areas as in many others, engineers have much to be proud of.

But climate change and transport are not the only areas where I see huge potential. I am excited about one significant piece of science discovered here at NPL in 2012.

The room temperature Maser was one of the top 10 most significant scientific breakthroughs in 2012, after the Higgs Boson. Via my Pathfinder team, we funded one of the scientists, Mark Oxborrow, for a "Friday afternoon project" for a year. He was researching a method of producing a solid-state maser, a device similar to a laser which uses microwaves instead of light' capable of operating at room temperature, potentially opening the way for a revolution in deep space communication. The results of this research, in conjunction with Neil Alford at Imperial College, were published in Nature magazine on 16<sup>th</sup> August. However, as you will all appreciate that this is only one small step in the long journey of research before it becomes an item the world sits up and notices because of its impact and benefit. To put it in perspective, the laser was developed about 50 years ago and is now in widespread use. Few envisaged how the laser would be

### The Swordsman

used when it was first developed and one wonders what the maser will be used for in 50 years?

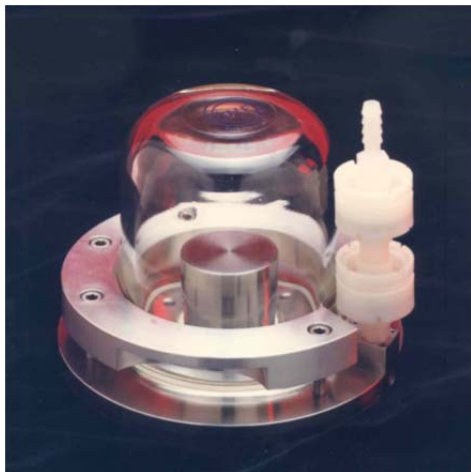


Mark Oxborrow with a Pentacene-doped P-terphenyl Crystall

There are 7 base SI units and the kilogram is the last remaining SI unit that is still defined by an artefact rather than a fundamental physical property that can be reproduced in different laboratories.

Four of the seven base units in the SI system are defined relative to the kilogram so its stability is important. You may have read that the kilo is getting heavier, or lighter, depending on which paper you read. Imagine the consequences!

The primary standards from weights and measures are held at NPL while the secondary and tertiary standards are held in the NMO and used to calibrate the local authority standards. This traceability chain provides the UK with legal measurement under the Weights and Measures Act.



Precisely 1 Kilogram at NPL

To help them measure small amounts accurately, the NMO is delighted that they have developed a method for Calibrating micro weights. On 18 September 2012,

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the NMO became the world's first mass calibration laboratory to be accredited to ISO 17025 for the calibration of mass standards down to 0.05 mg, with uncertainties as low as 0.0002 mg.



Measurement is recognised by the IMechE in its Armorial bearings which the College of Arms granted in 1939 (above). An important element was the use of a pair of callipers on a shield, signifying the act of measurement and the need for accuracy of workmanship. An heraldic horse chained to a globe, signifies controlled power dominating the world. To the left Archimedes symbolises science and, to the right, Vulcan, symbolising craftsmanship.



In our own Livery Coat of Arms (above), the Supporters are a winged Pegasus and a Wyvern. The winged Pegasus represents horse power and flight wears the Badge of the Company and holds a measuring stick representing some of the disciplines in which we are engaged.



## *The Swordsman*

The Goldsmiths' Company holds an annual Trial of the Pyx checking that UK coins produced at the Royal Mint are within the statutory limits for metallic composition, weight and size.

The benchmark against which coins are tested is called a Trial Plate. These metal plates, made of gold, silver, platinum and cupro-nickel, used to be under the personal charge of the monarch in the Exchequer, but are now the responsibility of the National Measurement Office, along with the weights against which the coins are measured.

Little has changed in the procedure since the reign of Henry III; throughout the year, coins are randomly selected from every batch of each denomination struck, sealed in bags containing 50 coins each, – approximately 50,000 coins in total. They are locked away in the Pyx boxes for testing at the Trial.

In 1870, as laid down in the Coinage Act of that year, Goldsmiths' Hall became the established venue for the Trial. This made good sense as the Goldsmiths' Company Assay Office is located in the Hall. It is the Assay Office which has the task of testing the metallic composition of the coins.

The trial is presided over by the Queen's Remembrancer, the oldest judicial office in the UK, dating back to the twelfth century, and it is their responsibility to ensure that the trial is held in accordance with the law, and to deliver their final verdict to Her Majesty's Treasury in May.



*The Trial of the Pyx at Goldsmiths' Hall*

The Trial of the Pyx must be the oldest form of quality assessment in the world. It was originally designed to keep the Mint on its toes in medieval times, but today we are always quietly confident of the Verdict because

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coins produced at the Royal Mint are continually tested throughout production and are among the best in the world. This combined with UK hallmarking is one of the oldest forms of consumer protection, dating back 700 years. Hallmarks are distinguishing marks struck on articles made of platinum, gold, silver or palladium which guarantee the purity of its precious metal content and indicate that it has been independently tested.

World Metrology Day on 20<sup>th</sup> May 2013 was a celebration of measurement (metrology is the science of measurement) and a chance to raise the profile of engineering. This year's theme is 'Measurements in Daily Life' and an opportunity to reflect on its importance to our daily lives, as I have tried to illustrate through this talk.

So now, even when you are gardening, you will notice measures where you least expect them. NPL are working with the vegetable harvesting industry to create an intelligent harvesting machine which could look below the leafy layers using imaging technology that would select the ready crops and leave the unripe to mature further. Currently, it is impossible to know if a cauliflower is ready without destructive testing.

To conclude: Measurement is everywhere. It has a significant global heritage. It is not a complete science – there is much still to do.

Measurement has been developing and improving throughout time. Devices have become more sophisticated and are a critical part of an engineer's world. And yet there are huge opportunities as needs change and new technologies become available.

The use of measurement techniques generates information that enables engineers to do their jobs more productively. Investing in measurement gives positive returns.

One way of looking at smart measurement is to adapt the well-known SMART acronym and apply it to measurement. In this: S can stand for specific, M for measurable (of course!), A for achievable R for realistic and T is for time-based.

In crucial areas, we need SMART measures that will enable us to demonstrate manufacturing's international importance to wealth creation and to the economy as a whole. If we can measure our manufacturing success and express it in units that everyone, even the politicians, can understand, what a step forward that would be.

## VISIT TO BROOKLANDS 18<sup>th</sup> June 2013

Continuing with the Master's "Aerospace" theme, 27 Liverymen and wives accompanied Master Graham and wife Margaret on the Spring Outing to Brooklands Museum near Weybridge in Surrey.

Over a cup of coffee, the Head of Collections at the museum, John Pulford, welcomed the party and outlined the museums history and exceptional engineering heritage. Most people have heard of its motor racing history but how many know of its aviation history stretching from the very early beginnings of powered flight right up to the 1980s when over 30% of each production Concorde was manufactured on this site?

After the welcome and introduction the party split into two and, ably led by guides Rob Burton and John Hutton, toured the motor and aviation museums in the morning followed by the Concorde Experience and Barnes Wallis Collection in the afternoon.

The banked concrete 2.75 mile racetrack, of which sadly only a very small piece survives today, was opened in 1907 and was the world's first purpose built race track. The first official lap was completed, not by a famous racing car driver, but by the wife of the owner Hugh Locke-King, driving a Siddeley car. Racing continued until August 1939. Many of the terms and features of the new sport were based on horse racing, for example, cars used paddocks and drivers wore colours. There was a grid for starting and a handicap system based, not on practise lap times but on the weight of the car or its purchase price! The lap record of 143.44 mph was set in 1935 by John Cobb driving the Railton Napier Special – and the car only had rear wheel brakes!

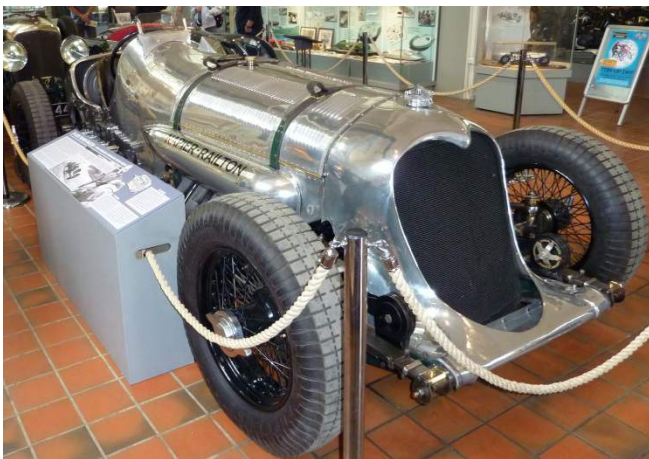
Barbara Cartland, she of pink and romantic novel fame, was an early pioneer female racing driver and even had a ladies rest room, sumptuously furnished in pink of course, built in the Clubhouse.

The motor museum has that wonderful dated smell of oil, grease and petrol and is filled with numerous examples of classic racing cars stretching from the earliest days right through to today's F1 cars. Looking at them one could not only help but marvel at the engineering development that lay behind them but also the courage of the drivers who had driven them. But the highlight of the motor section visit was undoubtedly that of our very own Wendy Roberts sitting in Lewis Hamilton's 2007 McLaren F1 racing car driving round Brooklands on the simulator. Her fastest lap was 1min 9 secs and she reached 143mph (anything John Cobb can do.....). Well done Wendy.



*Wendy Roberts driving an F1 car at 143 mph!*

The motor museum also contains historic motorcycles and bicycles, the latter transferred from the Raleigh Factory in Nottingham when production was moved to Asia. Also on display is the carbon fibre bicycle designed and ridden, albeit on a treadmill, by Bruce Bursford in 1996 to set the bicycle world speed record at an unbelievable 208mph!



*John Cobb's Railton Napier Special*



*This Bike went faster than Wendy's Car*



## *The Swordsman*

The Aircraft Museum housed numerous preserved military aircraft including a Hawker Hurricane, Vickers Vimmy and a Harrier. Pride of place is given to a Wellington bomber salvaged from Loch Ness in 1985. It is in remarkably good condition and the framework is left exposed to show the complexity of Barnes Wallis's geo-tech design. On display outside are examples of civil aircraft designed and built on the site such as Vickers Vanguard and Viscount, VC 10 and BAC 1-11.



*A Wellington's Frame*

The Concorde on display, G-BBDG, was the UK's first production model and the first aircraft in the world to carry 100 passengers at twice the speed of sound. Much of the design of Concorde and 30% of the airframe manufacture was completed at Brooklands. The aircraft was refurbished and restored by volunteers in 2005 and now forms the centrepiece of the Concorde Experience, which for those never lucky enough to actually fly Concorde, gives a flavour of what a flight was like. The flying imitation is very realistic through clever use of videos and sound recordings. Parts of the aircraft are exposed to show the engineering, including the airframe, which had been machined out of 25mm thick solid ring sections to form the outer skin and strengthening ribs. A beautiful aircraft, and to think it was all designed, built and tested in the days before computers.

Barnes Wallis worked at Brooklands for many years and there are many examples and references to his work. Examples of his genius include the dambusters bouncing bomb, the 22,000lb grand slam earthquake bomb and the geo-tech airframe design of the Wellington bomber. The not so well known earthquake bombs were used to destroy V2 rocket launching sites and submarine pens. They hit the target and entered the earth at supersonic speed and penetrated to a depth of 20m before exploding. The earthquake effect meant that the bombs could destroy not only the immediate target but other structures over a large area. The guide gave us an insight into the character of the man,

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evidently he did not suffer fools gladly, and showed us around the great man's office.



*Half the Group at Brooklands*

The visit concluded at 4.00pm with a group photograph. All had had an interesting day. The Museum places great importance on schools and educational visits and it was heartening to witness the number of children visiting while we were there. Our congratulations and thanks are due to David Johnson for organising a memorable visit.

*John Craik*

## **AWARDS AND LIVERY DINNER MERCHANT TAYLORS' HALL 9<sup>th</sup> July 2013**

The annual awards livery dinner was again held in the splendid surroundings of Merchant Taylors' Hall in Threadneedle Street. I always look forward to this event where most of the Company prizes and medals are presented following a wonderful dinner.

Merchant Taylors' Hall is grand and splendid, a hall has been on the site since 1347. Particularly delightful is the courtyard garden where, thanks to the good weather, we were able to enjoy pre-dinner drinks and meet with fellow Liverymen and guests.



*Reception in the Merchant Taylors' Courtyard*

## ***The Swordsman***

The principal guest was Sir George Cox the Pro-Chancellor and Chair of the University of Warwick whose speech is reproduced elsewhere in this issue.

Wonderful music for the evening was provided by the Live Brass Quintet under the direction of Simon Sturgeon-Clegg. Because many of the Company awards are given to service personnel I always find it a great joy to see the winners and their supporters in their colourful and often historic military dress uniforms.

In addition to being a Liveryman, this year I attended, as a Past Master Educator, representing the current Master of the Company of Educators. I was also detailed to look after another guest, Professor Steve Burnage, the President of the Society of Environmental Engineers. So a busy and immensely enjoyable evening, the more so by being able to hear about the formidable skills and achievements of those who received the Company awards.



*The Company's Award Winners 2013*

I have been a judge for the Fiona and Nicholas Hawley Award since its inception and the winners always impress. This year was no exception and the winner was Caroline Hepburn who had carried out work producing significant environmental engineering improvements in the water industry.

I was also particularly pleased to be involved with the reorganisation of the Baroness Platt of Writtle Award, which this year attracted 31 nominations from 15 engineering institutions. This award, in its new form, recognises an Incorporated Engineer who has achieved registration with the Engineering Council during the previous year.

The Engineering Council now actively promotes these awards directly through their 36 licensed members. It was particularly pleasing that the Deputy Chief Executive of the Engineering Council, Dave Hogan, was a guest at the dinner and took part in the Baroness

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Platt presentation to Flight Sergeant Stephen Williams RAF.

For a variety of reasons, it is not always easy to acquire nominations for awards and I am hopeful that the collaboration of the Engineering Council with these two will enable them to thrive and add to the positive impact that the Company awards can have generally within the engineering community.

*Raymond Clark*

## **THE ENGINEERING AWARDS** **Fiona and Nicholas Hawley: Excellence** **in Environmental Engineering**

*The Fiona and Nicholas Hawley Award was established in 2006 and is made annually to recognise excellent work in "Engineering for a Better Environment" by a resident of the UK, under 30 years of age at the date of submission, who holds a graduate or post-graduate degree in engineering or science from a recognised UK university, or who is studying for a post-graduate degree at such a university. The Hawley Award is aimed at inspiring younger engineers who can best demonstrate the application of proven technology, which they have developed, to make positive improvements to the environment.*

### **Winner 2013 (Medal and £5000 Prize)** **Caroline Hepburn**



Caroline Hepburn, of Cranfield Water Science Institute won the Award for her work on online measurement of siloxanes by Fourier Transform Infrared (FTIR) spectroscopy: A new tool for enhancing engine protection during energy production from biogas. Biogas from sewage contains siloxanes which damage the CHP engines used for energy generation. Activated carbon beds are used to remove the siloxanes, but current monitoring techniques delay warning of bed saturation and siloxane breakthrough for up to six days. Caroline has developed the use of FTIR to monitor siloxanes, which provides immediate results, resulting in significant cost savings in engine maintenance and repair.



## Baroness Platt of Writtle award

*This Award was originally established to recognise engineering excellence amongst those pursuing final year studies leading to the academic qualifications for entry to the Engineering Council's Incorporated Engineer grade but has now been refocused to those who achieved registration as Incorporated Engineer in the preceding calendar year. The Award is named after Honorary Liveryman and Court Assistant Emeritus The Baroness Platt of Writtle CBE FREng in recognition of her work in support of the Engineering profession in general and Incorporated Engineers in particular. The Award was made for the first time in 2002, refocused in 2013, and The Engineers' Company wishes to acknowledge the assistance of the Engineering Council and its partner Professional Engineering Institutions in selecting the Award winner.*

### **Winner 2013 (Medal and £1000 Prize) Flight Sergeant Stephen Williams RAF**



There were 31 nominations from 15 engineering institutions but the judges were unanimous that the award should go to Flight Sergeant Stephen Williams, who was nominated by the Institution of Mechanical Engineers and has served in the RAF for 28 years. He has worked on the maintenance of Harriers, Sea Kings and

Eurofighter Typhoons, managed a regional avionics centre and now supervises engineering and generic training at the Air Warfare Centre at RAF Waddington, Lincs. He is well acquainted with the human factors and safety issues in the maintenance of aircraft and devised and developed a new item of test equipment to reduce a safety risk while testing the brake parachute door lock on Typhoons. He also achieved savings on the replacement of underwater locator beacon batteries and reduced financial expenditure across the avionic and electro-mechanical equipment on the Typhoon fleet. He has interfaced aircraft components from 3 suppliers in 3 different countries and has led a team of 32 personnel through a period of airworthiness governance change. He spends time developing other engineers, is a Professional Review Interviewer and supports the engineering

profession as a STEM ambassador, mentoring school teams to design, build, test and fly model aircraft.

## Stephenson Award

*The Award is for those who have been particularly successful in encouraging young people to study engineering with an emphasis, but not exclusively, on mechanical engineering. In 1997, members of the Institution of Mechanical Engineers made donations to fund a Worshipful Company of Engineers Loving Cup to mark the Institution's 150th Anniversary. Donations in excess of those needed for the Loving Cup were used to establish the Stephenson Award and further donations were received from members in later years, supplemented by a substantial grant from Rolls-Royce plc. The Engineers' Company acknowledges the assistance of the Institution of Mechanical Engineers and the Engineering Development Trust (EDT) with nominations for this Award.*

### **Winner 2013 (Medal and £1000 Prize) Kerrie Rankine**



Kerrie is currently Head of the Creative Arts & Technology Faculty at Chelmsford County High School for Girls. She has been involved in promoting & encouraging engineering careers to young people, in particular girls, for 12 years. Her main mission with her pupils is to break down the stereotypes and offer opportunities to experience the world of

engineering. Kerrie has consistently entered teams for Go4 SET gaining "most innovative" and "best teamwork" prizes. She also promotes the Headstart and Year in Industry programmes in addition to participation in the Arkwright Scholarship programme. Outside the curriculum she supports students at year 10 and 11 by organising work experience through personal networking as a member of the Chelmsford Engineering Society, an organisation that promotes engineering to schools in Essex. Kerrie is a committed and dedicated teacher with a real passion for engineering. Her impact on students and her belief in their abilities has been demonstrated by the number of her students that have progressed to engineering careers.

## Water Engineering Award

The Water Engineering award is made jointly with the International Water Association (IWA) for the best presentation and paper at the annual IWA UK Young Water Professionals Conference.

### **Winner 2013 (Medal) Jack Barrie**

Jack Barrie is a Graduate Engineer in the International Development Division at Mott MacDonald. He has a passion for Engineering for Sustainable Development established during his MEng Studies at the University of Edinburgh and the University of Queensland, where he was actively involved in Engineers without Borders projects. He recently undertook a field based research project in Sierra Leone supported by the Humanitarian Innovation Fund, Concern Worldwide and the University of Edinburgh and is currently involved in water supply and sanitation projects in Africa. He has won prizes at University and for his recent work, including the best presentation at the International Water Association Young Water Professional's conference for his paper: "Identifying the current limitations of Water Point Mapping for determining the sustainability of rural water supplies in Sierra Leone".

Unfortunately Jack Barrie was unable to be present

## Mercia Award

The Award is made annually to a student under 30 for a postgraduate paper describing how engineering techniques are being used for the advancement of medical treatment and provides a medal and bursary towards the cost of a taught or research programme of postgraduate studies in Medical Engineering.

### **Winner 2013 (Medal and £500 Bursary) Megan Duffy**



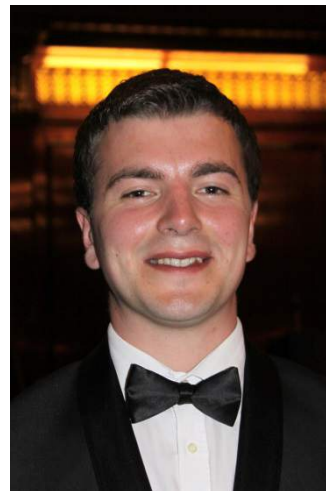
Megan Duffy is an NHS Clinical Scientist trainee at King's College Hospital and is studying part-time for an MSc in Clinical Sciences at King's College, London, specialising in Medical Engineering Design and Software Development. She graduated with a MEng in Engineering Science from Wadham College, University of

Oxford, having won the prize for the best project in Electronic Communications and an IET Women in Engineering scholarship, for the duration of her studies. Her paper described the potential of one of the new frontiers of medical technology – High Intensity Focussed Ultrasound. She has outstanding potential and is predicted to gain a distinction in her MSc.

## Cadzw Smith Award

Established in 1996, the Cadzw Smith Engineering Awards were endowed by the Eastern Group plc in recognition of the outstanding services to engineering of its former Chairman, Dr James C Smith CBE FEng FRSE now a Past Master Engineer. The Awards are for excellence on an accredited undergraduate engineering course conducted at one of the eleven universities within London and the Home Counties. Besides academic excellence, the recipients of the Awards must have demonstrated self-confidence, professional awareness, leadership and sound common sense.

### **Winner 2013(Medal and £2500 Prize) Matthew Wood**



Matthew is a final year student at Imperial College, London studying for a degree in Civil and Environmental Engineering. As well as achieving academic excellence Matthew has demonstrated impressive leadership skills in the *E.quinox* project in Rwanda, leading a team of 40 to design and install a pico hydroelectric power plant. Here, he

was clearly a "hands on" manager and was able to transfer useful skills to local operatives. It is particularly impressive that he was able to instil a new health and safety culture into the local workforce achieving a zero injury rate. He has been selected to tutor first year students at Imperial and is a member of the College rugby league squad. A strategic thinker, Matthew is a composed and assured individual who shows great promise for the future.



## **THE SERVICES ENGINEERING AWARDS**

### **The Services Engineering Undergraduate Award**

*Awarded to an officer graduating from the Defence Technical Undergraduate Scheme (DTUS) who has achieved outstanding academic performance and demonstrated clear leadership and commitment to a professional engineering career in the Armed Forces.*

#### **Captain Rebecca Pogson-Hughes-Emmanuel**



**REME**, a Corps of Royal Electrical and Mechanical Engineers sponsored In Service Degree Officer in the Defence Technical Undergraduate Scheme (DTUS), graduated from Aston University in July 2012 with a First class honours degree in Mechanical Engineering. Her degree classification accurately reflects her academic ability and the

enormous amount of hard work she put into all 3 years of her university education. Furthermore, her contribution to the training, mentoring and development of the DTUS bursars was outstanding and this, together with her academic performance, proved her to be a superb all-round young officer.

### **The Services Engineering Post Graduate Award**

*Awarded to an officer completing a postgraduate technical degree who has achieved overall academic excellence and contributed most to the advancement of technical knowledge or its application through a research project.*



#### **Squadron Leader Michael Dutton RAF**

is a worthy recipient of this award as an outstanding individual with a comprehensive

and detailed technical understanding of all the key disciplines involved in guided weapon technology and engineering. He graduated from Cranfield University with an overall mark of 83% in the technically demanding Guided Weapon Systems MSc in 2013, a grade which is comfortably higher than anyone else on the course in recent memory. He was also extremely helpful and co-operative with his cohorts. His dissertation involving the use of scramjet propulsion systems for missile applications was exemplary.

*Both of the Awards above were made on the recommendation of the College of Management and Technology, part of the Defence Academy of the United Kingdom at Shrivenham, Wiltshire.*

### **The Services Engineering Training Awards**

*Awarded to a Warrant Officer or Senior Rating / Non Commissioned Officer of each of the three Services for outstanding achievement in initial or continuing engineering training, measured through leadership and the professional inspiration given to others. Nominations are invited from the: Defence College of Technical Training, HMS SULTAN; Maritime Warfare School, HMS COLLINGWOOD; Royal School of Military Engineering; Defence School of Electrical & Mechanical Engineering; Defence School of Communications and Information Systems and Defence School of Aeronautical Engineering. Winners are selected against the criteria by the Company's Services' Awards Panel.*

### **Royal Navy Award**

#### **Warrant Officer 1<sup>st</sup> Class Engineer Technician (Weapon Engineering) Mark Fisher RN**



served in Victory Squadron, the Phase 2 Training Unit in HMS COLLINGWOOD, as both a Professional Divisional Officer and as the Executive Warrant Officer. In both roles he has continuously striven to deliver the highest standards of Weapon Engineering Technicians to the Fleet. He has coached, mentored and inspired in excess of

1000 trainees during his time so far in the Unit and there is not a single frigate, destroyer or capital ship in

the RN that has not benefitted from the presence of an Engineering Technician on board, trained and mentored by this exceptionally dedicated and loyal Weapons Engineer Warrant Officer.

**Army Award**

**Sergeant Nicholas Edmeades RE** joined the Corps of Royal Engineers in 2004.



After basic training, he successfully completed the All Arms Commando Course, receiving the Commando Medal and Commandant's Certificate for the most outstanding individual. By 2008 he had completed his technical training as a Draughtsman E&M, again achieving top student, and was promoted to Corporal in 2009. Most recently, his exceptional academic preparation and drive for engineering excellence led him to achieve the highest academic results seen from a Clerk of Works (Mechanical) student. If his academic studies were not enough, he has completed the Isle of Wight marathon, the 100 km London to Brighton Challenge for Cancer Research and is currently training for the Bolton 2013 Ironman. Additionally, he organised a 24 hour charity cycle event, individually cycling 600 km and raising over £1,100 for Help for Heroes. Following his recent graduation from the Clerk of Works (Mechanical) course, his initial assignment is to a Construction Supervision Cell within 39 Engineer Regiment. Deeply inspiring and with masses of potential Sgt Edmeades fully exploited every opportunity whilst on the course. Standing out amongst his peers he receives the RSME's strongest nomination for this Award.

**The Services Operational Engineering Awards**

*Awarded to an officer, from various Service and Corps areas, who has best made the application of professional engineering judgement or technical innovation to contribute significantly to the maintenance or enhancement of operational capability or effectiveness in any theatre of operations, including the UK. Recommendations for the Operational Awards are made by the Senior Specialist Services Authority appropriate.*

**Royal Navy Operational Engineering Award**

*Called the "Thunderer" award to sustain the heritage of this name within Worshipful Company of Engineers*

**Lieutenant Dale Smith RN** served in HMS



VANGUARD (STBD) as the Assistant Marine Engineer in charge of the Ship Section. During his final patrol, a high profile defect occurred on the foreplanes. This resulted in the loss of a large amount of hydraulic fluid which, unaddressed, would have caused the submarine to curtail her operational patrol.

Demonstrating outstanding initiative and tenacity Smith was, from scratch, able to design and build an oil catchment and scrubbing system entirely from spare parts and without external support. This allowed the leaking oil to be recovered and re-used throughout the patrol, mitigating a defect with significant consequences to an enduring operation of national importance.

**Royal Engineers Operational Engineering Award**

**Major Benjamin Hawkins RE** commanded the



Operations Squadron of the UK's Explosive Ordnance Disposal (EOD) and Search Task Force in Afghanistan, between March and October 2012. As the *de facto* lead for specialist capability development, Major Hawkins placed himself at the forefront of operational delivery and led virtually all the Task Force's input into EOD related engineering

research and development activity. During his tenure he focused collective efforts, across at least ten separate programmes, on driving forward technical innovation to defeat the threat, evolutionary in character and pernicious in nature, of Improvised Explosive Devices (IEDs).



**Royal Signals Operational Engineering Award**

**Captain (Technical Officer Telecomms) Paul Ceaser R Signals** of 2 Signal Regiment has just



completed his 5<sup>th</sup> tour of duty in Afghanistan, this time as the lead engineer in Headquarters Joint Force Communications & Information Systems (Afghanistan); responsible for engineering standards and the management and exploitation of all information services deployed in theatre. He is an engineer of outstanding ability who

has delivered a level of technical excellence that is unsurpassed and has underpinned every aspect of JFCIS(A)'s success; he has driven forward, with unbridled passion and professionalism, its engineering capability. Through his personal actions he has effectively re-engineered the entire deployed network at a technical depth never before attempted and thereby improved the availability of the main information services deployed on Operation HERRICK to unprecedented levels.

**Royal Electrical and Mechanical Engineers Operational Engineering Award**

On a six month deployment to Afghanistan, and with limited resources, **Captain Dougie Buchanan**



**REME** delivered and sustained significant improvement in the availability of a fleet of over 200 vehicles and, in so doing, won the absolute trust of the combat troops he was supporting. Adhering to basic engineering principles under the most demanding conditions, employing a diligent and pragmatic approach to problem solving and

building an equipment care culture, he achieved absolute success. Isolated from echelons of support, and working in the midst of a determined enemy, the

Scots Guards Light Aid Detachment, under Captain Buchanan's leadership, epitomised the REME Corps motto of "Arte et Marte". For his contribution to engineering and superb output, Captain Buchanan receives this Award.

**Royal Air Force Operational Engineering Award**

**Squadron Leader Robert Wright RAF**



conceived, defined, developed and delivered a capability critical to enabling Air Operations in the early stages of a crisis, by providing a High Readiness Air Deployable (HiRAD) communications and information systems (CIS) bearer network. In-service from 1<sup>st</sup> May 2013, HiRAD enables command, control and sustainment of Air Power

in the early stages of an operation. It is deployable by a single Hercules aircraft, instead of the ten aircraft loads required to transport the equipment it replaces. Throughout the development and delivery of this project, Squadron Leader Wright has displayed outstanding insight, leadership, engineering excellence and innovation.

**Services Engineering Support Award**

*Awarded to a serviceman who has contributed most, through the application of engineering skills including the use of leadership, management and technical acumen to meet materiel availability targets for any of the Armed Forces. The recipient is normally chosen from the Defence Equipment & Support Organisation with a recommendation by the Chief of Defence Materiel.*



*As Officer in Charge of Forward Support Unit 1, Warrant Officer 2<sup>nd</sup> Class Engineer Technician (Marine Engineering)*

**Christopher Mullan QGM, RN** led a team delivering

critical defect rectification on the four Mine Counter Measure Vessels in the arduous conditions of the Arabian Gulf. Through his drive and dedication there has been a significant improvement in the availability of these ships despite their age and the high operational tempo. Possessing an abundance of engineering experience and leadership prowess, he systematically interrogated legacy practices, implementing innovative methods to optimise the level of engineering support. His can-do attitude and dedication have been vital to the delivery of the highest possible levels of Operational Capability and enhanced the RN's reputation in a high profile theatre.

### **The Master's Speech**

Welcome to Merchant Taylors' Hall the elegant home of The Worshipful Company of Merchant Taylors who were originally the Fraternity of Tailors and Linen Armourers. On a night when we give prizes to Her Majesty's Forces it is worth noting that a Linen Armourer made padded tunics known as 'gambesons' which fitted under armour. It is thought that the threads and needles of their trade may have given rise to the name of the street where the Merchant Taylors Company has been based since 1342 after being established by King Edward III's Royal Charter in 1327.



I am really pleased to be here to enjoy this building which has fond memories particularly of Royal Charters. Not one as ancient as that of the Merchant Taylors but in 2004 The Engineers were one of the first of the modern livery companies to be awarded a Royal Charter. We received it officially from HRH The Duke of Kent on 27th April 2004 who was our

principal guest here that evening. I had the great pleasure of parading the bound vellum pages above my head to show publically the assembled company our significant achievement. After my arms started to ache with the weight, I was able to place it in front of The Master alongside our sword for display during the evening. Little did I know then nearly a decade later I would have the chance to sit here now - but with no Royal Charter to hide behind.

Many of you will realize from the settlement of livery companies precedence by the Lord Mayor in 1515 that

there is a risk with someone with my surname of 'Skinner' being here tonight at Merchant Taylors Hall. I have to hope now that the only 6s and 7s that we have this evening are associated with my age, and in case you were wondering, the 6 takes precedence in that calculation. It has gone well so far, delicious food from the in-house caterers, excellent musical accompaniment from the Live Brass Quintet, and good master-of-ceremonies from The Clerk and The Beadle.

I would like now to turn to our guests for the evening and to welcome them all on behalf of the Company. We have visiting Masters from the Armourers and Brasiers, Glaziers, Carmen, Air Pilots and Air Navigators, Fuellers, Lightmongers, Information Technologists, Water Conservators, and a senior representative from the Educators.

We are also joined by a number of other official guests. These include the new Dean of Engineering from City University, Professor Roger Crouch, with whom I will be working to set up our joint Bridge Lecture in February next year. From our closely associated professional institutions, I welcome Patrick Kniveton the President of the Institution of Mechanical Engineers accompanied by his Chief Executive Officer, the President of the Chemical Engineers, Ms Judith Hackitt and the President of the Society of Environmental Engineers, Steve Burnage. The Arkwright Trust is also represented here this evening by Mrs Georgina Hare.

Particularly pleasing for me, because of my own provenance, there are many distinguished members of our Armed Services with us this evening. All of you are most welcome and forgive me if I only mention a few. Major General Carew Wilks, President of the Institution of Royal Engineers and representing the Chief Royal Engineer, Rear Admiral Ian Jess, representing the Chief of Defence Materiel and Major General Mike Riddell-Webster who is the Director of the Defence Academy. From my own cloth I am pleased to see Air Vice-Marshal Julian Young who is Director Technical in the Defence Equipment and Support organisation. Because of the enormous debt this country owes to its Armed Forces and the sacrifice made by many in the discharge of their obligations to the Crown, we welcome you all unreservedly to our table.

I would also welcome my personal guests. Margaret's sister Barbara and her husband Christopher Cox and Michael Wigan, a Past Upper Bailiff of the Weavers' Company and long time business colleague from the City with his wife, Helen.



Our principal guest is Sir George Cox who is a colleague of mine as a Non-Executive Director of Shorts Bombardier and good friend through a mutual fascination with all things aviation, I am sorry you did not hear us nattering together like anoraks about the virtuoso performance of the Russian vectored thrust Sukhoi 35 at the Paris Air Show last month. Sir George is an aerospace engineer from Queen Mary University and has had a distinguished career through management consultancy, especially in the field of information technology, with his own partnership of Butler Cox which was floated on the London Stock Exchange and eventually sold to Computer Sciences Corporation in 1991. Later he became the Chief Executive of Unisys Ltd in UK and Ireland to progress with them later into their whole European leadership area. He then became Director General of the Institute of Directors in 1999. He used the outstanding example of teamwork and leadership by the RAF Red Arrows in his work with the IOD and was rewarded by the Air Force Board with a trip with the Reds on a training sortie (something that I never achieved and he hasn't stopped bragging about it since). After the IOD Sir George became the Chair of the Design Council. Sir George is currently a Board member of the New York Stock Exchange- Euronext and Pro-Vice Chancellor and Chair of Council of Warwick University. Through his good offices at Warwick he has been instrumental in facilitating a visit for The Engineers Company to the Warwick Manufacturing Group to be hosted by Professor Lord Bhattacharyya on 26th February next year. Sir George also completed the influential Cox Review of Creativity in UK Business on behalf of the Chancellor of the Exchequer and this year he carried out an independent review for HM Opposition on Overcoming Short-termism in British Business, a theme close to all our hearts in engineering infrastructure, projects and manufacturing. Off duty, Sir George has been the very active chair of the charity Merlin, which like RedR, provides emergency healthcare relief in emergencies around the world and he is presently the President of Leander Club at Henley where he has just had a very busy week. As you can imagine, I am very pleased that Sir George is able to be with us this evening and to be accompanied by Lorna. With such a diverse and distinguished career in delivering business and technology, we have been privileged to have Sir George assist in making our Awards tonight and I look forward to hearing his speech in a few moments.

Before then though I must remark that when I was still serving in the Royal Air Force, one of the most pleasurable aspects of being a Commander-in-Chief was to give out awards and to play a part in a public recognition of outstanding contribution by individual

servicemen and civil servants. I am aware of how much effort the sponsors make to put the right individuals forward for the awards. I thank all the sponsors here. Getting the awards organized against an annual time table is a demanding call and I thank all those on the Engineers Awards Committee under the leadership of our Charitable Trust Fund, together with our Clerk, for managing this so well again this year.

I congratulate all our Award winners and in considering their achievements in the skills of our profession, I can only reiterate the theme of this year's President of the Institution of Mechanical Engineers that I am 'Proud to be an Engineer'. Indeed, I was never so proud of our profession than 2 weeks ago when attending the City of London's tribute in the Crypts of the Guildhall to Sir Tim Berners-Lee and his colleagues who were winners of the £1million inaugural Queen Elizabeth II prize. This particular award has raised the awareness of national and international engineering in so many ways and I congratulate those in the Royal Academy of Engineering, some of whom are here this evening, who had the foresight and vigour to bring this to such prominent fruition for our profession.

We too are raising our game with our own Engineers' Charitable Trust Fund which has been reinvigorated in the last 2 years under the Chairmanship of Past Master John Robinson and with a new trustee structure. This together with an influx of funds to allow some wider support within our charitable objects has allowed an extension of awards. We are close to being able to make an announcement, in association with a hugely influential Institution, which would underpin the largest UK engineering award, ensure its continuing influence on engineering aspirations, and give a much higher level of exposure for us than previously. I wish I could say more, but watch this space.

What I can say however is that we expect to make the first award of a new series of major awards within the next month. These are the Leete Awards which result from a legacy from late Liveryman Dr David Leete, which you may have seen referred to in Swordsman or on the back page of tonight's programme. Dr Leete left almost half a million pounds to our charitable trust and instructed the trustees to make awards with the income from his bequest for Research in Production Engineering, which today we call Manufacturing Engineering. This area of engineering is now high on the national agenda. Last month, at the UK Manufacturing Professors Forum, I heard David Willett, Minister of Universities and Science actually say there were two things his administration had now recognised that it had not appreciated when it took

office. The first was that intervention is required in economic management and, secondly, a financial and service based economy was insufficient alone to power the UK. Manufacturing needs to be positively encouraged in the sectors where we have world leading skills. In our modest way we hope that we have the means to encourage research in manufacturing with our Leete Award. To fulfil its conditions we have reviewed the work of the country's major manufacturing research centres and agreed to offer an award at the Institute for Manufacturing within the Department of Engineering at Cambridge University. Our award has been structured against a background of UK universities finding it increasingly challenging to attract the most able research students, against competition from overseas and with basic national research grants seeming less and less attractive against the debt burden accumulated during first degrees. Our Leete award will be in the form of a "premium" award for the best applicant accepting a place for a 3-year research degree at Institute of Manufacturing starting this autumn. The Head of Institute of Manufacturing Professor Sir Mike Gregory, who by coincidence was the principal guest at our Annual Banquet at The Mansion House last year, says he is sure that our award will make a difference by helping attract more of the best candidates into production engineering.

Back to this Awards Dinner tonight and, to all the winners here, we have been delighted by the standards of all the recipients of our Awards in the wide variety of categories. My final words should go as hearty congratulations to you all and to strongly acknowledge that you all make me proud to be an engineer.

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

### **Speech by Sir George Cox**

I am truly delighted to be with you this evening - not just because of your excellent hospitality but because I am a passionate believer in the importance of engineering. This is not just a matter of indulging a life-long interest in the subject. Nor is it just special pleading from a member of the technology community. It is because I believe engineering is the key to our future economic success and quality of life.

The fundamental challenge for the UK is not how it emerges from recession, which has understandably dominated the public debate, but how it earns its living in a world where other nations are building vigorous and innovative new industries. What do we offer the

world, when we cannot compete on cost? This applies to both manufacturing and services, and to every sector.



The idea that the UK must inevitably lose its manufacturing industries to be replaced wholly by services is now surely discredited. Moreover, the traditional distinction between manufacturing and services is increasingly irrelevant in the modern world. Our leading manufacturer Rolls Royce derives more income from services than manufacturing. Is

Apple a manufacturing company or a services business? Financial Exchanges employ far more technologists than financial specialists.

We live in a world where the fast-developing newer industrialised economies no longer aspire to be the suppliers of cheap goods and services, competing on low-paid labour. They are investing in skills, education, research and high-tech industries. They demonstrate vigour and a belief in tomorrow. To flourish in such a world the UK has to recognise and make far greater use of its creative capabilities and innovative skills.

Political debate needs to shift from how we spend the nation's wealth to how we create it. I, along with many others, have worked hard in recent years to get this better understood in Whitehall and Westminster. Hopefully, there are signs that it is, at last, being recognised.

And success **is** achievable. Look at what has been achieved by companies as diverse as Dyson, Jaguar Land Rover and Rolls Royce. These companies serve totally different markets but are linked by a common passion for design and innovation, resulting in world-beating products. They are also companies which take a long-term view, investing in capacity building, research and skills.

But the importance of engineering goes beyond just economic success. It holds the key to many of the major problems that we face in society today in areas such as conservation of the environment, the supply and efficient use of energy, waste management, the built environment, transportation and health. The challenges in all these areas cannot be met by throwing



resources at them, it needs new thinking and new solutions. Our future quality of life is dependent on utilising our engineering capabilities more fully. We need to promote better understanding of this. We need to get greater recognition of what the profession has to offer and the attractions of engineering as a career.

One only has to look at our inspirational Award Winners this evening to see that we have the latent capability.

That is why I applaud the work of the Worshipful Company of Engineers. I am delighted, Master, that one of your planned visits during the coming year will be to Warwick Manufacturing Group. This is not just because of my pride in the University. It is because you will find many things there which I think hold the key to our future. You will see multi-disciplinary research that will inspire you. You will see a level of university and industry cooperation which I think sets the model for the future. You will learn of the National Automotive Innovation Centre that is currently being constructed at Warwick and you will hear of the plans for the new Academy school that we are creating specialising in engineering.

Master, during our many trips to Belfast together, I have heard much of the activities of the Company and its programmes to celebrate and promote engineering. It therefore gives me great pleasure both to thank you on behalf of all our guests this evening and ask everyone to join me in toasting the health of the Company.

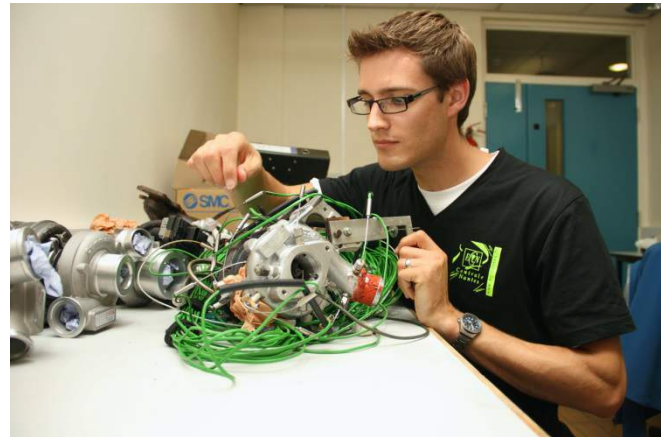
“The Worshipful Company of Engineers - May it flourish root and branch forever.”

### **Hawley Award 2012 Update By Chris Vagg**

In the twelve months since winning the Fiona & Nicholas Hawley Award last year a great deal has happened for me, helped, in no small part, by the prize money from the Award. I used the Award money to fund a secondment in France and speaking at an international conference about my research work.

I spent October 2012 as a visiting researcher at the Ecole Centrale Nantes in France, where I conducted a series of experiments on turbocharger performance on a bespoke test rig. This work fed directly back into a project within my research group at the University of Bath, and has laid foundations for future collaboration between the research groups. As well as this, I spent the time conversing entirely in French, learning words such as “capteur” (sensor) and “ligne de pompage”

(surge line), which don't often come up in classroom lessons! My hope is that, having worked in an engineering environment in French, if only for a relatively short period of time, my language skills are now at a level that I could consider doing business in French.



*Chris Vagg Testing a Turbocharger in Nantes*

My most recent PhD work has been accepted for presentation at the Institute of Electric and Electronic Engineers Vehicle Power and Propulsion Conference, which will take place later this year in Beijing.

As well as these two opportunities a great deal of my time has been taken up in the last 6 months with the launch of a business venture. Having previously worked in Formula One, as well as with electric vehicle technologies, I was extremely interested to learn of the launch of the FIA Formula E championship, which will see Formula cars powered exclusively by electricity, racing in iconic city centres around the world. In February 2013, I, with two co-directors, founded Vastha Racing with the aim of securing a team entry in this championship. This has involved entering into negotiations for considerable amounts of sponsorship and, being able to use some of the prize money to fund business expenses during this uncertain time has been empowering. We are yet to see whether our efforts will result in us securing an entry, and should find out by September. Should we be unsuccessful, there is a huge amount of experience and confidence that I can take from the experience; but, being positive, assuming that we will be successful, an enormous amount of work will begin!

When all is told, the Fiona & Nicholas Hawley Award has given me the support to undertake a number of engineering career developing activities and experiences that I would not otherwise have been able to consider. It has, without doubt, shaped the last twelve months for me, and I hope and believe that its effect will shape my future also.

## ENGINEERS PLAY AT THE HOME OF THE RYDER CUP 2<sup>nd</sup> July 2013

The Worshipful Company of Marketors held their 2 day Ryder Cup Livery Fellowship event at the Verulam Golf Club in St Albans on the 1<sup>st</sup> and 2<sup>nd</sup> of July. The Worshipful Company of Engineers played on Day 2. Captained by David Scahill the team comprised Graham Skinner, Chris Price and myself.

Thanks to the wonders of Satnav, the team arrived in time to enjoy the bacon rolls and coffee laid on by the organisers before venturing forth to the various competitions.

After a warm welcome by the Marketors' Senior Warden we ventured forth under leaden skies trusting the Met Office forecast that there would be no rain – how wrong we were! And what a start! A hole in one from David followed by another single shot success by Graham on the third inspired the team. However, this was only the putting competition, the main event lay ahead, four ball better ball and individual Stapleforths.



*Chris Price, The Master Graham Skinner, David Scahill and John Ferrie. Very professional but perhaps not quite up to Ryder Cup Quality*

Under overcast skies we teed off to enjoy the many charms of the Verulam course. Its 6429 yards featured fast and tricky greens, tight fairways with numerous out of bounds areas and not to mention a 120 yard, over the road, par three complete with safety net and passing traffic! The frequent rain showers did little to dampen our enthusiasm as we did battle with the course, which usually won! However our Captain did record a Birdie, our sole highlight from an enjoyable round. Chris led the scoring on the team's individual cards. It was otherwise agreed that the final scores would remain a closely guarded secret!

Back in the Clubhouse we enjoyed a well-deserved refreshment and dinner at which the numerous prizes were presented to both individuals and teams. The Worshipful Company of Insurers took the team First Prize. Needless to say the Engineers didn't feature in this year's prize list!

So to next year and the prospect of resurgent interest in the Engineers Golf Society from which who knows one or more teams might emerge to enjoy a day's golf at the 'Home of the Ryder Cup'.

*John Ferrie*

*I am pleased to report that the comment in the last paragraph above relates to the fact that Mike Hassall has agreed to lead the revival of the Engineers' Golf Society. Anyone interested may contact Mike at [mhassall@wardell-armstrong.com](mailto:mhassall@wardell-armstrong.com) (Ed)*

## ANNUAL GOLF DAY BEACONSFIELD GOLF CLUB 23<sup>rd</sup> July 2013

The Master, Graham Skinner and his wife, Margaret, welcomed fourteen members of the Company, along with wives and guests, making a total of twenty-five in all, to the Annual Golf Tournament Day, held at the Master's home club at Beaconsfield.

After having experienced two weeks of hot sunny weather, there was a little concern over the morning forecast of thunder and rain for the first part of the day. The competition started at 10.30 just as the thunder rumbled around but happily with no sign of lightening nearby. We had a couple of hours with some periods of rain but then luckily the sunshine arrived and stayed with us.



*Richard Rooley, Helen Ferrie and Ladies Winner Patricia Huffell in front of the Club House*



## *The Swordsman*

The Course was beautifully prepared with plenty of challenges resulting in some demanding but very enjoyable golf.

The afternoon ended with everyone coming together for a delightful meal in the splendid dining room of the Clubhouse, preceded by the Master giving us a very interesting insight to the history of the Club and the significance of the railway which passes through the Course.

With everyone replete, the Master began the prize-giving. The successful competitors were:

Patricia Huffell: nearest the pin on the 16th and the overall Ladies' Prize with 36 points  
Rob Walmsley: nearest the pin on the 7th.  
Ray Millbank: visitor and overall runner up.

The winner of the WCE Trophy and the best score of the day with 39 points was Jan Lewis.



*The Master Presenting the Trophy to Jan Lewis*

Our warmest thanks go to Graham and Margaret for organising such a wonderful day.

*John Huffell*

## **Opportunities for Those who Find Themselves with a Whole Day in a 'New Place' whilst Others Play Golf**

This is one of my favourite Engineers outings. I have arrived in a new club house. I am given excellent coffee and a bacon butty. This is a rare treat which is necessary for the golfers who have work to do through the day but without the option of another meal until all the golf is complete and a super-sized early supper becomes the finale of the day!

So this year we were foraging in the club house at the Master's home course in Beaconsfield. As this was the third visit some of the 'cherries' had been picked.

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Creative planning had been called for by Margaret and Gill. The model village was to be our place of choice close to our lunch venue of the Beech in Beaconsfield.

I will admit to never having visited such a place but was quickly enchanted by the vision of 1930's village life as we joined the local school who were out for an end of year fun day. Bekonscot is quite extraordinary and we joined a world of Enid Blyton, the vision of Ronald Callingham who built the first ever such place in his garden. 'A world famous folly that evolved as a result stands tribute to British eccentricity, humour, determination and craftsmanship'. There is a working train and every part of British life is celebrated.



*Brownies Dancing Around the Maypole*

There are Brownies dancing around a maypole – what a relief that we gave up straw bonnets for Brownies.



*Cement Works Very Close to the Canal, Parks and Housing*

The Master's favourite is the airfield although I think my husband would have enjoyed the cement works. The vicar is just missed by a tin of paint and Peter Cullimore's office is there on the village green! Margaret had arranged for us to visit the workshops which are staffed by a team of adults although one would hope for the help of a few night working elves to manage the details. Our ladies, sadly only four of us,

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were enchanted by the figures and delighted to meet the model maker. An expert, discovered working in the tea room, who now has boxes of figure parts which she assembles into the needed figures. If you can remember the books of 'heads, bodies and legs' you can imagine this in a vast collection of cast parts. We saw the renovation of the horses ready to gallop off to the fields whilst the combine harvester was just being prepared for the harvest. The names of all the shops and buildings had us giggling all-round the garden.



*Peter Cullimore's Office on the Village Green*

The four of us enjoyed a good light lunch beautifully served in the real village and then took off for West Wycombe Park. Here we enjoyed the vistas and walk up to the house. The Dashwood family seem to have enjoyed a number of family fortunes. Originally built following Grand Tour visits to Italy the 2<sup>nd</sup> Baronet built the house in Palladian style. The house is a delight and recent years have seen paint removed to show original walls. There are pictures and statues which have been collected over the centuries. Much has been lost and regained. Our guide was inspired to tell stories of each room but relating mostly to the filming which takes place in the house. The Dashwoods still live here but the National Trust has use on some days each week. There is no doubt that it is a party house and often appears on both large and small screen.



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We had experienced such contrasts in life style. As we set out back to our transport we passed the lions (*bottom left*) resting on the terrace. It was time to find out how the golfers had got on and be there so they could eat that wonderful well-earned supper.

*Ruth Cousins*

## **VISIT TO CAMBRIDGE** **25<sup>th</sup> July 2013**

### **Technical Visit to Marshall Group and Cambridge University Engineering Laboratory**

Our visit to the Marshall Group began with a warm welcome from the Chairman, Sir Michael, Terry Holloway, Group Support Executive and Liveryman Brian Phillipson, Engineering Director of Marshall Aerospace. Brian, who had organised the technical and Partners programme, presented the Company to us and explained what we were about to see.

Founded in 1909 with little capital as a chauffeur drive company (still going strong as Marshall Chauffer Drive) in Cambridge, Marshall moved into the retail motor business in 1912, obtained the Austin Distributorship for Cambridgeshire in 1920 and entered the aviation business in 1929. With all its growth funded by ploughed-back profits, the Marshall Group remains a privately owned family Company, with a turnover of more than £1bn per annum. The Group of Companies is chaired by the third generation of the Marshall family and employs members of the fourth generation including Robert Marshall, CEO of the Group. The Group currently employs just over 4,000 people working in the fields of aerospace engineering; design and manufacture of specialist vehicle applications, military mobility shelters and hospital surgical units; motor vehicle sales and after sales support; refrigerated transport sales and support; and property ownership and management.

The Marshall Aerospace and Defence Group (MA&DG) was formed on 1 January 2013 from Marshall Aerospace and Marshall Land Systems in order to build upon the unique strengths of Marshall's two major engineering businesses and to provide better opportunities for these previously separate businesses to penetrate world market places with a 'larger footprint'.

Marshall has become the United Kingdom's leading independent aerospace company; renowned and respected worldwide for its quality of service, engineering excellence, flexibility and reliability. As



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an independent service provider, Marshall Aerospace (MA) specialises in the conversion, modification, maintenance and support of military, civil and business aircraft; and its capabilities include engineering design, manufacture and test. MA holds many type approvals, granted by national and international authorities, airlines, airframe manufacturers and defence agencies, which enable the Company to design and certify modifications and perform maintenance on a number of civil and military platforms. Based on its 475 acre site in Cambridge since 1937, the Aerospace business has an annual turnover in excess of £240M and employs more than 1500 people. The core of Marshall Aerospace is engineering practiced by 330 professionals plus another 70 supporting from outside the company.



*View of Marshalls Aerospace and Cambridge Airport*

Many of the customers insist on confidentiality and this results in Marshall remaining a best-kept secret. Surprisingly, one of the engineering customers is Ferrari! MA was responsible for the ‘droop nose’ of the Concorde and today is the Design Authority for the last flying Vulcan V-bomber.

Marshall Aerospace distinguishes itself by undertaking the difficult problems that other people cannot, or do not want, to do. This capability exists for managing the whole life cycle of an aircraft.

Following the company presentation, our first shop visit was to the vast hanger for maintenance and overhaul work on the Lockheed C 130 family of military transport aircraft.

I was pleasantly surprised to come across two of my former colleagues from The Dowty Group. They were brought in by MA to carry out specialist repairs on the anti-icing device on propeller blades. The hanger contained C 130s from Nigeria (recovered by MA from the jungle!), the Netherlands, Danish and

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Swedish Air Forces. The Marshall Group knows more about the fatigue and corrosion aspects of the C 130 than even the original manufacturer. This corporate knowledge enables high value-added export business consisting of maintenance, overhaul and upgrades, including new digital cockpits.



*Some Major Maintenance*

The next hanger contained the business jet operation. The work included maintenance, repair, overhaul and modification. The layout and general cleanliness were in keeping with the expectations of very demanding customers.



*Cockpit Maintenance and Up Dating*

We then had quite a surprise by visiting the new airport terminal. It has the characteristics of a boutique in that the everyday scheduled passengers can enjoy the same experience as the usually more cosseted executive jet passengers. The civil aircraft are high speed 50 seat SAAB 2000's (over)powered by Rolls-Royce Allison engines fitted with Dowty propellers – the same power plant as the much larger C 130s! The destinations include Jersey, France and Schiphol. The time from Cambridge to climbing on-board a long haul aircraft at Schiphol is shorter than driving to Heathrow!

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The Aerostructures Division has carved out a useful niche business with both Airbus and Boeing. One highly engineered product is the Aircraft Centre Tank for increasing fuel capacity for long range operation on both business and military aircraft. They are twin-walled, lightweight but crash-proof. Interestingly, some of the raw material is sourced as far away as California for economic reasons.

The highly regarded Marshall Land Systems business has been integrated into the Aeronautical Division. All Land-Rover based military ambulances and MAN based specialist catastrophic incident vehicles were engineered and produced by Marshall Land Systems.



We then enjoyed 40 minutes mingling with a cross section of the workforce including test pilots. Throughout the visit we were encouraged to talk to the employees and this session was very revealing about how much the jobs are valued. (Typical view Left).

Many individuals talked of career road maps developed with the company. We gained the

impression of a company with much self-confidence emanating from a well-cared for workforce.

Reflecting on our visit it is clear that The Marshall Group is already a Gem and is fast becoming a National Treasure.

After the generous buffet lunch in the Master's Garden at Corpus Christi College we visited the Cambridge University Engineering Department's Whittle Laboratory which specialises in research into Fluid Dynamics and Thermodynamics of Turbo-machinery and later the Schofield Centre for Geotechnical and Environmental Research.

Our visit was hosted by Dr Tom Hynes. He succeeded in making all of the research projects come alive with perspective and appropriate detail. The sponsoring companies from the world of power included Rolls-Royce, Mitsubishi and even Dyson. The applications ranged from jet engines to wind turbines. The laboratory focuses on the early (i.e. pre-competitive) Technology Readiness Levels (TRL 1-4) whereas the companies typically apply and exploit the higher levels (TRL5-8). The companies control and protect the

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technologies after they represent competitive advantage.



*Celebration Plaque*

Current research is helping to define the performance characteristics at the very heart of power systems e.g. aspects of the sealing of gasses at both high temperature and pressure in highly stressed rotating machinery. This involves both the physical design of seals and the consistent achievement of very small clearances.

We were introduced by the inventors themselves to an award winning novel system for measuring extremely high temperatures with exquisite accuracy. In practice today these extreme temperatures, at which all current instruments melt, are only measured very indirectly and inaccurately. We witnessed a very promising development.

Dr Gopal Madabhushi hosted our visit to the Schofield Centre. He provided a fascinating insight into the science of soil mechanics. The work included the modelling of unusual civil engineering designs and structures and investigating their interaction with various soil types. To achieve this, 'standard soil' is made up in the lab from very basic ingredients and then is loaded into an instrumented high-powered centrifuge – buried underground for safety.

One of the extreme experiments includes the simulation of earthquakes. We were left with the impression that the basic research in the lab has some highly relevant applications needed sooner rather than later.

The whole party got back together and all agreed we had enjoyed a very special day largely thanks to the arrangements made by Brian and Denise Phillipson. Brian, a Liveryman, is not only a director at MA&DG but also is a graduate of Corpus Christi.

*Tony Edwards*



## Visit to Corpus Christi College and the Fitzwilliam Museum

Saint Augustine's Gospel is thought to be the oldest illustrated Latin gospel in existence and was brought from Rome to Canterbury in 597AD. St Augustine was sent by Pope Gregory the Great to re-introduce Christianity to the English and he was successful in converting King Ethelred and much of the population. This still vibrant manuscript formed the foundation of the Church in England. St Augustine as the first Archbishop of Canterbury and the gospels have played an important role in the enthronement of each successive archbishop, most recently that of Justin Welby.

When not required for official duties it resides at the Parker Library, Corpus Christi College, Cambridge and this is where it was on view for our most memorable visit. Gill Canell, sub-librarian at the Parker Library, introduced us to the magnificent collection of early English manuscripts and books that were donated to the college by Matthew Parker in 1574.



*Inside the Parker Library*

Parker was a fascinating man and Gill gave an overview of his illustrious career. From a bible clerk

aged 14 he progressed to become a Fellow of Corpus Christi and was ordained as a priest. Queen Anne Boleyn made him her chaplain as did Henry VIII. He became a powerful figure during The Reformation and is considered largely responsible for the establishment of the Church of England. In 1544 he was elected master of Corpus Christi College and in 1545 became vice-chancellor of the university. In the reign of Queen Elizabeth, Matthew Parker became Archbishop of Canterbury.

An avid book collector and keen to establish confirmation of an English-speaking Church independent of Rome, he rescued hundreds of medieval manuscripts dispersed at the dissolution of the monasteries. As a consequence the Parker Library holds a quarter of all Anglo-Saxon manuscripts in the world. Books and manuscripts line the walls and some are on display in glass cabinets.

We were shown Chaucer manuscripts, Anglo-Saxon chronicles and giant bibles. They would 'blow your socks off', is how one of the party expressed her amazement at these ancient artefacts! Surprisingly, the librarians do not wear protective white gloves. Just very clean hands are considered better when handling the vellum.

From the library the party visited the chapel which is directly opposite the gatehouse to the college. In term-time there are Anglican services every day and it is very popular for weddings.



*Corpus Christi Chapel*

The chapel, completed in 1827 was designed by William Wilkins and includes medieval glass and four stained-glass windows that came from a nunnery in Germany. It was in the chapel that we came across the pelican depicted on the coat of arms of Corpus Christi. It is portrayed on the resplendent altar-cloth and the huge cast iron doorstops holding open the door to the chapel. The pelican is a reference to the college's name: 'Corpus Christi' means 'the body of Christ', and the pelican was said to have offered its own blood to

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its children, just as Christ offers his body to his followers in the Eucharist.



*The Pelican Altar Cloth*

Lunch was held on the lawn of the Master's Garden. Summer sunshine, a bountiful buffet and the shade of a spreading ancient mulberry bush were the key ingredients for a very English lunch. Here we were joined by those who had been on the Marshall visit and everyone was eager to exchange accounts of their morning's respective events.



*A Very Pleasant Lunch under The Mulberry Tree (as long as you avoided the fruit dye)*

The Partners' Programme continued with a gentle stroll to view the Corpus Clock. It is situated at street level on the corner of Trumpington Street. The main features of the clock are a huge gold plated serpent-like coil and a grim-looking sculpture of an insect similar to a grasshopper or locust. Installed in 2008, it has no hands or numbers but displays the hours, minutes, and seconds by illuminating individual slits in the coils of the clock face.

Given a choice of afternoon activities, some opted to walk the short distance to the Fitzwilliam Museum

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whilst others availed themselves of a retail therapy opportunity in the boutiques and stores of Cambridge's shopping centre.

Situated further along Trumpington Street, the Fitzwilliam Museum is housed in the Founders Building, an imposing temple-like structure in the neo-classical style which is a work of art in its own right. It was founded in 1816 by Richard, seventh Viscount Fitzwilliam of Merrion who bequeathed his works of art and his library to the University of Cambridge.

A gentle stroll around the various galleries was just a 'taster visit' to sample the prodigious collections that include antiquities from Ancient Egypt, Sudan, Greece and Rome, English and European pottery and glass, furniture, clocks, fans, armour, coins and medals, illuminated manuscripts and rare books. Many of these are on permanent display as are paintings by Turner, Titian, Rubens, Van Dyck, Canaletto, Hogarth, Gainsborough, Monet, Degas, Renoir, Cezanne and Picasso. One of the temporary exhibitions included hundreds of remarkable combs illustrating 6000 years of African hair combs and hair styles from pre-dynastic Egypt to modern plastic afro-combs.

To mark the Queen's Diamond Jubilee the Fitzwilliam Museum is presenting an exhibition of more than 80 works of art by contemporary ceramicists from the city of Jingdezhen, Southeast China. Jingdezhen has been making fine porcelain for more than 2000 years and was in such demand by Europe's elite that it became known as 'white gold'. The exhibition includes items ranging from artists whose work is traditional in both style and technique to the avant-garde such as Caroline Cheng's Prosperity robe, a sack cloth robe covered in four thousand white unglazed porcelain butterflies. 'Breath-taking' is the response to this dramatic piece.



*The Prosperity Robe in the Fitzwilliam Museum*

The day came to a close and everyone boarded the minibuses grateful for the exceptionally well organised day.

*Lynda Edwards*



**INFORMAL MIDLAND DINNER  
HAMPTON MANOR HOTEL  
30<sup>th</sup> August 2013**

All in all, even if I do say so myself, a very successful evening!

*Penny Taylor*

**VISIT TO VULCAN XH558 AT  
ROBIN HOOD AIRPORT  
10<sup>th</sup> September 2013**

Q: What do Cuban cigars, cycling in France, tattoo removal, Riley cars and the Charitable aims of the Worshipful Company of Engineers have in common?

A: topics of conversation on our table at the informal Midlands dinner.



This was an opportunity for freemen, liverymen and their partners and guests to get together in a lovely setting for good food, great company and stimulating conversation. Some 25 people attended the dinner with a significant number opting to stay over at Hampton Manor for the night. Pre-dinner drinks were served in Sir Fred's Bar, named in honour of Sir Frederick Peel, son of Sir Robert Peel, Prime Minister and founder of the police force who built the house.

Dinner was served in the Nescliffe Suite and from what I saw, only clean plates returned to the kitchen! The service was efficient and unobtrusive and the quality of food and drink was excellent.



It was much appreciated that the Master and Margaret were able to join us, and thankfully the drive up was not as long as they had expected. I took the opportunity to invite two friends who are interested in joining the Company, as this was an easy way to meet people and get a feel for the type of events that go on. Both were very impressed and keen to find out more.

On the morning of 10<sup>th</sup> September I was up bright and early at 6am to get the 07:15 from Clandon station. A rather busy Vauxhall saw me onto the Victoria line and up to Kings Cross; no delays and all short connections excellent! I was in Doncaster at 10:08 and a short taxi ride saw me as second to arrive at the hanger at Robin Hood Airport and able to greet most of the other members and guests as they arrived. Life has been pretty hectic with work around the world for the last few years so it had been a while since I had been to an Engineers Company meeting but everyone was, as always, friendly and welcoming and it was good to see the familiar faces of Master Graham Skinner and his wife Margaret for the first time in several years.

Having worked in the rail sector for the last 20 years a puzzling moment occurred for me when a group of men in orange vests trooped through the reception area carrying the protective covers used when working on the 650V third rail on Network Rail's Southern Infrastructure. It transpired that a rail maintenance training school is one of the activities which shares XH558's hanger!

Through the glass wall of the entrance area we caught our first glance of XH558. I have always loved the Vulcan since I saw it fly at my first Farnborough airshow as a child in the early 60's; such a wonderful shape in the sky and I also remember so well the test aircraft for the TSR2/Concorde Olympus with the single test engine under its belly making such a deafening noise (the only Vulcan with an afterburner). I had last seen a Vulcan display at the Woodford airshow in the 80's when we were living not far from there in Cheshire. It was the star of the show for me and from the information we were given on the visit was almost undoubtedly XH558 in its RAF display days.

We were soon ushered through to stand in the shadow of this mighty aircraft which looked fantastic. The love and care lavished on it by its current maintainers is evident from its condition, looking for all the world like it was delivered last week. After tea and coffee the day proper started and we all sat down to an excellent talk from Dr Robert Fleming, the Chief Executive of the Vulcan to the Sky Trust on the history of the

## *The Swordsman*

aircraft and its restoration to flight. For those not present and wanting the full story and a chance to purchase all sorts of Vulcan related material a visit to the hangar at Robin Hood Airport, Doncaster is highly recommended and the trust's website [www.vulcantothesky.org](http://www.vulcantothesky.org) contains a wealth of information.



*The Master, Graham Skinner, Introducing the Programme*

XH558 is the oldest complete Vulcan airframe surviving having been the first Vulcan B Mk2 delivered to the RAF in July 1960. It also has the highest number of flight hours and of course, as the only Vulcan still flying, is gaining on the other 'survivors' (two others XL426 and XM655 are occasionally taxied). It was also the last Vulcan to leave RAF service, flying from 1986 to 1993 as the single RAF display Vulcan, a career of 33 years. It was then sold into private ownership and (thankfully) maintained with an ambition to return it to flight, a task which proved long, complex and costly.

The Vulcan (or the 'Tin Triangle' as it was affectionately known) was one of three 'V bombers' (the Vulcan, the Victor and the Valiant) conceived to deliver a British independent nuclear deterrent capability during the Cold War. It is quite remarkable now to think that in the 1950's Britain had the skills and resources to develop not just one technically advanced long range bomber but three. We were told that the requirement was perceived to be so important that developing only one type was considered too high a risk. Today XH558 is the last wholly British designed four engine jet still flying. Both the Vulcan and the Victor had long and commendable lives with the RAF whilst the Valiant was retired in 1965 due to fatigue issues. The Vulcan was subject to significant on-going development to meet the evolving threat and for role changes including tanker and maritime reconnaissance duties. Thankfully it was never used 'in anger' until its role in the Falklands conflict of 1982, where the now famous operation 'Black Buck' raids saw it making the epic 6800 mile journey from

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Ascension Island (with multiple mid-air re-fuellings) to drop conventional Mk20 1000lb bombs on Port Stanley airfield and to attack other strategic targets; at that time the longest bombing raids in history. As well as its striking delta wing design the B Mk2 includes a number of engineering firsts in a service aircraft including:

- Anti-lock braking
- AC power generation (with electro-hydraulic constant speed drives)
- The use of fuel movement between tanks to trim the aircraft
- First use of a twin-spool engine (the Bristol-Siddeley Olympus)



*XH588 on her delivery flight from Woodford to RAF Waddington in July 1960 painted in "Anti-flash white"*

Stretching a picture of a Vulcan to around twice its length produces something that looks remarkably like Concorde, but whilst there is some common ancestry (and two Vulcans were used to develop the later Olympus engines for TSR2 and Concorde) the Vulcan could never have flown supersonically due the thickness of its wing (well over 7ft at its thickest point). It was designed with significant reserves of power and high lift to enable it to defeat Soviet defences by flying at very high altitude (those present confirmed operation at in excess of 60,000ft) but, following the downing of Gary Powers' U2, the B Mk2's also carried significant electronic countermeasures in the 'coke bottle' tail. The pace of technological development during WW2 was underlined by the fact that only 11 years separated the first flight of the Vulcan from that of the Lancaster both delivered by what was essentially the same design team.

Next Dr Fleming told us the remarkable story of XH558's restoration to flight which he has led since 1997. Firstly, for such a complex aircraft to fly again, it was necessary to gain the support of both BAe Systems and Rolls-Royce which fortunately was



achieved. Furthermore Marshall of Cambridge, who had the skills and experience necessary to convince the CAA, agreed in 1999 to be the Engineering Authority for the restoration. Fundraising was clearly a significant challenge in itself with the initial estimate for restoration to flight put at £3.5 million. At the second attempt in 2003 the Heritage Lottery fund provided £2.7 million, all the more remarkable and a testament to the importance of this aircraft as the Fund's rules say that it will not finance projects to restore aircraft to flight. With funding secure restoration of the aircraft could proceed. All of the work was carried out under the supervision of Marshall Aerospace at Bruntingthorpe where XH558, which the Trust had by then purchased for the nation and named 'Spirit of Great Britain', was stored. To secure this Dr Fleming emphasised that a large team had to be trained but many who had worked on the Vulcan in the RAF also gave their time.

The restoration was conducted in four phases:

- Detailed inspection: (conducted before the Heritage Lottery Fund grant) which confirmed the feasibility of restoration. Some corrosion and fatigue was found in the airframe but the margins were high (and subsequent inspections have confirmed no further deterioration).
- Rectification of defects found: one significant area was the control surfaces (elevons and rudder) which were mostly magnesium and had suffered significant corrosion requiring a complete re-build. Another complication is that the aircraft is almost wholly 'imperial' so material had to be sourced from the US.
- Overhaul of all the significant sub-systems by the OEM's: where BF Goodrich of the US were significant contributors.
- Reassembly and progressive testing: leading to CAA certification and the first flight.

Fortunately 8 zero time engines were available from the former RAF spares holding. Some modern avionics were fitted and a number of redundant systems were removed, all of which needed safety cases to be provided by the Marshall team.

The restoration started proper in August 2005 and was to have taken a year, in fact it took over two years with the return to flight coming on 18<sup>th</sup> October 2007. The final cost was £7 million of which Marshall contributed over a million. The aircraft is CAA

registered but has special dispensation to fly in RAF colours as XH558.

On the 5<sup>th</sup> July 2008 XH558 performed its first post-restoration display and since then has become a star attraction at air shows up and down the country. It has been seen by many thousands of people and is now regarded by the Heritage Lottery Fund as one of its most successful projects. It costs around £2 million per annum to keep the aircraft flying, all of it coming from private subscriptions with funding often only secured 'just in time' for a season.



*Dr Robert Fleming's favourite post-restoration picture, XH558 over Windermere in July 2009 with her later 'low-level' paint scheme*



*In recognition of the fantastic achievement of the restoration, The Vulcan to the Sky Trust was awarded the Company's Heritage Engineering award in 2008 and the certificate was on prominent display.*

In terms of the future, this winter will see a fatigue modification carried out on the leading edge of the wing in the area of the 'angle change' just outboard of

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the engine nacelles. This has been made possible by the use of digital photography allowing the wing skin to be restored after the changes in the absence of the original drawings. This modification should give the airframe around another 8 years of life; unfortunately the aircraft may be grounded before that (after only two more seasons) due to engine life. In RAF service the engines had a life of circa 2000hrs, but under the current display conditions and with the lack of other available references Rolls-Royce will only certify the engines for 180hrs of flying. Currently achieving an extension on that is viewed as unlikely.

Finally Dr Pleming explained how XH558 is being used as an educational tool to encourage young people's interest in engineering and the plans to continue that use in a customised centre once the aircraft can no longer fly.



*The Worshipful Company of Engineers, Liverymen and Guests, in front of XH588, Spirit of Great Britain.*

Dr Pleming's comprehensive presentation was very much appreciated by members and guests as were the clear answers to a number of questions.

Members then enjoyed a very plentiful, tasty and varied lunchtime spread, during which time there were also many interesting displays to view.

After lunch we had the privilege of an additional presentation from 'Taff' Stone who heads the aircraft maintenance team. Maintenance has now passed to him and his team of 6 who are deemed by the CAA to be competent to maintain the aircraft. He explained how with more flight hours the team had grown to know the aircraft and become confident that they knew exactly what was required. He also told us about the fuel leak which had prevented the aircraft displaying at Leuchars the previous week. The leak had been traced to one of the rubber bag fuel tanks which had been removed from the wing and sent back to the original supplier (who is thankfully still trading) for investigation. (Post script: unfortunately the tank proved 'beyond repair' and a new one has had to be

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ordered, ending flights for this year). Taff confirmed that they currently had 6 serviceable engines with run times of between 17 hours and 100 hours which, barring any mishaps, will last another two display seasons. He also told us that 13 known Vulcan Airframes survive in the UK, 3 in the US and one in Canada.

Members then had ample opportunity to walk around and under the aircraft to take photographs and ask questions.

A very informative and interesting visit to a British engineering icon which I am sure everyone present enjoyed as much as I did. Sincere thanks go to Robert, Taff, Toni and the rest of the Vulcan to the Sky team. Let's hope the loss of the final displays at the end of 2013 has the silver lining of giving enough engine life to squeeze in a third flying season going forward. I for one will be going to see XH558 fly again before it is too late.

*Roderick I Muttram*

## **VISIT TO NORTHERN IRELAND 26<sup>th</sup> to 29<sup>th</sup> September 2013**



### **Introduction by the Master**

We got to know Northern Ireland well after I retired from the RAF and became a Director for Bombardier Aerospace in Belfast. Recently, Margaret and I felt that progress in the Province thoroughly deserved a first time visit from The Company during my Master's year. Our OOTM13 was planned as a mixture of technical, cultural and social events in the capital city and to coincide with the 4th centenary of the London Livery plantation and UK Year of Culture events in Derry-Londonderry. Many people helped us put an innovative visit programme together and for the



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weekend itself we were grateful to Court Assistant Richard Groome and his wife, Janet, who produced the attendees photo-fits and ran some very successful fund raising for our own charity. We would not be telling an Irish Story if we said it was a pleasure to have so many of you enjoy the weekend with us and we were thrilled with the enchanted porcelain vase from Belleek Pottery in County Fermanagh presented to us as a memento of the occasion.

*Graham and Margaret Skinner*

## **Dinner in the Penthouse Suite of the Europa Hotel, Thursday 26<sup>th</sup> September**

An out of town weekend in Northern Ireland had to be something special. For those from Great Britain it has the intrigue of a land across the sea, while retaining the familiarity of the United Kingdom.

We had arrived by various means – by air from numerous points in Great Britain or even the Continent, or by sea – and converged on one of the finest hotels in Belfast, the Hastings Europa, our home for the next few days. Perhaps we felt a sense of place on reading the blue plaque informing that “Bill Clinton stayed here”, but a spectacular preview of the treats to come was afforded by the views from the gallery of the hotel’s Penthouse Suite, venue for our opening reception and dinner. Samson and Goliath – Harland and Wolff’s massive cranes, the City Hall – to be the venue for our livery dinner, and the Albert Memorial Clock – Belfast’s “leaning tower”, were laid out before our eyes. We were also able to look down on the famous Crown Liquor Saloon, the ornate Victorian pub and CAMRA Northern Ireland’s Pub of the Year 2013, owned by the National Trust.



*The Europa Hotel at Night*

The gallery was abuzz as we took the opportunity to renew acquaintances, and perhaps make new ones with

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the help of a photo directory provided by Richard and Janet Groome – many thanks to you both.



After a superb dinner of local pork followed by rhubarb crumble, Howard Hastings, (*left*) Managing Director of the Hastings Group and Chairman of the Northern Ireland Tourist Board welcomed us warmly to Belfast. In a lively and interesting talk he introduced us to the varied interests and tourist attractions in Northern Ireland.

With a population of 1.8 million, 28% of the population of the island of Ireland, Northern Ireland has 40,000 jobs in the growing tourist industry, which aims to reach a turnover of £1bn by 2020. Northern Ireland hosts conferences at the highest level including the G8 summit, and there are strong links with the City of London. Following our visit they will be hosting the Worshipful Company of Leathersellers.

The rich cultural heritage includes such names as Sir James Galway, the playwright Martin Lynch, the poet Seamus Heaney and C S Lewis. Derry-Londonderry is the UK City of Culture for 2013. Industrially, Northern Ireland is well known as the birth place of the Titanic, which is commemorated in Titanic Belfast. Natural gems include the North Antrim Coast with the 50 million years-old Giant’s Causeway. Both these sites were on our weekend itinerary.

The Master welcomed the Company to the out of town meeting, extending a special greeting to those attending for the first time, and expressing our good wishes to those unable to attend due to illness or for any other reason. The organization of the trip had involved a great deal of work, and the Master thanked Margaret, Tony Willenbruch, Steve Grundy (who alas was indisposed) and the local agent Robert for their support.

Finally the Company’s charitable events were introduced by Richard Groome. Raffle tickets would be sold for exciting prizes including a stay at the Waldorf in London, a return visit to the Europa in Belfast, a model Sunderland flying boat donated by the Master, seats at Lord’s, and various appropriate beverages. Richard announced silent auctions for a box at the Royal Albert Hall and for a week in Portugal.

At the end of a delightful evening we retired to contemplate the weekend ahead, and perhaps to speculate on who might be going to Portugal and who might be returning to the Europa!

*Edmund Morgan-Warren*

### **Visit to Bombardier and Guided Bus Tour, Friday 27<sup>th</sup> September**

For the ‘technical’ group, Friday involved a splendid visit to Bombardier Aerospace sandwiched between very interesting coach tours of Belfast.

The initial briefing at Northern Ireland Advanced Composites and Engineering Centre allowed us to learn about the history of Short Brothers leading to their place in Bombardier Aerospace today.

Half the Bombardier Company is Aerospace and it has a turn-over of £8bn and 36000 employees. There are 6000 employees in NI with 1100 engineers. Impressive was the commitment to R & D, to training the engineers and leaders of tomorrow and to outreach in the community. Even more impressive was the fact that Bombardier is developing one new aircraft type every year.



*C-Series Composite Wing Manufacturing Facility*

The tour through the new C-Series aircraft composite wing manufacture facility was awe-inspiring. The precision lay-up of carbon fibre weaves to form the 50ft wing surfaces, huge complex tools for initial compaction and epoxy impregnation in a giant autoclave, forming a fuel tight wing (eventually a wing set every 2 days) was a superb demonstration of advanced UK manufacturing. A successful first flight of the C-Series Aircraft took place on the 16<sup>th</sup> September. Everyone we met at Bombardier

Aerospace was rightly proud of this and the important part the new composite wing will play in the aircraft’s future success.



*Regional Aircraft Fuselage Manufacture*

The second factory tour was main production where we saw much aluminium part machining, fabrication and assembly of fuselages for a large range of biz-jet and commercial aircraft and specialised manufacturing typified by the ‘rappy tappers’ who made pipes in weird and wonderful shapes.

The tours round Belfast enabled us to appreciate the geography and history of the city and why it developed as it has. We covered all the sites including the City Hall, the linen mills, the clock tower which is one metre out of true (not made by Bombardier), HMS Caroline, a marvelous view of Stormont from half way up the drive and the sectarian enclaves of West Belfast. The latter brought a jolt to one’s senses, not withstanding the general positive view of the future that abounded our visit to NI.

The time at Bombardier and the tour of Belfast was a great start to the NI OOT, made special for me by the visit to the C Series wing manufacture facility.

*Mike Howse*

### **Cultural Tour of Belfast Friday 27<sup>th</sup> September**

After some of us ladies enjoyed a late breakfast having seen our partners off on their Engineering Tour, we boarded the coach for our tour of the sights of Belfast.

Arriving via the University, we visited the Ulster Museum located in the magnificent Botanic Gardens. The Museum has over 8,000 square metres of public display area and is the largest museum in Northern Ireland. A veritable treasure trove housing a rich



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collection of art, history and natural science provided much of interest for all. After an extensive refurbishment it reopened to the public in 2009 on its 80<sup>th</sup> anniversary.



*The Palm House in Belfast Botanic Gardens*

The Botanic Gardens with its magnificent Palm House have been enjoyed as a public park for over a century, a legacy from the Victorian city fathers. The Palm House shares the same builder as that at Kew – Richard Turner of Dublin. The cool wing houses a colorful collection of scented Geraniums, Fuchsias and Begonias. The Stove wing and Dome contain a range of temperate plants with an emphasis on species of economic value. Viewed from a balcony, the Tropical Ravine, built in 1889, features a Blue Plaque dedicated to Charles McKimm its creator who rose through the post of Head Gardener to become the General Superintendent of Parks in Belfast. The Ravine contains some of the oldest seed plants around today. Both the Palm House and the Ravine are used as sketching subjects by the University’s Art Students. Walking along the long herbaceous borders and amongst the extensive Rose Gardens helped prepare us for the coming lunch.



*One of the Exotic Plants in the Palm House*

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On departing the Botanic Gardens we stopped briefly outside the Friar’s Bush Cemetery. The site also contains the mass graves of hundreds of people who lost their lives during the cholera epidemic of the 1830s and the famine of the 1840s. They were buried under a mound, known as ‘Plaguey Hill’, located just inside the site’s main gates.

The remainder of the coach tour gave a first hand appreciation of the sectarian divide that still exists between the communities in Belfast. Driving along the Falls and Shankill Roads with its Peace Wall, where the gates still close each evening, provided a stark reminder of the remaining challenges of the ongoing peace process.



*The Titanic Building from the Old Slipway*

Our tour ended at the impressive Titanic Centre with its triple bowed design overlooking the famous Harland and Wolfe slipway from which the now legendary ill fated ship was launched.

*Helen Ferrie*

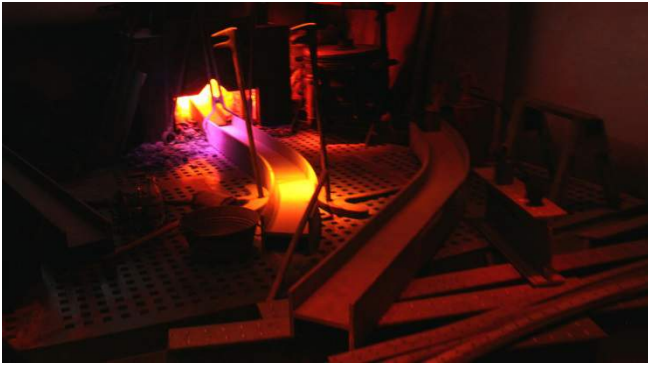
## **Titanic Centre Thursday 26<sup>th</sup> September**

On Friday afternoon we visited the stunning new visitor centre in the “Titanic Quarter”. Outside it are HMS Carlyle, which fought in the battle of Jutland, and the tender Nomadic, which was used to ferry passengers out to liners at Cherbourg. Our visit started with lunch in the Bridge Restaurant on the top floor, with a view out to the slipways where the Titanic and Olympic were built.

After lunch, we toured the museum at our own pace. It is packed with information, with more detail accessible by touch screen technology for those with specialist interests. Exhibits start with the history of Belfast, including its near quadrupling of population between 1851 and 1900, by which time the city was the linen capital of the world and over 65,000 people worked in the linen mills of Ireland. By 1907 Belfast was a boom

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town with over 6,000 people working in its docks. By 1912 15,000 people worked at Harland & Wolf.



*An Example of the Construction from the Gondola*



*Riveting was Very Unpleasant Work*

The story of the construction of the Titanic and its sister ships Olympic and Britannic is brought to life with a theme park style ride recreating the working environment of the shipyard by means of a very effective son et lumière display of various stages of construction. The White Star Line wanted luxury and elegance as it competed with Cunard for passengers. The Olympic and Titanic were ordered on 17<sup>th</sup> September 1908, after which it took two years to prepare the slipways.



The Titanic was one of ten ships launched by Harland & Wolf in 1911. It had 29 coal burners, three propellers, and a rudder 78 feet (23.7m) high which was delivered from Darlington Forge in six pieces which were later bolted together. The Titanic had ten decks, of which eight were for passengers, with an elaborate layout to keep the three classes of passenger separate and permit the crew access to all parts of the ship. After launch, there was ten months of fit-out by a team of 3,000 men. In photographs all the workers had cloth caps but their children were barefoot.

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The museum also showed the contrast between the luxury of first class cabins and the more cramped conditions with bunk beds in third class cabins.

*A Typical First Class Cabin below and Third Class Cabin on the left*



After sea trials in early April 1912, the Titanic set off from Southampton, picked up passengers at Cherbourg and Queenstown (Cork), and a few days later struck an iceberg and sank. The British Board of Inquiry set up in May 1912 made 24 recommendations, including spaces in lifeboats for all those on board a ship. Since then, no lives have been lost to icebergs in peacetime.

The museum also tells the history of Titanic's sister ships. The Britannic was a hospital ship in the First World War and struck a mine in the Mediterranean. The Olympic struck a rock near Cherbourg but survived to become part of Cunard when the latter merged with the White Star Line in the 1980s. Harland & Wolf built over 130 warships in World War Two but now only builds structures for renewable energy. The tour concludes with the discovery in 1985 of the Titanic on the sea bed in 4,000m of water and the marine organisms that live at such depths. Altogether it was a fascinating visit worth repeating and a "must see" for anyone visiting Belfast.

*Peter and Diana Blair-Fish*



## Livery Dinner in Belfast City Hall Friday 27<sup>th</sup> September



Belfast City Hall was the venue for our formal Out of Town Livery Dinner, a magnificent building opened in 1906 built following the awarding of City status by Queen Victoria in 1888. Cost overruns are not new – the £300,000 budget was exceeded by 60% for its construction and refurbishment, but which resulted in a truly spectacular civic centre.

*Entering the City Hall for the Reception and Dinner*



*First Floor Reception Under the Dome with Harara Marble Columns from Greece in the Background and Chipelino Marble Handrails from Italy*

We started the evening in the Rotunda (under a dome which boasted its own Whispering Gallery) with a drinks reception prior to what was programmed as an optional tour of the building. And this is where Tony Willenbruch showed off his true persona as a cross between our Gallant Clerk, Dr Who and the BBC Reader of the 5.00 am Shipping Forecast! After delivering the mandatory Health & Safety message (which was so lyrical that he could easily have slipped into “Cape Wrath to Rattray Head...”), he announced that between the hotel and the City Hall we had travelled through a time warp which had consumed our guides and ended the prospect of a guided tour (in fact the guides had got the time wrong and had left at 6.30 pm – before we arrived.) Not to be put off we were invited to explore the building ourselves or, as many of

us did, use the time for more conversation over further drinks. Throughout the time the Ireland String Quartet provided delightful background music including Titanic themed music.



*The Ireland String Quartet*



The formalities started with a welcome from Rt Hon The Lord Mayor of Belfast, Councillor Máirtín Ó Muilleoir. (Left) The Lord Mayor welcomed us in true Irish style - "C'ead Mile Failte" (A hundred thousand welcomes) - to The Worshipful Company of Engineers' CONFERENCE being held in Belfast. The Master hinted later to a little innocent subterfuge that had been necessary to secure our Reception and Dinner in City Hall. Unfortunately Councillor Ó Muilleoir had to leave for another function and was unable to join us for our formal dinner but not before The Master had presented him with a Company shield.

There was a familiar feel to the Banqueting Hall (also known as the Titanic Room), similar to a Livery Hall where we enjoyed an excellent meal comprising: Beetroot and Salmon, Grilled Asparagus with Shortbread, accompanied by a Babich Sauvignon Blanc; Rack of Lamb, Gratin Dauphinoise and Savoy Cabbage with Bacon and Carrots accompanied by a Marques de Mundaiz Rioja Crianza and finally Apple Pie with Caramel Custard and Honey Ice Cream with a Quinta de la Rosa Ruby Port. The reasons for describing the Menu *in detail* are two-fold. First to let those Liverymen who did not attend the Northern Ireland OOT Weekend know just what they had missed and secondly, to explain why The Master was

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moved to present our Chef for the evening with a highly prized WCE Livery Apron!

The dinner followed a normal livery pattern but the City toast was to The Lord Mayor, the City Council and Citizens of Belfast which was proposed by The Master before his speech during which he welcomed



all our guests including principal guest Mr Michael Ryan, (Left) VP & GM Bombardier Aerospace and Mrs Ryan Mr Kenneth Brundle, Chairman Bombardier Aerospace and Mrs Brundle. Lady Moyra Quigley, widow of Sir George Quigley the late Chairman of Bombardier Aerospace.

In thanking the Company on behalf of the guests, Michael

Ryan gave a succinct speech paralleling the remarkable success in the development of the City and of Bombardier both of which deserved to be held in high regard. He closed with the toast to the Worshipful Company of Engineers.

*Gill and David Scahill*



Assistant Barry Brooks was one to explore the City Hall and came across a unique display cabinet, commemorating the record of the only man from Northern Ireland to be awarded the Victoria Cross in World War 2, Leading Seaman James Magennis VC Royal Navy. (Left) Born in Belfast in 1919 he earned the Victoria Cross for his remarkable

courage as one of the crew of a mini-submarine planting limpet mines on ships of the Japanese Imperial Fleet in Singapore harbour in July 1945. The citation below describes his bravery:

*“The King has been graciously pleased to approve the award of the Victoria Cross for valour to Temporary Acting Leading Seaman James Joseph Magennis, D/KX144907. Leading Seaman Magennis served as diver in His Majesty's Midget Submarine XE3 for her*

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*attack on 31 July 1945 on a Japanese cruiser of the Atago class. Because XE3 was tightly jammed under the target the diver's hatch could not be fully opened, and Magennis had to squeeze himself through the narrow space available. He experienced great difficulty in placing the limpets on the bottom of the cruiser owing both to the foul state of the cruisers bottom and to the prominent slope upon which the limpets would not hold. Before a limpet could be placed therefore Magennis had thoroughly to scrape the area clean of barnacles, and in order to secure the limpets he had to tie them in pairs by a line passing under the cruisers keel. This was very tiring work for a diver, and he was moreover handicapped by a steady leakage of oxygen which was ascending in bubbles to the surface. A lesser man would have been content to place a few limpets and then to return to the craft. Magennis, however, persisted until he had placed his full outfit before returning to the craft in an exhausted condition. Shortly after withdrawing, Lt. Fraser endeavoured to jettison his limpet carriers, but one of these would not release itself and fall clear of the craft. Despite his exhaustion, his oxygen leak and the fact that there was every probability of his being sighted, Magennis at once volunteered to leave the craft and free the carrier rather than allow a less experienced diver to undertake the job. After seven minutes of nerve racking work he succeeded in releasing the mine carrier. Magennis displayed very great courage and devotion to duty and complete disregard for his own safety.”*

The Memorial to James Magennis was unveiled in 1999 after his death in 1986 and was attended by his brother, three sons, eight grandchildren and his wartime commanding officer, Lieutenant Commander Ian Fraser VC, DSC.

## Discovering Derry/Londonderry Saturday 28<sup>th</sup> September



It took about an hour and a half by coach from Belfast to Derry/Londonderry, the only walled city in the whole of Ireland. After a coffee break at the City Hotel and a short walk in the sunshine to the Guildhall, we were welcomed at a Civic Reception by the Mayor, Martin Reilly. (Left)





Looking around the Guildhall, which was built in 1890, the connection with the City of London was obvious by the many artifacts and crests about the rooms. Indeed I was surprised and delighted to find a picture of my old school, St Paul's, as it was in Hammersmith, in a stained glass window. The window depicted the work of the Worshipful Company of Mercers in pride of place on the stairs.

*One of the Mercers' Windows. This one depicts*

*the Royal Exchange.*

This strong connection with the City of London and the Livery Companies goes back to King James I, who wanted to stamp his authority once and for all on this most rebellious corner of his realm. He turned to the Livery Companies of London. In return for land grants, the City of London Livery Companies agreed to build a new settlement – Londonderry. Building work started in 1611 and the city walls were constructed in 1614. They built St Columb's Cathedral between 1628 and 1633. Livery Companies have a tradition of appointing apprenticeships and a group was formed in Londonderry, the forerunner of the Apprentice Boys today.



*The Peace Bridge*

The Mayor told us of the City's regeneration following the agreement known as the Peace Process. The central area and the City walls have been cleaned up, and barriers taken down. A Peace Bridge has been

constructed across the River Foyle to a large area of land on the opposite bank, which had been the largest army base in the UK, now handed back to the people. The City was granted the UK City of Culture for 2013, which had led to many visitors and an increase in prosperity for the city.



*Martin McCrossan Walking Backwards to Lead an Entertaining and Informative Tour*

The fine and sunny weather was just right for a walking tour of the City walls and St Columb's Cathedral with our guide Martin McCrossan. Martin enthusiastically explained the history of the City from the siege in 1689 when the City was caught up in the English civil war, through to the start of the more recent troubles with Bloody Sunday on the Bogside, and the welcome Peace Process. For many of us who remember listening to the news reports during the Troubles, Martin filled many gaps and the helped us slot events more clearly into place.



*St Columb's Cathedral*

## **The Swordsman**

After a splendid walk admiring the walls and St Colomb's Cathedral, we had lunch at Everglades Hotel. There we had a talk by Edward Montgomery



(left) of the Irish Society. Originally named "The Society of the Governor and Assistants, London, of the new Plantation in Ulster, within the Realm of Ireland". It was established in 1613 to regulate the involvement of the Livery Companies with the new plantation and to apportion land to the various Livery Companies. The Irish Society continues to support and promote Londonderry and the income from its holdings is used on charitable grants, maintenance of properties and administration.

The original name Derry is derived from the Gaelic language and means 'oak grove' or 'oak wood'. In many ways it is a beautiful place in a beautiful setting. We can only wish its people well in their quest for peace.

*Bill Bayly*

## **Londonderry to Belfast by Train Saturday 28<sup>th</sup> September**

Following our visit to Londonderry on a glorious Saturday morning, our return to Belfast was by a Class 3000 Diesel Multiple Unit (DMU) train.



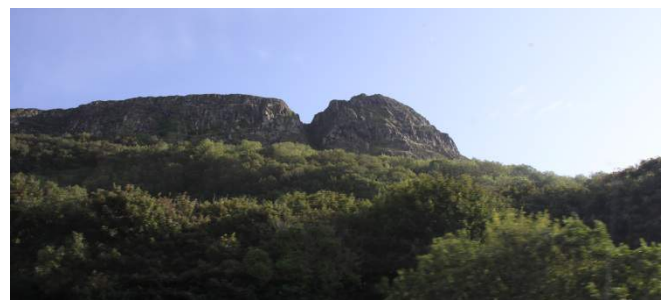
*Class 3000 Diesel Multiple Unit (DMU) train.*

The train service in Northern Ireland operates under the name of Translink and has received significant UK government funding during the last 15 years to modernise the railway infrastructure and trains. During

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this time, 43 new 3 car DMU's have been delivered from a Spanish manufacturer, CAF, to a track gauge of 5ft 3inches, some 6 inches wider than the UK and European railway standard gauge. Each car is powered by a 390kw MTU engine which meets the latest European exhaust emission standards, Each 3 car set has seating capacity for 212 people with a maximum speed of 90mph and is capable of accepting an additional fourth car should this become necessary to meet increased passenger usage.

Departure was at 15.33 and for the first part of the journey we tracked the coastline on the edge of Lough Foyle, alongside the reclaimed land where the Irish Society engineers designed sea walls to enclose sections of the eastern side of the Foyle estuary. With the sea water excluded, cultivation began on these richly fertile, level lands – some of the most fertile in Ireland. As well as creating polder lands (lying below sea level!), the newly established "dry" land offered a low cost route for the new railway connecting the cities of Belfast and Londonderry.



*A View Inland from the Train*

This route was introduced in 1855, being built in many places on reclaimed land and has been described by Michael Palin a one of the best railway journeys in the world.

Between Londonderry and Coleraine, via the smaller towns of Ballarena and Castlerock there were some fine views across the Lough to Donegal County, the northern most County of the Irish Republic.

We passed examples of deserted WW2 airfields which were critical strategic assets for the Allied effort. Without these operating bases on the very extremity of British territory, the Battle of the Atlantic may well have been lost and many, many more tonnes of shipping would have been destroyed by deadly German submarine patrols.

Nearby, we spotted the chemical dispatch quayside for the Maydown industrial zone which was the site of the first DuPont production facility in Europe. DuPont first invented Kevlar in 1965 and its Maydown



## The Swordsman

manufacturing facility is one of only three places in the world where Kevlar is produced. The coastal part of the rail journey took us passed the 7 mile beach at Downhill, with the famous Mussenden Temple perched above us when we entered one of 2 tunnels.



*A View Towards the Sea from the Train*

After passing by the Castlerock golf course, we travelled along the River Bann as it enters the sea via the Barmouth at Portstewart which is a nature and wildlife reserve offering an attractive habitat to migrant waterfowl, waders and nesting birds throughout the year.

For those of us in the carriage with Isobel Pollock, who spent her childhood in this part of Northern Island, we received an excellent commentary on the most scenic aspects. Ballymoney, her home town is perhaps well known to either camera enthusiasts as the manufacturing home of Periflex cameras.

Beyond Coleraine we turned inland passing through some of the most beautiful and undulating Drumlin countryside of County Antrim calling at a number of stations including Ballymena and Antrim itself before arriving into Belfast on time at 17.50.

*Tony Roche*

## Irish Themed Dinner, Grand Ballroom, Europa Hotel, Saturday 28<sup>th</sup> September



What better way to start an Irish themed evening than to follow the red carpet into the Grand Ballroom past a welcoming table resplendent with glasses of Irish Whiskey, Irish Stout and Liqueur Cocktails resembling that most famous other Irish Stout!

After enjoying the reception, the Company entered the inviting subdued ambience of a candlelit ballroom for

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dinner accompanied by the strains of an Irish Harp and Spanish Guitar. Once seated, our Storyteller invited us to ponder a riddle about a wee boy locked in a solid walled prison cell with only an apple and a knife to affect his escape – how did he do it? After several failed solutions from the audience, we were left to ponder over dinner! Another enjoyable and fulfilling dinner ensued with animated conversations creating a convivial atmosphere throughout the room.

Virtuoso performances from our instrumentalists –



both solo and duets – together with some surprising comedic songs from our Harpist entertained us after dinner. Typical barney from our Storyteller (*left*) - with audience participation - helped the evening along a pace as we were regaled with tales of murder, deceit, crafty tailoring and not to forget the true story of how a Causeway to

Scotland was built by an Irish Giant! We also got the answer to the pre dinner riddle – but it is too long and involved to recount here but I'm sure those present will recall it in all its glory and be happy to repeat it for anyone who would like to hear it!



*Graham and Margaret with their Belleek Vase*

The Raffle draw produced its fair share of amusement when winning tickets were generously redrawn – several times! The result of the Silent Auction was announced and £600 was raised for the Charitable Trust. The evening concluded with a well deserved vote of thanks and presentation of a porcelain vase from Belleek Pottery with a signed Menu Card to the Master and his Good Lady for organizing such a superb Out of Town Meeting.

*John Ferrie*

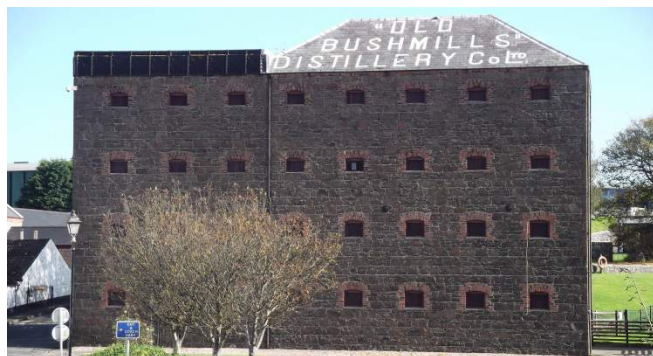
## **The Giants' Causeway and Bushmills' Distillery, Sunday 29<sup>th</sup> September**

The Sunday outing started with an extended guided coach journey, which followed the scenic coast road from Carrickfergus around the top Northern Island. A short stop gave us the opportunity to view the sculpture of the Flying Swans of Ballycastle, as well as a welcome coffee break. A little later, just before Ballintoy, another stop gave us the opportunity to view the rope bridge to the island of Carrick-a Rede. The guide informed us that the original fisherman's rope bridge had only one handrail, but when it was rebuilt in 2000 it included two hand rails. Unfortunately, we did not have time to cross the bridge, but given the wind on the headland, some of us were not that disappointed.



*The Rope Bridge to Carrick-a Rede*

Continuing the coach journey, we arrived at Bushmills, where we had an enthusiastic guided tour of the distillery. The Bushmills distillery undertakes the entire process from barley to bottle on the same site. We were told that in the making of Irish Whiskey the barley malt is not smoked when it is dried. Instead the colour and flavour comes from water and the mix of barrels used to mature the tripe distilled spirit. Bushmills use barrels in which Bourbon, Sherry and Port have previously been stored. At the end of the tour we were offered a generous sample of their 12 year old Whiskey.



*The Old Bushmills Distillery*



*On The Giants' Causeway*

Follow the tour of the distillery, the two coaches took us to the recently opened visitors centre at the Giants Causeway. This was undoubtedly the highlight of the Sunday tour and we spent most of the afternoon at the causeway, although this did include time for lunch. By the time we arrived at the Giants Causeway, the day had transformed from an overcast and windy morning into a beautiful sunny afternoon. Although, the causeway is some way from the visitor centre, a small bus was available to get down to Causeway. Nevertheless, for most, the good weather allowed a pleasant walk to the causeway and around the various paths in the area, to view some of the other rock formations such as "Organ" and the "Giant's Harp".



Over dinner, the previous night, we had heard one of folk lore stories of the giant Finn McCool who is mythically supposed to have created the causeway in a fight with the Scottish giant Benandonner. The audio guide, supplied by the visitors centre, included a number of other Finn McCool legends, including the information that the remarkable stacks (left), visible at the top of an adjacent headland, are the chimneys of Finn McCool's house. Following a very enjoyable visit to the Giants Causeway, the coaches took us back to two Belfast airports and the Europa Hotel.

*Dave Richards*



## LADIES LUNCHEON THE ROYAL AIRFORCE CLUB Wednesday 9<sup>th</sup> October

What a day – where to start...After coffee, we split into two groups and Mr Harry Irons (*Left*) spoke to us



about the fight to have a Bomber Command Memorial erected in this country, where to put it and raising the funds. Harry had been a rear gunner in WW2 and he and a group of friends started the project; with great determination they carried it through, with a little help along the way from the Queen, John Cauldwell and Lord

Ashcroft (two particular benefactors amongst others), Robin Gibb, London Transport (for the land) and a VAT refund from the government. They began with £200 and ended with raising the £6.5m necessary to unveil the memorial in 2012. They paid particular attention to detail over the bronze statues of the seven crew members, who form the centre of the memorial. Harry pointed out that the cocking stick was missing from the rear gunner's boot and it was duly added.



*Admiring the Memorial*

We could have listened to Harry all day but as always time was of the essence, so we 'crossed' the road to Green Park to look for ourselves. The memorial is truly amazing; the faces of the crew members show fear (requested by Harry and his friends), coupled with weary, grim determination. Harry's rear gunner's cocking stick was tucked down the boot of the rear gunner. The bronze statues are totally life-like and the

roof structure over the memorial is made from the structure of a Halifax bomber. A fitting memorial to the 55,573 aircrew lost.



*Helen Whitaker's Stained Glass Window*

## *The Swordsman*

When we arrived back at the RAF Club, we listened to a short talk by Wing Commander Mike Guildford, a trustee of the RAF Club Art Collection about the artwork in the Club, followed by a short guided walk. The majority of the paintings, which have been donated over the years, are of aircraft with only a very few portraits. There are also many Squadron crests which have been meticulously painted by the Royal College of Arms and a collection of busts, which includes those of Air Commodore Sir Frank Whittle and R J Mitchell. A beautiful stained glass window by Helen Whittaker graces the staircase; the design of which includes 'various themes that characterise both the history of the Royal Air Force and the RAF Club since their formation in 1918'.

One painting which really stood out was of the bombing raid on Peenemunde by Frank Wootton and then as we stood at the top of the stairs unable to see a painting being described, we thought that we had misheard: 'This is obviously a rhinoceros in the mating season'! When we were able to view the painting in question, yes there was a rhinoceros, but of course an aircraft as well. The artist was David Shepherd, who is also a trustee of the RAF Club Art Collection.



*Mike Guildford Showing One of The Pictures*

After our tour we went up to the ballroom for lunch, where the ceiling is painted with blue sky and clouds. The lunch was delicious and of course the conversation was of a high intellectual standard (well mostly!).

Over dessert The Master's Lady introduced the guest speaker, Viscount Trenchard of Wolfeton, Chairman of the RAF Benevolent Fund and presented him with a cheque on behalf of the ladies to the Fund. Viscount Trenchard spoke about his grandfather, the first Viscount Trenchard from joining the Royal Scots Fusiliers in 1893, spending seven years in India and the North-West Frontier, taking on the Fourth Hussars (and Winston Churchill) at polo and winning. He was badly wounded in South Africa, after which he attended the Royal Flying Corps' Central Flying

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School in 1912. In 1915 he was appointed General Officer Commanding the RFC in France and after the war became Chief of the Air Staff until his retirement in 1930. During that time he set about laying the foundations for the modern RAF, including an apprentices' scheme where the top three graduates went on to Cranwell as officers, quite radical for its time. The first Viscount Trenchard had founded the RAF Benevolent Fund in 1919.



*Margaret Skinner and Viscount Trenchard*

The current Viscount Trenchard ended by explaining the goals of the charitable trust. The vote of thanks was given by the Senior Warden's Lady, who thanked Viscount Trenchard for sharing his family history and for his enlightening and inspirational talk.

At the end of the lunch Mr Harry Irons thanked all the 'girls' for their company and said 'Goodbye'. We then left after a very enjoyable, informative day – some to their homes and others for a little retail therapy.....

*Gillian Gasper*

## **COMPANY NEWS** **July Court Meeting**

*Welcome to six New Liverymen Invested at the Court Meeting on 9th July 2013*

### **Eur Ing Richard Drabble BEng, CEng, FIMechE, CPEng (Aust), MASME**

After graduating from Newcastle University Richard joined the Steam Turbine division of GEC. On completion of his graduate training Richard worked overseas on veteran coal fired power plants.

After his return to the UK he spent time with consultant Ewbank Preece, before re-joining GEC



Alstom and the joys of turbine power plant commissioning during the dash for gas.

platform in Norway. Both are around 1 billion US\$ in value.



In the late 1990s Richard acted as a consultant to the Mexican equivalent of the old CEGB when they began to open up to the idea of the Combined Cycle Power Plant before joining Rolls-Royce to work on smaller Gas Turbines.

Currently Richard is Managing Director, Sentry Intercontinental Ltd, UK & President,

Grupo Sentry SA de CV, Mexico and is the commercial advisor to Rolls-Royce, Rolls Wood and several other quality Power Engineering companies, as well as providing in country operations, consulting and other services to them.

Richard is the Vice President and Treasurer of the British Society of Mexico, and a Director of the British Chamber of Commerce, along with taking an active interest in British-Mexican Charity and Educational Institutions

**Gardner Crawley BSc(Eng), CEng, FICE**

Following graduation Gardner worked as a site agent on civil engineering including 2 years secondment to Freeman Fox and Partners.



From 1975 to 1989 Gardner worked for John Howard and Company Ltd, subsequently taken over by Amec, as project manager on Thames Flood Prevention schemes and other heavy civil engineering projects and as marketing

manager for marine civil engineering.

Gardner is now a Director of Dal-Sterling Plc. providing commercial help and advice to owners and contractors engaged in major construction projects world wide. Currently projects he is directly involved with include a gas-fired combined cycle power plant in Netherlands and topsides for an offshore production

Gardner enjoys his volunteer job as Chairman of Rother Valley Railway Heritage Trust, a registered charity reconnecting the Kent and East Sussex Railway (K&ESR) to the national rail network at Robertsbridge. The Trust has repaired and rebuilt 5 bridges at Robertsbridge using new and restored 1904 decks from the site of Charles Dickens train crash on the Tonbridge Ashford line. The Institution of Civil Engineers recognized the excellence of this scheme with its Preservation Award in June 2013.

**Ian Kingham BSc(Mech Eng) MBA, CEng, FIMechE, FIET**



Ian's early career focused on Measurement Control and Automation in the water industry followed by a period in the Pharmaceutical sector. Seven years in South Africa led Ian to become a mining plant project manager. After returning to the UK Ian worked for seven years in the China Clay industry in Cornwall's. He moved to London in 1995 and

joined London Underground as an Electrical and mechanical Engineer.

**Patrick John Waterhouse BEng (Hons), MBA, CEng, FICE, FCIArb, FCMII**



Patrick graduated in civil engineering from The City University and then gained an MBA from Durham University Business School. Patrick started his career with Wimpey Construction working in design and site management on building and engineering projects. His early career included projects in building, highways, water treatment and offshore

installations. He moved into business development for Alstom Transport working on high speed rail

## ***The Swordsman***

projects in the Far East and then with telecommunications contractor Marconi.

Since 2002 Patrick has been a director of Bowdon Consulting, a construction contracts and dispute resolution consultancy. He is a construction adjudicator and accredited mediator, specialising in the resolution of disputes in construction and engineering and providing contract advice. In addition to this work he delivers training and consultancy services to public and private sector organisations. He is a keen advocate of training and is a reviewer for the ICE, examining candidates for chartered and incorporated engineer status.

Patrick is married with two children and enjoys landscape photography, the outdoors and good wine.

## **Eur Ing Robert Brown Gillespie OBE, BSc, MBA, CEng, FIMechE, Baron of Blackhall**



Bob took a B.Sc. Hons. in Mechanical Engineering at Sussex University, and after working for some years as a consultant with McKinsey & Co., sat an MBA at INSEAD in France. During his career, he has held operating management positions with the French Air Liquide industrial gases group, both in France, and in the United States, as Director of the Liquefied

Petroleum Gas Division and as Mid West Regional Manager in Chicago. Bob has managed two French plants of the Italo-German KME group, the largest non-ferrous metal semi-products manufacturer in Europe;

Bob has also been General Manager of European Operations of the American, Mueller Industries non-ferrous metals group, running three plants in the UK and France, both as Managing Director of Wednesbury Tube Ltd. in the United Kingdom, and as President and C.E.O. of Desnoyers S.A. in France.

Bob is a specialist in Six Sigma and Lean Manufacturing techniques and is the General Manager of the Lean Six Sigma institute, working from Paris in English, French and Italian. As a Lean Six Sigma Master Black Belt, he is a frequent speaker at conventions and a contributor of articles for web and press publications. He has trained and coached over 1,000 Lean Six Sigma Deployment Champions,

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Master Black Belts, Black Belts and Green Belts in Europe, the United States, the Middle East and in China to certificate level. He continues to assume personal leadership of complex continuous improvement projects, which he runs on behalf of his clients worldwide.

He is a past Committee Chairman of the French non-ferrous metals industry association, and Vice-Chairman of the British non-ferrous metals industry association. He is Chairman of the French branch of the British Institution of Mechanical Engineers. Bob is a previous chairman of the "British Luncheon 1916" in Paris, of the "British Community Committee," grouping 80 associations of British interest throughout France, and past board member of the "Thomas More Institute," think tank in France.

He became an Officer of the Order of the British Empire in 2005 for significant contribution to British industry in France, particularly in the engineering sector.

## **Lionel Anthony Edwards BSc (Hons), MBA, CEng, FRAES**



In 1962 Tony gained an engineering apprenticeship with Rolls-Royce Aero Engines and read Production Engineering at the University of Birmingham. From 1968 to 1989, he held senior managerial positions with General Electric (USA), Motorola and Canadair Aerospace Group of Bombardier. He joined

Lucas Industries plc in 1989 as Managing Director - Aerospace, subsequently becoming Group Managing Director. Whilst working in USA he completed an MBA with distinction at Harvard Business School, subsequently joining the faculty as a Lecturer on Production and Operations Management.

Tony became Chief Executive of Dowty Aerospace Group in 1992 and in 1994 was appointed Chairman and Chief Executive of Messier-Dowty International, the world leading aircraft landing gear joint venture into which TI Group and Snecma Group merged their respective landing gear businesses. Tony was subsequently Chairman of TI Group Aerospace and a Main Board Director of TI Group plc. The Aerospace Division held world leadership positions in propellers



## **The Swordsman**

and aircraft engine components and niche market leadership in hydraulics, actuation and aerostructures.

Tony is now a non-executive director of Beagle Technology Group following a period as Chairman of RTL Materials Limited, a privately owned UK company dedicated to the development and commercialisation of its patented Bi-stable Reeled Composite in oilfield services, military communications and industrial inspection.

Tony is President of the British Aviation Preservation Council and Vice President of the Guild of Aviation Artists. He is also Past President of the Society of British Aerospace Companies (SBAC), Past President of the Royal Aeronautical Society, former Chairman of The Air League and recently was awarded The Air League Gold Medal for services to the cause of aviation.

His recreations include farming, classic car restoration and historic aircraft preservation.

## **MEMBERS' NEWS**

We are very sorry to report the deaths of Peter Grey in June, Past Master John Grove in July, Professor Peter Lines also in July and Professor Martin Leakey in September. All were long standing members and good supporters of the Company and an obituary of John Grove is given below.

### **Rear Admiral John Grove CB, OBE**

The Master represented the Company with Peter and Cynthia Hammersley at the funeral of Past Master Rear Admiral John Grove CB, OBE who died on 29 September after a long illness. John's wife Betty died in March 2013. John's son Peter and Peter Hammersley each gave an Address.

John was brought up in Scotland and was always proud of it. He failed to get into the Navy in 1945, because of his eyesight, so he went to St Andrew's University where he gained a First Class Honours Degree in Engineering and went on to do his national service with the Royal Engineers becoming a Lecturer at Sandhurst.

Later he was able to transfer to the Instructor branch of the RN and then to the Electrical Branch.

He joined submarines in 1953 and in 1958, he and I were appointed to Dreadnought, the Navy's first nuclear submarine, for building and trials. This was a turning point in both of our lives. We qualified with

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the United States Navy as nuclear watchkeepers before going to Barrow-in-Furness, where Dreadnought was being built. We operated the machinery through the test programme for Vickers and Rolls Royce and, eventually, took the boat to sea in 1963. John left in 1964 after 6 months at sea and was awarded the OBE.



His career went from strength to strength. He set up the Central Plant Control Authority to monitor nuclear safety and served in various other demanding jobs in the rapidly expanding nuclear submarine programme ending up as the Chief Strategic Systems Officer responsible for all aspects of the

nuclear deterrent and as the Chief Naval Engineer Officer advising the Admiralty Board on all Engineering personnel and hardware. He retired from the Navy in 1985 and was awarded the CB. He became a Director of Devonport Royal Dockyard Management and a Consultant to British Maritime Technology.

John became a Liveryman of the Company in 1984 and was the Master from 1994 to 1995 when there was a slow decline in the numbers of Liverymen. He set up the Membership Committee and the positive action taken during his year helped to ensure the long term stability of the Company.

John and I saw a lot of each other, professionally and socially, from the beginning of our Dreadnought time onwards. I greatly valued his friendship and we were both proud to be Liverymen of the Company. John remained an Assistant Emeritus until his death but, tragically, his long illness prevented his involvement during recent years.

*Peter Hammersley*

### **Golden Wedding Anniversary**

Many congratulations to Past Master Sir Frederick Crawford CBE, FREng and his wife Beatrice who celebrated 50 years of their Entente Cordial on Trafalgar Day, 21<sup>st</sup> October 2013 with a party in Waterloo Place.

## Honorary Doctorate



Congratulations to Court Assistant professor Ric Parker CBE, FREng who has been awarded an Honorary Doctorate by Nanyang Technology University of Singapore for his contribution to the growth of Rolls Royce research activities in Singapore and for fostering links with technical institutes and universities particularly with Nanyang.

## President IET



Congratulations to Court Assistant Commodore Barry Brooks who took office as President of the Institution of Engineering and Technology in October.

Barry Brooks read Electrical Engineering at Imperial

College, sponsored by the Royal Navy, with whom he had a successful and varied career as a submarine electrical and nuclear propulsion engineer.

## A Message from the New Lord Mayor Alderman Fiona Woolf CBE

I am honoured to be promoting the City of London this year as the 686th Lord Mayor (and only the second woman since 1189). I have been overwhelmed by the support I have received from the Livery and am looking forward to seeing you all in the coming year.

I shall be continuing with the theme of The City in Society but my focus will be on “The Energy to Transform Lives”, which reflects my long association with the City as an energy lawyer specialising in global electricity industry reforms to bring cheaper and cleaner energy to more people. The title refers to my conviction that the City of London has the energy and talent for innovation necessary to serve the needs of society and the environment at a time that I call the “new normal”. All of my mayoral programmes are based on three themes which I feel are critical to our resource-constrained society: sustainability, diversity and charity. If I have a single objective, it would be inclusiveness and Liverymen have so much to bring to the party.

“Tomorrow’s City” is a programme of events and dialogue which focuses on how the City can best ensure its future success as a “city of cities” and a “city for cities” by enabling long-term value creation for an increasing urban population that is conscious of the environment more than ever before. Through a series of evening and breakfast events, Tomorrow’s City focuses on a number of topics including regulation for the long term, infrastructure and energy, integrated reporting of financial, social and environmental outcomes, sustainable urban development, taxation and the attraction of investment in the UK.

We have abolished the “shut down and start up from scratch approach” to the Lord Mayor’s Appeal by the creation of a permanent charity to provide a long-running platform for the Appeal. This will enable us to accept contributions in cash and in kind over more than one year and to promote giving to a wider audience. It also enables us to support smaller charities, particularly those that punch above the weight that their size might imply in terms of their impact and outcomes, and that is exactly my plan! This year the Appeal 2014 is supporting four community-based charities that all have “the energy to transform lives”.