

The Worshipful Company of Engineers

(Incorporated by Royal Charter 2004)

The Swordsman Newsletter

Issue 27, November 2011



CONTENTS

Editorial	2
Warden’s Lecture, 15th June 2011	3
Visit to the Royal Shakespeare Company at Stratford on Avon, 1st July 2011	10
Awards Dinner, 12th July 2011	11
Mentoring an Arkwright Scholar	19
Golf Championship, 26th July 2011	20
Visit to Hughenden Manor	21
Ladies Luncheon, 5th October 2011	22
Visit to DCME, HMS Sultan, 5th October 2011	23
The Master’s Musings	25
Out of Town Visit to Edinburgh, 22nd to 25th September 2011	27
Annual mansion House Banquet, 28th October 2011	37
Mansion House Lectures	43
Company News	45
Member’s News	47

COVER PHOTOGRAPHS

Top Left	Flags flying proudly outside Stirling Castle
Top Centre	The Master John Banyard OBE FREng and Mrs Judith Banyard
Top Right	The Falkirk Wheel
Top Full Width	The Master, Wardens, Lord Mayor and the Principal Guest with their Ladies at the Annual Banquet.
Centre Full Width	View from Edinburgh Castle of the Princes Street deserted Tram Construction Site
Bottom Full Width	The Master hosted 16 Past Masters at a Dinner in Wax Chandlers’ Hall in November

FUTURE EVENTS

14th December 2011	Carol Service and Dinner	Tower of London
8th February 2012	Bridge Lecture	City University
6th March 2012	Election Court and Dinner	Wax Chandlers’ Hall
23rd March 2012	United Guilds’ Service	St Paul’s Cathedral
24th April 2012	Installation Court, Common Hall and Dinner	Vintners’ Hall
13th June 2012	Wardens’ Lecture and Luncheon	
25th June 2012	Election of Sheriffs	Guildhall
10th July 2012	Court Meeting and Awards Dinner	Carpenters’ Hall
24th July 2012	Golf Day	Beaconsfield GC
20th-23rd September 2012	Out Of Town Meeting	Basel

EDITORIAL

The last six months have been a busy time for the Master and for the Company as you will see from the reports in the following pages. This period also marks the completion of Liveryman and Court Assistant Alderman Michael Bear’s year in office as Lord Mayor. Michael is the third Lord Mayor from the Engineers’ Company in its 28 years of existence, a formidable achievement. In the report of the Mansion House Banquet you will be able to read of some of the work that Michael has been doing during his year. The report on the Mansion House Lectures highlights one of the initiatives of his year in demonstrating the importance of Engineering design and construction to the infrastructure of the City and the United Kingdom to help maintain the Country’s position as a World leader. Engineering excellence is shown in the Warden’s lecture and the reports of our technical visits and our Awards encourage the bright young engineers and servicemen and women in their careers.

Again I thank the willing reporters of the Company’s Events and I hope that you enjoy reading this edition. If I have not asked you to report yet and you would like to contribute please do let me know. Letters and original articles from Liverymen are always welcome and I apologise I did not have space for all contributions.

Raymond Cousins
Cyril.blumfield@btinternet.com

THE WARDENS LECTURE BP HEADQUARTERS 15th June 2011



Senior Warden David Scahill welcomed many members of the Company, and their guests, to BP's international headquarters in St James's Square. Together with a number of BP staff, they had gathered to listen to the Company's Warden's lecture to be given by the Junior Warden John Baxter.

John's lecture on oil exploration, which follows below, started with onshore drilling in the 1850's in America, moving offshore to the Gulf of Mexico some 100 years later (albeit in only 5m of water!) and finally into current deep water drilling and production at depths of up to 3000 m. His lecture gave a fascinating insight into the scale of current drilling and production equipment as well as the associated infrastructure. He also highlighted some offshore engineering technical challenges and talked about the scale of the tragic Deepwater Horizon accident and some of its consequences. His key message was that, for BP, safety is the measure of successful operations.

I have summarized the lively discussion which followed the lecture as a postscript and at the end of the discussion David Scahill thanked BP for their hospitality and proposed a vote of thanks to John Baxter, complimenting him on an amazing lecture and the audience on an amazing series of questions.

Simon Waldram

Engineering and Technology Challenges in the Oil and Gas Business- Past, Present and Future

**John Baxter, Junior Warden
Group Head of Engineering, BP**

It was a great pleasure to host the 2011 Junior Warden's Lecture at the BP headquarters in London. The lecture provided an over view of deepwater oil

and gas exploration and some background to the tragic loss of the Deepwater Horizon and the subsequent release of oil and gas to the Gulf of Mexico waters. This paper covers the outline of that lecture. I have also taken the liberty of adding a section on Castrol lubricants, where a small group of Liverymen visited our technology centre earlier in the year (*see Swordsman 26*) and an example of early Scottish influence on hydrocarbon technology. Each of these areas has been presented as a 'technology snapshot' to illustrate the key role engineers play in developing and delivering energy products to society. I hope Livery colleagues enjoy these stories of past, present and future engineering and technology challenges in BP and the energy sector.

INTRODUCTION



To help address the energy challenges facing our planet today, BP has grown a vast engineering and technology portfolio. A large energy company like BP is remarkable for the sheer diversity of activities it embraces. It not only searches for hydrocarbons across the globe, but it produces them in

often extremely hostile environments. It then transports, refines and markets them as a range of manufactured products - everything from fuels to lubricants and chemicals. Also, BP is a major player in the field of alternative energies and one of the largest independent energy traders in the world.

TECHNOLOGY SNAPSHOT: JAMES YOUNG

The first story begins in 1847 when a Scottish industrial chemist by the name of James Young collected samples of a natural petroleum seepage from a colliery in Derbyshire. When he distilled the liquid, he obtained two useful products: a light oil suitable for burning in lamps and a heavier residue for lubricating machinery.

He then had the idea that by applying a low level of heat to coal and oil shale, he could extract more fluid. Young went on to set up the first commercial oil works in the world in 1851 in West Lothian, near Edinburgh. Using oil extracted from locally mined

shale and bituminous coal, the company manufactured naphtha and lubricating oils. Five years later they started selling paraffin as a fuel.

‘Paraffin’ Young as he became known, took out the first US and UK patents for the production of paraffin from the distillation of coal. By 1900 the business had grown substantially and their products were exported all over the world. Some four thousand people were employed in the extraction of two million tons of shale annually. You can still see the spoil tips today.

Incidentally, after he retired from the company in 1870, Young went back to his first passion - science and engineering - and worked on a means of determining the speed of light. Much of the money he made from his business he gave to finance David Livingstone’s African expeditions, quite possibly the oil industry’s first foray into corporate giving.

Young’s company was subsequently acquired by BP and it would seem that his work represents the earliest example of oil industry technology to which BP can lay claim.

TECHNOLOGY SNAPSHOT: RETHINKING EXPLORATION

Many industry observers consider exploration to be the jewel in BP’s crown. Indeed, the very existence of the company stems from exploration success. In 1908, Anglo-Persian struck oil 200km north of Abadan on the Gulf Coast, and so began the development of Middle Eastern oil - arguably the most important resource base of the twentieth century (and maybe the twenty-first).

Remarkably, BP’s first discovery in Persia was a giant field, and finding giant fields was to become a defining feature of the company throughout the century. In this regard, BP enjoys an unrivalled track record amongst its peers for having participated in the discovery of ten of the largest fields ever found.

The period of our exploration history described in this technology ‘snapshot’ occurred in the 1980s and 1990s. While the 1970s had yielded massive discoveries in frontier areas such as Alaska and the North Sea, the 1980s were much less prolific. The focus in the 1980s was on keeping the large production infrastructures (particularly the pipeline systems in Alaska and the North Sea) full by developing local, and inevitably smaller, reservoirs. ‘Elephant’ hunting - that is searching for giant oil fields in frontier areas, traditionally the company’s greatest skill - was no longer a priority.

However, the 1980s was also a time when a lot of new and exciting geosciences research was taking place. This was recognized by BP and fundamentally refreshed our view on structural studies relating to the formation of reservoirs.

In 1989 two important steps were taken. Firstly, the exploration function within BP was reorganized - in particular barriers between teams were swept away. By this time it was clear that more could be achieved by focusing on the ‘joins between the disciplines’ than in the disciplines themselves. Integrated teams made up of engineers and geoscientists were moved out of the central research team and into the businesses who were leading the exploration activities. Secondly, a major refocusing of the exploration strategy took place. BP would again focus on what had traditionally been a core skill, finding giant oil fields in frontier areas. A global study of new basins around the world led to 10 being targeted, half of which were in deep water. This was a bold step for BP as at that time it was not universally acknowledged that giant fields existed in deep water.

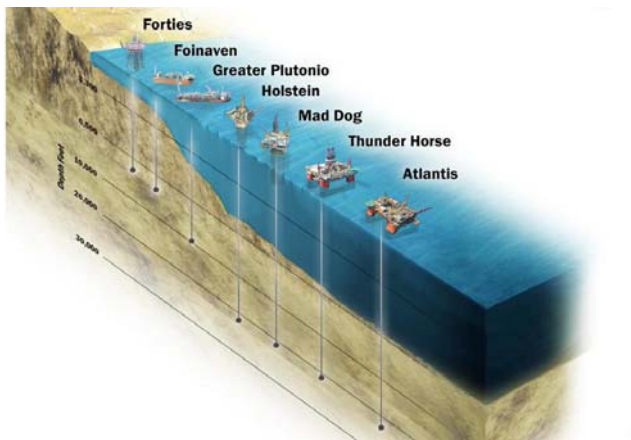


Thunder Horse Platform

But it paid off. Within 10 years, BP had a string of exploration successes in several of these frontier basins in places such as the Gulf of Mexico, Angola, Egypt, Russia and Azerbaijan. These successes were enabled by advances in seismic technology but the strategic shift occurred many years earlier based on that geosciences research. In parallel the development of the floating facilities and subsea engineering systems provided the means of producing the oil and gas from these frontier basins. Examples include the Thunder Horse and Atlantis platforms in the Gulf of Mexico moored in 5000 feet of water. As the largest deepwater production facilities in the world they handle up to 250 and 200 thousand barrels per day respectively, plus the associated gas. The engineering systems on the seabed present new challenges where every activity is managed remotely.

This technology snapshot takes us back to the early 1970s and is about oil field development. By development in this context, we mean the engineering needed to bring an oil field on stream.

In October 1970, BP discovered the Forties field 170 kilometres east of Aberdeen. Forties was certainly a giant (2.5 billion barrels recoverable oil) making it the largest and most profitable field in the UK sector. However, from an engineering perspective, what made Forties challenging was not so much its size, but the location - the fact that the field was in a water depth of 125m and in one of the most hostile marine environments in the world.



Exploration Journey to Deep Water

The sea conditions were hostile by any measure - the 100 year maximum-design wave height exceeded 28m. Persistent bad weather throughout most of the year meant that fatigue damage to the steel structures became an over-riding design consideration, and the summer season for offshore construction was only 3 to 4 months long - a fraction of what the industry was accustomed to in areas such as the Gulf of Mexico.

It is worth reflecting on the nature of the design challenge in a 'frontier' area like this where there are no precedents. There is usually very little available data characterizing the natural environment - e.g. weather, currents and soils. There are often no design rules and so these need to be created from first principles and, back in 1970, computing power was limited. Indeed, much of the stress analysis of both the node configuration on the jackets and the pipeline installation was conducted using physical models.

The field was developed using four massive steel jackets, built in a specially constructed fabrication yard

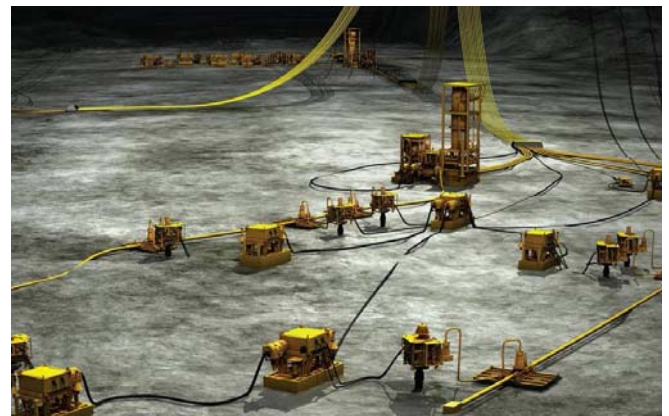
in Scotland. Everything about Forties was on a giant scale, often exceeding current industry practice at the time by a factor of 2-3 times in terms of weight and diameter. The export pipeline back to the beach also broke all industry records in terms of water depth and size. It was the first offshore pipeline to be constructed using fully automatic welding and the first to be designed to resist propagating buckles.

There are many other industry 'firsts' associated with Forties but, for the purposes of this paper we wanted to convey that in developing Forties in the early 1970s BP was undertaking an industry-first project on a huge engineering scale. To this day, the pace of this project remains a benchmark for a 'basin opening' development.



The Scale of Deep Water Facilities

Being an early developer of oil fields in frontier areas is very much a core BP skill. It happened back in 1911 when BP built the first pipeline in Persia to carry oil from the discovery at Masjid-i-Suleiman to the new refinery in Abadan. It happened again in the North Sea with Forties and then in Alaska, and it is still happening today in places like Azerbaijan and in the deep-water Gulf of Mexico.



Sub Sea Architecture

TECHNOLOGY SNAPSHOT: DEEPWATER HORIZON INCIDENT

The snapshot is on the Deepwater Horizon drilling rig and the tragic accident that occurred in April 2010, and touches on the technology developed at a rapid pace in response to this incident.



The Deepwater Horizon rig

In September 2009, the Deepwater Horizon rig had drilled the deepest well in the history of the industry at the BP Tiber field in the Gulf of Mexico. That well was 35,000 feet (or nearly seven miles) below the earth's surface. The Deepwater Horizon had also drilled wells at the BP Atlantis and Thunder Horse fields in the Gulf of Mexico.

In April 2010 the Deepwater Horizon was drilling at the Macondo prospect 50 miles off the coast of Louisiana when a blowout took place. Hydrocarbons escaped from the well resulting in explosions and a fire that burned for two days until the rig sank. 126 people were on board and, tragically, 11 men lost their lives and others were injured. Hydrocarbons continued to flow from the well for 87 days, resulting in a major oil spill. BP deeply regrets this tragic event.



Burning Off Hydrocarbons

Several investigations have been conducted, some of which have already published reports. These include BP's own investigation, in which external experts participated, the report of the Presidential Commission and a specific report for the US government Joint Investigation Team on the blow out preventer (BOP). Both the Presidential Commission and BP's own internal investigation concluded that the accident was the result of multiple causes, involving multiple parties.

Several factors stand out in the findings of these reports, including:

- The cement at the bottom of the well did not seal off the hydrocarbons in the formation.
- The negative pressure test carried out to check that the well was sealed was misinterpreted.
- The BOP did not seal the well at the seabed - it is clear that the blind shear rams failed to close.

BP's own investigation made 26 recommendations covering issues including BOPs, pressure tests and cement testing. Furthermore, the Presidential Commission made wide ranging recommendations for government and industry on areas ranging from risk management to planning for oil spill responses. BP is now systematically implementing the recommendations from the internal report across the company.

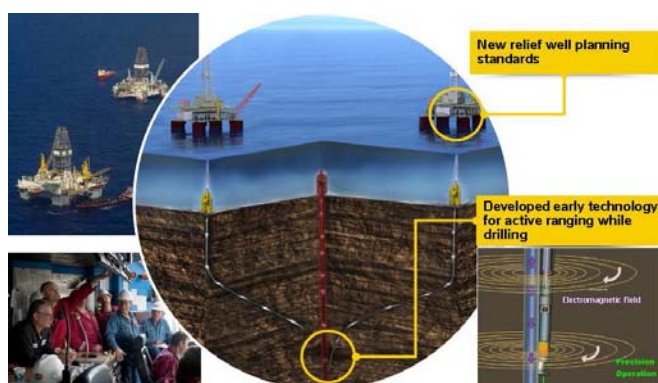


Control by Booming

While the event left BP and everyone else involved in a state of shock and grief, the imperative was to respond - to seal the well, to tackle the oil spill and to help those who were affected. This meant that together with the US state and federal government departments and agencies and industry partners and contractors, BP mounted a major crisis response. At its peak it involved around 48,000 people, 6,500 vessels and 125 aircraft. That phase is now over but BP is still very much in action in the Gulf, meeting legitimate claims and fulfilling our commitments to the Gulf Coast communities.

The Swordsman

In terms of engineering and technology, the effort to stop the flow of oil meant working fast to enhance existing technologies and develop new ones. Never before had anyone experienced a blown-out well at a depth of more than 5,000 feet and over \$200 million was spent on technology development by BP alone during the response. BP deployed a range of technologies with increasing success. Within 12 days of the accident, BP had begun work on drilling a relief well that would permanently stop the leak, and a back-up relief well was started two weeks later. BP employed multiple technologies to contain the leak, collecting oil in open water, using containment systems that piped oil to vessels on the surface, and ultimately sealing the well by fitting a capping stack on top of it. These technologies were developed at extraordinary speed - the containment systems, for example, were created in three months when the norm would have been around two years.



Relief Well Technology

BP has learned a tremendous amount from these experiences and the findings of the various investigations. We have committed sharing the lessons we have learned and have so far shared the lessons with industry and regulators in 20 countries. We have organized the lessons into five areas: prevention, containment, relief wells, spill response and crisis management.

In terms of prevention, for example, we have been systematically reviewing risk management plans for every one of BP's wells and enhancing our practices in areas such as cementing and well integrity testing.

Aside from the practical and engineering lessons, BP is responding to the events of last year in ways that will embed change within all of our businesses, worldwide. We have formed a powerful, new safety and operational risk organization. This organization has the resources and the mandate to drive safe, compliant and reliable operations. This includes the ability to intervene in BP's operations anywhere in the world to

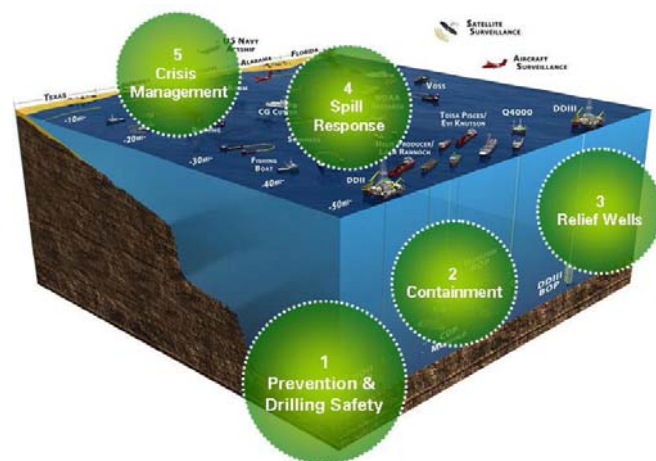
Issue 27

bring about corrective action and we are already seeing results. We have collaborated with various businesses to halt operations where legitimate concerns have been raised and we have been involved in decisions to turn away or require modifications to drilling rigs where they would not conform to our new requirements. The new organization has over 500 safety and risk specialists who work alongside our operational managers.

BP has also made changes in structure, introducing three divisions in the upstream: exploration, developments and production. This creates greater clarity and accountability as well as bringing specialists together into teams where they can build their capability. All of BP's wells are now drilled by a single Global Wells Organization to drive standardization of process and consistency of implementation to drilling worldwide.

In taking these initiatives we are drawing on lessons from other industries where safety and risk management have been developed to a world class level. One of these is the US nuclear navy, which was identified by the Presidential Commission on the Deepwater Horizon accident as a leader in safety.

Strengthening safety and earning trust are the foundations on which BP will build a new value proposition, designed to create value for the long term, in a manner that is safe and sustainable.



Lessons Learned

TECHNOLOGY SNAPSHOT: LUBRICANTS

And now for something completely different - during the first decade of the last century, it was not just the supply of fuel that failed to keep pace with a rapidly expanding automobile market - the same thing was happening with lubricants.

The Swordsman

In 1899 a young entrepreneur named Charles Wakefield started a company in London manufacturing and selling lubricants. The oil he used was imported from America and blended at a plant in Liverpool. The principle market for his product was steam locomotives.

His business grew rapidly and then in 1906 he went on to market his first motor oil. One of his early customers was a London bus company. In those days, not just cars, but aircraft too, were regarded as toys for the wealthy. In 1909 Louis Bleriot became the first man to fly across the English Channel, in the process winning the one thousand pound prize put up by the Daily Mail. The huge amount of publicity and excitement generated by that historic flight made a great impression on Charles Wakefield.

That same year (1909), Wakefield's research chemists discovered a means of blending castor oil - a vegetable oil obtained from beans - with the finest quality mineral oil. The result was a compound oil with much improved lubricating properties over an extended temperature range. The castor oil no longer oxidised at elevated temperatures and the blend remained fluid at temperatures as low as -32°C.

What followed was a wonderful marriage of technology and marketing. In 1909 Wakefield launched a series of lubricating oils under the brand name of 'Castrol' (which is now one of BP's flagship brands), and it was no coincidence that at Britain's very first flying meeting, also held in 1909, every event was won by aviators using Castrol.

From the very start, Castrol lubricants were marketed by linking them to record breaking and racing - a concept that Castrol brilliantly exploited over the next century when their product would feature in just about every land-, water- and air-speed record attempt. Bluebird electric maintains this tradition using Castrol lubricants.

WHAT DOES THIS TEACH US?

The history of the energy industry is fascinating, and it is very important to contemplate what this can teach us about the future.

Operating at frontiers is really about operating without analogues. It is about being an applier of engineering and technology in the field and about not being afraid to go first. It is about having a deep understanding of the natural environment and the hazards it contains. It demands that we learn from 'doing' and share that know-how across the company. It requires substantial

Issue 27

in-house and external resources, both expertise and money, to handle the scale and complexity of these challenges. Also, it is worth emphasizing that throughout this period and despite the extremes in which we operate, engineers have continuously improved the safety and environmental footprint of our industry and, when incidents have occurred, they have been at the forefront of the response effort and subsequent application of lessons learnt.

Over the last 100 years of BP's history, this frontier risk has taken many forms, all the way from the industry's first exploration programme in the Middle East in 1908, to 2008 in the Gulf of Mexico where BP brought the Thunder Horse oilfield on stream (which, by some margin, was the most technologically-advanced offshore project ever undertaken by the industry), to 2010 and the Deepwater Horizon incident. The big leaps in engineering and technology, either in pursuit of a business opportunity or to respond to an incident, have been made possible by teams of great engineers and scientists, both inside and outside BP.

FUTURE TRENDS FOR ENERGY TECHNOLOGY

Notwithstanding recessions from time to time it is reasonable to expect that the global demand for energy will continue to grow, driven in particular by developing countries. Energy consumers throughout the world want secure and affordable energy which does not damage the environment. Their actions and those of their governments are driving a more sustainable energy landscape, enabled by new technology.

The transition to a sustainable energy system is being driven by political forces and this will take a long time. That is the nature of our industry as the investments required are huge, at around \$1 trillion per annum.

CONCLUSION

In summary, BP is a part of a hugely diverse industry which today embraces everything from geosciences to plastic and other manmade products used everyday. While the industry has made a number of technological breakthroughs, its real strength lies in the ability to identify, integrate and apply engineering capability from a variety of sources to deliver energy products to our customers.

If our technology heritage demonstrates one thing, it is that while BP may be universally known as an oil company, one of its core values is innovation. It

always has been and always will be. BP pushes the technical boundaries today and creates tomorrow's breakthroughs through our engineers and technologists. This requires a broad innovation ecosystem from the most advanced research institutions globally to the engineers in BP who apply that scientific knowledge to practical problems.



Safety and Risk Management at the Heart of BP

Discussion

Q Who is responsible for decommissioning particularly after interests are sold on to a new owner?

A There are government requirements to build up a decommissioning fund over an extended period of time during normal operations and other requirements on transfer of any oil lease.

Q How is directional drilling achieved?

A Bore holes can have amazing configurations. At Wytch farm the well goes down some 520m and then extends horizontally for several miles. BP characterisation of reservoirs is amongst the best in world so we do know exactly where we want to drill. Even so, seismic analysis and drilling is a mix of art and science. Drilling is normally contracted to specialist drilling companies.

Q Is subsea separation possible so as to avoid the need for 2 phase pumping and flow?

A Ideally we would like to pump single phase fluids, maybe so we can separate and re-inject the water or gas or produce LNG. As yet, subsea separation is not possible.

Q You are drilling in ever more difficult locations. Is it also attractive to work in easier fields but to extract more hydrocarbons by other means such as "fracking" or Enhanced Oil Recovery (EOR)?

A For "tight" gas reservoirs very high pressure water can be injected to fracture the rock and release the gas. EOR is possible using gas re-injection and this

is a potentially attractive use of CO₂. Processing other types of reserves (e.g. oil shales) is only viable if the price of crude exceeds a threshold level

Q Can better Blow Out Preventers be designed?

A Many will be familiar with the "Swiss cheese" model of safety barriers and their efficacy. The blow out preventer is only one such safety barrier. In the Deepwater Horizon incident a series of safety barriers – 8 in total - were all compromised. The Bly report makes recommendations about BOPs and following it several industry-wide task forces have been established.

Q Will ready availability of "top hats" to cap subsea blowouts become compulsory?

A There are new requirements to have specific safety equipment available in prescribed geographical areas of operation. BP has made design details of their top hat and capping stack available within the oil and gas industries. But top hats may not be the answer: recall that hydrate formation within the top hat was a problem in the Deepwater Horizon incident.

Q What types of Quantitative Risk Assessment (QRA) does BP use?

A QRA is used by BP, as well as many other Hazard Identification methods including Hazard and Operability studies. QRA will usually be performed using specialist software packages.

Q In the engineering safety field what methods does BP use for cost benefit analysis?

A Much of BP's business is in areas that are heavily regulated: our objective is always to comply with the requirements of all such regulations. Several software based approaches to cost benefit analysis are used. These will help define details of likelihood and consequences (i.e. risk), and the costs for preventative measures, consequences and their potential mitigation.

Q What is the likely future role of Canadian tar sands in the energy industry?

A These reserves are huge but processing is energy intensive and therefore costly. Processing may also have a significant potential environmental impact. BP has licences for parts of the Canadian tar sand reserves. As with all such reserves you have to decide at what point you decide to access them and this has not yet been reached. Tar sand reserves are unlikely to be exploited if the crude oil market price is less than about \$60 per barrel.

Q How do you calculate the fatigue life of major items like rigs, platforms and pipelines: is extensive instrumentation required?

A Instrumentation is widely used but is not possible in all locations. Therefore routine replacement at fixed intervals, e.g. of risers, may be specified. Also testing of sample coupons for fatigue and corrosion is very common. For pipelines, surveying using intelligent pigs, from the air or by visual inspection are all common. Industry also shares much information.

Q Do you have back up for GPS systems? How do you guard against cyber-attacks or local terrorism?

A GPS systems are critical to BP in many contexts as is IT in general and a myriad of computer systems. Safety critical systems may need to have an independent backup to ensure sufficient reliability and IT systems are always guarded against rogue attacks and have to be guarded against failures. For instance, following the Exxon Valdez accident, BP's Alaska Class tankers have independent propulsion and steering mechanisms. Local arrangements will vary with specific locations, e.g. hot taps from pipelines are not unknown! Many ex-police and military staff are employed by BP in security roles.

Q Two questions. How are oil field names chosen? And BP is a very complex organisation with lots of contractors. How do you manage these in a safety context?

A The project team generally choose the field name. BP, in line with other oil majors has systems to assess contractor safety performance. This is a key part of any contracted arrangement

Q BP purchases vast quantities of supplies, e.g. steel. To what extent are these sourced from the UK?

A BP buys from suppliers all around the world usually using competitive bids. Ships might come from Korea or China, steel from UK or mainland Europe or drilling and production equipment from Norway. Ethical purchasing policies are followed and the most important question is "from where can BP get the right supplies?" Some \$20 billion are spent on projects annually: the key requirement is always quality.

Q What is BP doing about carbon capture?

A Separation and re-use of carbon dioxide for EOR is potentially attractive. Also some North Sea structures are very stable and could in principle be used for CO₂ storage. A major project to gather CO₂ from a number of producers in the North East of the UK and to transport it via pipeline offshore for reinjection and storage did not proceed for financial reasons.

Q What concerns do you see on the horizon – in terms of legislation or over-regulation?

A You never know what may be around the corner, e.g. windfall taxes or changes in the method or price of carbon trading. For instance, Centrica has chosen to cease extraction of gas from its Morecombe Bay field following the announcements of the tax increase on petroleum extraction in the March 2011 budget. New regulations and standards are certain – but they must be pragmatic. Things can also change very quickly politically, e.g. the Arab Spring.

VISIT TO THE ROYAL SHAKESPEARE COMPANY, STRATFORD ON AVON, 27th June and 1st July 2011

Demand for the Engineers Company visit to Stratford was so popular that the event had to be split into two groups on different days. As it turned out, it was indeed a fascinating experience which, for us, took place on the Friday 1st July.



The Tour Guide explains some of the History of the Theatre to the Group in the Foyer

After arriving in Stratford we found our way to the Royal Shakespeare Company (RSC) theatre in its lovely setting beside the River Avon. We were met by the Master John Banyard and were allocated a guide to take us on a tour of the two theatres in the building, Royal Shakespeare and Swan, which were re-opened in November 2010 following renovation. The original theatre, built in 1879 was burnt down in 1932. A new theatre was built shortly after and then the original was restored and re-opened as the Swan Theatre in 1986. There were many problems with the theatres, not least the sharing of backstage space, and, after initial proposals for demolition it was decided to completely gut the structure and provide a new interior. The architects and designers have cleverly

The Swordsman

combined the old with the new, retaining existing features such as certain of the old walls and reusing the original stage floor boards in part of the corridors allowing visitors to 'walk the boards'. Our tour took us back stage and into the 'bowels' of the theatre to see props, a vast array of costumes, wigs, and then up in the goods lift to see the cleverly designed theatres above with their projecting stages providing an intimate surrounding and then onto the state of the art sound and lighting desks.

Following the tour we gathered for a group photo outside the theatre and had a short time for mingling with fellow Engineers alongside the river before finding our way to the restaurant for a delicious meal with good company. Even in the restaurant there was evidence of the old theatre with a line of seats still attached to the top of the original wall above our heads depicting where the original audience back-row had been.



The Engineers' Company Visiting Group outside The Theatre

For our Friday tour the performance was *The Merchant of Venice* with the stage set as a Las Vegas casino complete with Elvis and a Dixieland celebrity theme. The interpretation was very clever and with the seating taking us within metres of the action, we were within spitting distance from the cast headed up by Patrick Stewart as Shylock.

Having stayed the night in nearby hotel we were lucky to find ourselves in the right place to enjoy the River Festival on the Saturday before heading for home.

Thank you John for arranging a lovely day and evening event.

Stephen Davies

AWARDS AND LIVERY DINNER PLASTERERS' HALL 12th July 2011

Plasterers' Hall formed a resplendent back drop for this year's Awards Dinner which, choreographed like a military operation, was a roaring success. Having spoken to each of the award recipients, a quarter of whom were ladies, a constant theme was apparent: their vibrant enthusiasm for technology and its application combined with the spark of innovation and determination to see a project through. It is infectious to see such talented young engineers carving their careers and reaping such just deserts.

With a chest full of pride we also watched the best military engineers receive their accolades from the Master. The formal ceremony and relaxed company was the perfect respite from the relentless operational tempo. Daily these engineers are delivering precision military capability and succeeding despite some of the most testing times seen in a generation. Whether they are enabling a provincial reconstruction team in Afghanistan or crafting the process for making 'perfectly spherical' doughnuts in the Midlands we salute the endeavours of all our award winners for 'improving the world through engineering'.

Mark Hunt

THE ENGINEERING AWARDS Baroness Platt of Writtle Award

The Award has been 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. The Award is named after Court Assistant, 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 consists of a prize, medal and certificate. The Award was made for the first time in 2002 and The Engineers' Company wishes to acknowledge the assistance of the Institution of Engineering and Technology in selecting the Award winner.

Winner 2011 (Prize £1000) – Robert Moon

Robert worked as an apprentice motorcycle technician before joining the BEng course in Motor Sport and Motor Cycle Engineering at Coventry University.



Robert has scored high marks in all his studies and used his technical knowledge to improve the motor cycles that he races on. In his final year as a student he led a team project to develop a single cylinder racing bicycle and rode an electric motor cycle for Team Agni in the first British TTxGP championship; he also rode the Weald EVT electric drag bike

to a British record of 14.1 seconds for a standing start quarter mile.

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 2011 (Prize £500) – Tessa O’Shea



Prior to becoming a teacher in 1988, Tessa was a practising Civil Engineer. In the early stages of her career change, she took on the role of teacher mentor for the Engineering Education Scheme and entered teams into many competitions. Since joining Wimbledon High School in 1998, Tessa has been extensively involved in raising the

profile of Engineering in the school and Engineering Days for Key Stage 2 and 3 students are now embedded in the school curriculum. Actively supporting the wide range of opportunities available, including Smallpiece schemes, each year Tessa encourages Year 11 students to apply for an Arkwright Scholarship, over 19 years guiding a significant number of girls to success; for 4 years she has been part of the team that sets and marks the Scholarship’s aptitude paper. She has long been a Member of EDT’s National Advisory Committee and is a key member of their STEM advisory Group. Tessa O’Shea is a committed and dedicated teacher with a passion for engineering. Her impact on students has been considerable over many years with an impressive number going on to engineering careers.

Winner 2011 (Prize £500) – Jane Atkinson



Jane Atkinson is Vice President of Sembcorp UK Utilities Operations responsible for operations and maintenance of assets serving many large manufacturing companies. A Fellow of the Royal Academy of Engineering and the Institution of Chemical Engineers, she is passionate about encouraging young people into

engineering, spreading the word about the wide range of fulfilling careers it offers. She is an inspirational role model, particularly for women entering engineering, as a member of the “Women In science and Engineering” national coordinating committee. As well as introducing primary school children to green energy as part of NEPIC Children Challenging Industry visits to Sembcorp biomass power station, she regularly addresses sixth formers studying engineering. Jane is committed to all aspects of closer collaboration between education and business, undertaking a number of influential roles including Chair of Teesside University’s Science and Technology Advisory Board, ensuring that the university provides employee-ready graduates, and as UK Lead Employer Champion for the new 14-19 Engineering Diploma.

Unfortunately Jane Atkinson was unable to be present at the Awards Dinner but was presented with her award at the Court meeting on 11th October

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 2011 (Medal) – Ruyi Hu



Ruyi Hu graduated from Central South University in China with a BSc in 2005, gaining an MSc from Loughborough University in 2006, both in Pharmaceutical Engineering. He is a Project Manager with United Utilities Group PLC, currently working on the £20m SUPRABIO project which looks at sustainable products

from economic processing of biomass in highly integrated biorefineries. His work on the use of Volatile Fatty Acid as a route to renewable transport fuel has provided an alternative solution for waste management and second generation biofuel production. Ruyi was the winner of this award in 2009, *Swordsman 23*, and is also a winner of the 2010 Ten Outstanding Chinese Young Persons Award.

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 2011 (Medal and Bursary) – Joanna Yuen Sai Li

Joanna Yuen Sai Li gained an MEng in Mechanical Engineering at Imperial College London in 2009 where she was sponsored by Arup and was Vice President of the Mechanical Engineering Society. Currently studying for her PhD in the Arthritis Research UK Biomechanics and Bioengineering Centre team at Cardiff University, her research is primarily based on creating a finite element model of the knee joint and incorporating specific gait loading data to examine changes due to interventions such as



total knee replacement surgery. Joanna's earlier awards include an Arkwright Sixth Form Scholarship and an IMechE Undergraduate Scholarship. In her leisure time she has a strong interest in Sailing.

Cadzow Smith Award

Established in 1996, the Cadzow 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 and now a Past Master. 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 2011 (Prize £2500) – Christopher Hopper



Christopher Hopper is a natural leader with a unique blend of entrepreneurial and technical skills, one of those rare engineering students who is not only academically first class but also able to demonstrate how engineering can change society for the better – and he has achieved this through leading a team, influencing government, while still

completing his degree. Within the student-led charity 'e.quinox', of which he was a co-founder and whose aim is to provide an affordable solution for rural electrification in the poorest parts of the world, he has developed the "energy kiosk", a practical and cost effective way of distributing electrical energy in

The Swordsman

developing countries. The charity raised over US\$100,000 in just two years to implement a pilot scheme in Rwanda. To date 3 energy kiosks have been completed and the 'e.quinox' model is now part of the Rwandan Government's policy. About to graduate with an MEng degree in Electrical & Electronic Engineering from Imperial College London, Christopher has a clear and focussed vision for the future.

Issue 27



course in July 2010. Placed first of 9 students, he stood out from his peers and won the course prize. His course preparation found him in Helmand Province delivering \$12M of reconstruction and development projects. On an industrial attachment, his leadership and innovative engineering was crucial in the

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.

Flying Officer Rhys Jenkins RAF joined 'Typhoon Squadron' in



September 2006 to study at Loughborough University on the Defence Technical Undergraduate Scheme (DTUS). He graduated in July 2010 with a first class MEng in Systems Engineering and is now undergoing training as an Engineering Officer at RAF Cranwell. During his time on Typhoon Squadron he

demonstrated an outstanding level of commitment; achieving a variety of Adventurous Training qualifications. His mental prowess, coupled with a mature character and well rounded personality shows his excellent potential as an RAF Engineer Officer.

construction of a £6M strategically vital entrance route into London's Olympic Park, coping with the potentially catastrophic consequence of failure of the city's northern outfall sewer. In Arup's design office he proved that he has detailed innate engineering understanding, conducting design checks on the Cannon Street development, identifying and rectifying structural problems, and meeting onerous architectural challenges on £400M of developments in the Middle East. Recently he has used his new skills and Chartered Engineer status to drive through changes in engineering management and quality assurance with an immediate impact on the operational capability of the Corps of Royal Engineers. Overall, Timothy Brewer is a dynamic, inspirational leader and outstanding engineer delivering responsibilities well above his Captain rank.

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.

The Services Engineering Postgraduate 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.

Nominations are invited from: Defence College of Electro-Mechanical Engineering, HMS SULTAN; Maritime Warfare School, HMS COLLINGWOOD; Defence College of Communications and Information Systems; The Royal School of Military Engineering and Defence College of Aeronautical Engineering. Winners are selected against the criteria by The Services' Awards Panel of The Worshipful Company of Engineers.

Captain Timothy Brewer RE graduated from the Royal Engineers Professional Engineer Training

Royal Navy Award

Chief Petty Officer ET(WE) Nigel Hogg is an innovative leader who is able to share his passion for Communications & Information Systems (CIS) and enthuse and inspire trainees into developing their own technical knowledge in a deeply specialised area. His unrivalled dedication, vision and zeal, combined with his extensive technical abilities have enhanced the delivery of CIS capability across all front-line maritime platforms. Implementing enhanced training solutions to the benefit of all Phase 2 and 3 Engineering and CIS Career Courses, he is an extremely versatile engineer. He is committed and tenacious in ensuring he delivers maximum training output for the benefit of the trainee and the Service alike.



Army Award

Nominated for this award as a Corporal in the Corps of Royal Engineers, but since promoted, **Sergeant Bhabendra Muktan** joined the Army in Nepal in 1999. Completing his Class 1 draughtsman course with Distinction, he stood out immediately for higher technical training. He commenced Clerk of Works (Electrical) training at the Royal School of Military Engineering in September 2009 and graduates on promotion to Staff Sergeant this month. Deployed in a Forward Operating Base in Afghanistan as the sole Engineer Section Commander advising an Infantry Company Commander, he led his 10-man section on patrol and providing essential infrastructure engineering. Thoroughly prepared and extremely well motivated to undertake a Foundation Degree, he has excelled both academically, and in the leadership courses he has



taken. He has achieved a record unsurpassed for many years, maintaining a 90% grade average for some 20 months. He is on course to gain a Distinction as top student. Ever respected by his peers and senior staff, he has consistently shared his extensive engineering, leadership and combat experience to best effect. He is an outstanding student and an inspiring example.

Royal Air Force Award

Chief Technician Andrew Jones is responsible for developing aeronautical engineering NVQs for Royal Air Force Apprenticeships. In 2010, his input was pivotal to the introduction of a Level 2 Apprenticeship, ensuring all aircraft tradesmen gained appropriate qualifications while providing assurance that personnel met the required engineering standards. Chief Technician Jones is closely involved with the WorldSkills organisation both as UK aircraft maintenance skills manager and Deputy WorldSkills Chief Expert. He worked tirelessly to run the UK 2010 competition inspiring young people from across the industry to achieve engineering excellence and currently mentors and trains the 2011 UK aeronautical technician entrants.



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 The Worshipful Company of Engineers)

During the grounding of HMS ASTUTE (the first of a new Class of nuclear powered attack submarines for the Royal Navy) near Skye in October 2010, **Lieutenant Commander Chris Hodge RN**, the



Marine Engineer Officer, showed exemplary engineering judgement under extreme pressure, leading by example and managing the nuclear reactor, overcoming immense issues and challenges. Problems were experienced with several systems that required the use of back-ups which had not been tested in a dynamic environment. Hodge's professional engineering judgment and excellent leadership ensured the safety of the submarine and crew in unprecedented conditions and ultimately enabled the submarine to return alongside under her own power.

Royal Engineers Operational Engineering Award

Major Simon Thomas RE commanded a Specialist



Team Royal Engineers within the UK Works Group based in Camp Bastion, Helmand Province, Afghanistan. In this role he was responsible for the engineering design and project management of £150 million of construction. He provided a simple system, rough yet elegant, that would securely fix ballistic glass in the guard post apertures. The prompt, successful retro-fitting of this simple yet innovative solution no doubt saved several lives. Major Thomas also reverse engineered two key bridges in order to determine the crucial elements that he would have to examine during his brief inspections. His advice permitted vital assets to be moved and also prevented further damage to a route that was essential for the local population and commerce.

Royal Signals Operational Engineering Award



Captain Robert Harris Royal Signals has demonstrated a single-minded determination to bring improvement to the Afghanistan Communications & Information Systems (CIS) operational network. He has displayed exceptional engineering expertise complemented by clarity of thought and a huge capacity for hard work. By force of personality, he has bridged the gap between UK-based commercial theory and in-Theatre reality. The results are evident: delivery of high quality broad-bandwidth services to tactical patrol bases and the success enjoyed after overcoming the technically problematic federation of the mission critical Overtask network. Crucially, none of this work impacted on those who relied on CIS on Op HERRICK.

Royal Electrical & Mechanical Engineers Operational Engineering Award

Major Ray Kolczak REME receives the REME



Operational Engineering Award for his performance within the Joint Aviation Group on Op HERRICK. He is a highly motivated, capable and inspirational commander displaying all that is best of a REME Officer delivering on Operations. Coping with the increasing demands for more aircraft hours, Major Kolczak balanced safety and airworthiness against this increased requirement. Through his engineering professionalism, he ensured an exceptional level of availability of high profile battle winning equipments during a period of unprecedented operational activity, which included the largest air assault undertaken on the Operation to date. Major Kolczak also provided engineering training to

The Swordsman

the Afghanistan National Army Air Corps, leaving a legacy that will endure beyond the current operation.

Issue 27

Warrant Officer Class 2 Nicholas Wood. The FIRESTORM system provides fighting troops with the capability to identify targets and call for aircraft or artillery fire to destroy them. FIRESTORM's initial through life support solution contained unacceptable operational risks and presented a considerable logistic burden. The fleet size had to be increased to allow more systems for Afghanistan and training. By applying his excellent engineering skills and technical judgement to the problem, not only did Warrant Officer Wood's solution remove all support related risks but also it demonstrated through life savings of some £5M. His solution has been accepted in full and praised by Her Majesty's Treasury.

Royal Air Force Operational Engineering Award

For the last year, **Squadron Leader Leonie Boyd RAF** has been the Senior Engineering Officer on No 216 Squadron at Royal Air Force Brize Norton which projects rapid global mobility for all UK forces engaged on operations. In particular, this includes the extremely challenging task of providing the strategic airbridge to UK forces in Afghanistan using the aging, technically challenging but still very capable Tristar aircraft. Squadron Leader Boyd has commanded the squadron's 260-strong engineering workforce and successfully motivated her engineers on round-the-clock shifts while preserving airworthiness and safety. Despite the added pressure of the political sensitivity surrounding airbridge sustainment, Squadron Leader Boyd delivered incisive technical leadership, crafting innovative solutions to meet this enduring commitment. In particular, as the engineering specialist, she solved the many difficulties that arose during introduction to service of the fuel tank inerting system, designed to reduce the risk of fuel ullage ignition in the event of small arms fire. She is an inspiring engineer whose leadership, technical knowledge and moral courage set a shining example to her subordinates.



Sqdrn Ldr Boyd was unable to be present and the photo shows the reporter Liveryman Wing Commander Mark Hunt receiving the Award on her behalf

The 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.

WO 2 Nicholas Wood was unfortunately unable to be present

ARKWRIGHT SCHOLARSHIPS

The Worshipful Company of Engineers is currently supporting 3 Arkwright Scholars undertaking their Sixth Form studies at schools in Greater London as a potential lead-in to higher engineering studies. They are:- 2009-11 Miss Prerna Aswani – Henrietta Barnett School, Hampstead Garden Suburb and Mr James Routley – St Paul's School, Barnes. *Swordsman 23, see also an update on mentoring elsewhere in this edition.*

2010-12 Miss Sarah Laughlin – Colfe's School, London SE12. *Swordsman 25*

The Master's Speech

Wardens, Masters, Liverymen, Ladies and Gentlemen, it is my very pleasant duty to welcome you all to our Awards Dinner in the magnificent surroundings of Plaisterers' Hall. (For those of you in doubt I have taken advice on the pronunciation. We are most grateful to the Plaisterers for allowing us to use their Hall and to the caterers for the excellent meal, and finally our musicians, the Live Brass quintet, who have matched the music to the award winners so aptly and entertained us throughout dinner. Could I ask you all to join me in expressing our thanks to them all?

We have many guests with us this evening, and time is limited for introductions:

Our Principal Guest is Prof Madeleine Atkins, the Vice Chancellor of Coventry University. Madeleine is one of the most influential figures on the West Midlands Innovation scene, promoting new initiatives across a wide range of disciplines.



The Master John Banyard OBE, FREng during his Speech

We have already congratulated one of her students on winning the Baroness Platt of Writtle award, but the University's involvement with the motor industry is more extensive, including a ground breaking initiative involving a consortium of small specialist car manufacturers to explore how far they could move to using common platforms and components, thus reducing cost and increasing competitiveness, while at the same time retaining the individuality of each vehicle. For those who fear a return to the badge engineering of the 1950s and 60s, I suggest driving two Caterham vehicles, with different tuning of the suspension. The objective is attainable but it takes vision to appreciate the opportunity exists.

At the other end of the technical spectrum, Madeleine has established the Serious Games Institute, which applies the software and techniques of computer games to educational and corporate software.

We look forward to hearing from Madeleine later.

Our other guests include no less than ten Masters from other Livery Companies together with the President of the Institution of Mechanical Engineers and we welcome them all.

The Arkwright Trust is one of the charities that we support because its purpose is to attract high flying school children into a University Engineering Education through the provision of Scholarships and we are delighted to welcome Linda Scott its Chief Executive.

We are also very pleased to welcome our guests from the armed forces, particularly Major General Keith CIMA who is representing the Chief Royal Engineer and who is also President of the Institution of Royal Engineers and Major General Ian Dale from the Defence equipment and Support Organisation, who is

representing Chief of Defence Materiel. They are joined by a number of other Senior Officers.



Professor Madeleine Atkins during her Response

Finally from academia we have Prof Constantine Arcoumanis, the Vice Chancellor of City University; and I am delighted to welcome Professor Andrew Wheatley from Loughborough University, Every year Andrew organises a conference, on behalf of the International Water Association, for post graduate students from all over the UK, where they present the results of their research work, and our Water Engineering Award is made on the basis of those presentations. Andrew we are most grateful to you for your help and co-operation.

There are of course many other guests, most of our winners are accompanied by a supporter from their own employer or organisation, and we are delighted that so many of you are able to be with us tonight. There are also the personal guests of members of the Livery, and I hope you will all understand that time does not allow me to welcome you all individually.

We are here tonight to celebrate achievement and much of that is based on "Innovation" Of course the Livery movement was not always as open to innovation as it is today. Initially the Livery Companies existed to protect the quality of goods and services provided by its members and to guard the

Trade secrets which were only shared among members. Indeed in Tudor England restraint of trade had become a major ambition of many companies, and the Stationers managed to control the trade of printing across the whole of England, their Charter awarded by Mary Tudor was linked to maintaining religious orthodoxy, and their garden was used to burn “unsuitable” books. Predating Fahrenheit 451 by well over 400 years.

It was large scale immigration that put an end to these practices, with many of the immigrants being at least as skilled as the members of the Livery Companies. In 1592, among others, Sir Walter Raleigh supported an attempt to create an Act of Parliament against “Outlandish Strangers that dealt in Retail Trades.” Lord Burghley would have none of it and the proposal failed.

Today “Innovation” has become something of a fad. In some quarters it appears to be seen as the “silver bullet” to solve many of the country’s problems with industry and the civil service being exhorted to innovate in every area.

On occasion the cynical comment of “If it works – change it” hardly does justice to the vigour with which this ideal is promoted particularly among the non technical. On the other hand those who have been involved in R&D are only too well aware that a successful outcome cannot be guaranteed.

I was therefore delighted, when a few months ago I attended a key note address by Lord Sainsbury, where he decried this approach and urged a focus on “Good Innovation.”

He cited the example of the pedal powered aircraft that had been developed using the very latest lightweight materials, airframe analysis techniques, advances in mechanical efficiency etc, and as a result a new record had been established for man powered flight across the English Channel. This Lord Sainsbury declared was a major feat of innovation, but it served no useful purpose whatsoever. Even though such craft were possible and clearly had low carbon emissions when flying, there were unlikely to be hordes of tourists adopting this means of crossing the channel for their summer holidays, and certainly it was not going to challenge on the transatlantic routes. It was therefore bad innovation.

Contrast that with the development of a new strain of wheat (Lord Sainsbury is a food technologist), which can be grown on poor ground and delivers a 15% increase in crop yield over previously available grain,

and you have something that represents a major advance in terms of human benefit.

Therefore to distinguish between worthwhile innovation and bad innovation it must be possible to demonstrate a real and measurable benefit.

I am sure that had Lord Sainsbury been invited to apply his test to each of the winners here tonight he would have been left in no doubt that we are indeed celebrating some very good innovations, and I do congratulate all of the winners most sincerely on their success tonight.

And now I would ask all members of the Worshipful Company of Engineers to join with me in a toast to our guests.

MENTORING AN ARKWRIGHT SCHOLAR

When I joined the Company I did so partly in order to assist with the education of future generations of engineers. Therefore I was pleased to volunteer to help when the Company Charitable Trust announced in 2009 that, in addition to the sponsorship of two Arkwright Scholars, it would ask the Company to provide mentors for them.

For those readers who are not familiar with the Arkwright Scholarships Trust, it is a 'not for profit' organisation which offers scholarships to young people still at school in the UK who want to go on to become engineers or technologists. The applications are made during their final GCSE year and the scholarships apply for their two A level years.

I was asked to mentor James Routley, a pupil at St Paul’s School in Barnes. The first few months were frustrating because – like all youngsters of his generation – he was not a good communicator, something which was compounded by my extensive travel commitments. Mentoring was limited to emails as I sought the chance to meet up with James to make a personal assessment. Once we had met though (and I had his cell number!) things improved considerably.

He thought he wanted to eventually specialise in mechanical or aeronautical engineering but recognised the advantages of a broad based start. He also thought he wanted to go to Oxford. Being a Manchester trained chemical engineer whose son went to Cambridge meant that I had to hide my prejudices.

James found a one week engineering familiarisation course for himself at Oxford and I was able to arrange

a one week placement for him with British Sugar. That company takes quite a few undergraduate engineering trainees each year from Loughborough. He spent the handover week there so he was with 2nd and 3rd year students at both ends of their 'thick sandwich' year in industry.



James Routley being Presented with his Arkwright Scholarship in October 2009 by the then Master Chris Price

He seemed to benefit from the experience, meeting both undergraduates and practicing engineers at various levels from several disciplines. He was working in the head office and then at one of the factories for 2 days. He was set a mini-project at the factory which was more chemical than mechanical in nature and had to make a presentation on it at the end of the week. Most importantly British Sugar were pleased with him, would welcome him back and would welcome another Arkwright scholar at another time.

The 2010/11 academic year was quiet on the mentoring front as James settled down to getting the grades he needed. He was given some guidance during the University application process and encouragement from time to time. He soon reported that he had four University offers, including the all important one from Trinity, Oxford.

James' mentoring is now over as he has the AAA grades he needs for Oxford where he will start in October. I have told him that I, and the Company with its breadth of contacts, will continue to be available if he wishes to ask for assistance in the years to come. Would I do it again? Yes, of course I would and I would encourage you to help too as it is a very rewarding experience.

Mike Inkson

ANNUAL GOLF DAY BEACONSFIELD GOLF CLUB 26th July 2011

The Annual Golf Day was held at Beaconsfield Golf Club on 26 July 2011. The course is easy to get to - just a few miles from junction 2 on the M40. The day was organised by Graham Skinner, our Middle Warden, who is a member at Beaconsfield; many thanks to Graham for arranging an excellent day out.

The course dates back to 1913, and the clubhouse is situated right next to Seer Green railway station. It was sold to the Members for the princely sum of £12,500 in 1951! The course is very attractive and well maintained, with four par 5 holes (five for the ladies). Most people found it moderately difficult, with some quite narrow fairways and tricky rough which seemed to swallow golf balls. The greens were large and often well protected by bunkers.



The first groups of Golfers to finish in front of the Club House

There were 16 golfers, including 4 ladies. The weather was dull and humid, but luckily it did not rain. Coming off the 18th green, one very smartly attired and colour co-ordinated lady (she knows who she is, but your correspondent is far too discreet to name her) commented that her round had been a mixture of occasional brilliance and sheer stupidity. *'Golf can best be defined as an endless series of tragedies obscured by the occasional miracle'* – Anon.

Following the golf we had an excellent dinner in the dining hall upstairs – prawn & salmon starter, roast beef main course, and tarte tatin for dessert – well done to the clubhouse catering staff.

The Master John Banyard and his wife Judith joined us for dinner, having flown back specially from

The Swordsman

Perpignan for the occasion! This was real devotion to duty! After dinner, the prizes were presented by the Master.



The Master presenting the Company Winner's Trophy and Voucher to John Ferrie

The winner this year was John Ferrie, with 31 points. John was also nearest the pin at the short 7th hole, so he was clearly playing some pretty accurate golf. Second was last year's winner, David Scahill, with 30 points. Chris Price was in third place with 29 points. However the highest score of the day went to Celia Aston, a guest of Sylvia and Chris Price, with 34 points. These were all impressive scores on a challenging golf course. The prize for closest to the pin after 3 strokes at the 503 yard par 5 17th hole went to Andrew Cullimore.



The Master presenting the Overall Winner's Voucher to Celia Aston

Issue 27

Overall this was a most enjoyable day out, with exciting golf, a very good meal, and excellent company. The Golf Day will be held at Beaconsfield for the next two years, so we hope to have lots of new golfing Engineers and their guests at next year's event.

Alan Grant

VISIT TO HUGHENDEN MANOR, 26th July 2011

Over the last few years non-golfing partners have had a special day out whilst the golfers were battling for the Annual Livery Golf Trophy. This year Middle Warden's lady, Margaret Skinner arranged a visit to Hughenden Manor, the former home of "the most unlikely Victorian Prime Minister", Benjamin Disraeli, now owned by the National Trust.



The Non Golfers outside the House before their Tour

Our tour guide was very interesting, bringing the house to life as we went from room to room. It was a very welcoming house and we felt that we could quite happily live there, admiring the gardens and enjoying the library.

Disraeli bought the house in 1848 after two years of negotiations during which he struggled to raise the finances eventually becoming part of the landed gentry but his Jewish heritage, lack of public schooling and non-aristocratic background always set him apart.

Disraeli stated that he owed all his successes to women and this is certainly true at Hughenden. His wife, Mary Anne helped him create the background he needed to succeed as a politician and achieve his ambition of becoming Prime Minister, paying off many of his debts and ensuring that he remained solvent despite his lack of financial acumen.

The Swordsman

Disraeli had a deep respect for the monarchy, becoming a close and valued friend of Queen Victoria and one of her favourite Prime Ministers, unlike Gladstone, his great political rival, who addressed her “as a public meeting”. In 1877 the Queen visited Hughenden for lunch; the legs of one of the dining chairs were specially cut down so that she could reach the floor comfortably!

Disraeli was Prime minister twice; once in 1868 and then from 1874 to 1880. He is remembered for his powerful speeches but he also delivered some lasting achievements; much of the credit for the Second Reform Act in 1867 went to Disraeli, in 1875 he introduced the Public Health Act and acquired a major shareholding in the new Suez Canal, backed the Royal Titles Act in 1876 which enabled Queen Victoria to become Empress of India and perhaps his most celebrated triumph was at the Congress of Berlin in 1878 when he negotiated “peace with honour”.



Gill, the Reporter, and Margaret, the Organiser, in the Garden checking that everything was according to plan after their Original Reconnaissance

Disraeli died in 1881 and after his death Hughenden Manor reverted to the quiet obscurity it had previously enjoyed; eventually it was entrusted to the Disraeli Society to be preserved for the nation.

Our second tour was to the Ice House Bunker. During the Second World War Hughenden Manor was occupied by the military and contributed to the war effort by becoming a top secret mapping unit codenamed “Hillside”. It was requisitioned by the Air Ministry in 1941 to produce accurate maps to be used on bombing raids. The maps were coloured as they would appear in moonlight on a night bombing raid. In particular the roads were painted red using ox blood which was found to show up best when photographed

Issue 27

for the bomber crews’ copies. The drying maps and the paint pots had to be kept covered as the flies also enjoyed it.

Our final stop was the Church. During the tour of the house our guide had regaled us with the tale of a rich widow, Sarah Brydges Willyams, who had asked Disraeli to be the executor of her will. She also wished to be buried beside him. Mary Anne agreed to this provided she was buried on his right side. The £30,000 which he inherited from Sarah enabled him to pay off his mortgage.



And there they were. The Tomb outside the Church with Disraeli buried in the centre, Mary Anne on his Right and Sarah on his Left

And so we rejoined the golfers. Thank you, Margaret, for organising such an interesting trip.

Gillian Scahill

LADIES’ LUNCHEON FOUNDERS’ HALL 5th October 2011

50 ladies gathered in the cosy anteroom at Founders’ Hall, all enjoying a welcome drink and friendly chat. Just before lunch we were lucky to have the expertise of a City Guide, Mr Malcolm Dick, on hand to explain the history of the Hall and the local area. Founders were workers in brass or tinsplate, casting small articles such as candlesticks or pots and pans. Their original Hall was built in 1549 but, like so many, destroyed in 1666 in the Great Fire of London. The new Hall was built of brick and stone and brought an income to the members from a variety of users.

In 1845, the Company built yet another Hall in Founders’ Court but then let it out in 1853. A further Hall was built in St Swithin’s Lane, but this was

superseded by the present Hall in Cloth Fair which was completed in 1987. Being such a large company ourselves it is not often that we have the chance to visit smaller Halls such as this. To be able to enjoy the outlook onto a small garden while dining was a bonus.



Question and Answer session in the Founders' Hall

We were obviously enjoying our lunch and wine too much and time was moving on, and as our speaker had further engagements that afternoon, we had a break before pudding for her talk, following an introduction by Mrs Judith Banyard, The Master's Lady.

Mrs Barbara Frost, CEO Water Aid told us about this charity. Started in 1981, initially in the water industries, its aim is to provide safe water and sanitation for everyone. Unfortunately, they still have a way to go after 30 years. Half the hospital beds in Africa are filled due to unsafe water. We learnt how the lack of clean water leads to disease and a lot of time taken, usually by women, to fetch water, which even then may not be clean. However, coupled with lack of sanitation, there was a likelihood that dirt would get into the drinking water and thus into babies who were less able to cope with infection. Without proper toilets, girls were likely to leave school at puberty. (There was an apology for introducing such topics whilst eating lunch.)

In 30 years, 16 million people have been helped to have access to clean water and, since 2004, 11 million have been provided with toilets. Last year, long-term sustainable solutions provided 1.5 million people with clean water and 1.6 million with sanitation.

To reach these people, work has been done by locals, at low cost and using appropriate technology. In rural areas, a flush toilet would not be appropriate but a composting toilet might be. However, it is not enough just to provide the facilities, people must also be educated as to why they are important and the link between lack of sanitation and disease. Hygiene is taught and the most important lesson is to wash hands

after using the toilet or changing nappies and again before preparing food. In fact, the same hygiene lessons apply as those that we are encouraged to follow.



Mrs Barbara Frost, Chief Executive Officer of Water Aid and the Master's Lady Mrs Judith Banyard

In order to deliver this help, Water Aid uses its research and information to advise the decision makers in the countries concerned along with donor governments and other NGOs. It has been found that, for every \$1 invested in clean water and sanitation, there is an \$8 increase in livelihood. It costs just £15 to give one family safe water for life.

Our support was encouraged, not just financially, but by understanding and disseminating this information.

A vote of thanks for this informative talk was given by Mrs Gillian Scahill, The Senior Warden's Lady.

Our luncheon concluded with pudding and coffee.

Linda Brooks

VISIT TO DCME, HMS SULTAN 5th October 2011

On Wednesday the 5th October seven members of the Company attended a visit to HMS Sultan by affiliated Livery Companies. We were accompanied by members of the Fuellers, Blacksmiths, Turners, Plumbers and Shipwrights. If there be safety in numbers, all was well as this Company fielded the largest contingent.

After welcoming refreshments of tea, coffee and biscuits which gave us an opportunity to meet each other and our Liaison Officer, Lt. Jamie Walker, we

proceeded to a lecture theatre for the first part of the visit programme.

We were initially addressed by the Commodore of Sultan, Mark Slawson. The Commodore began by giving us an outline history of the site. This has been assigned at different times to all three Services, starting with the Napoleonic era when it hosted two defensive forts (Army) whose remains are still extant if used only for storage and the grazing of goats (who keep the grass on top well trimmed). During World War I it became a Naval Air Station which later transferred to the RAF before reverting to the Navy as Naval Air Station HMS Siskin. Finally it assumed its present engineering training function as HMS Sultan.



The Party from all the Livery Companies visiting HMS Sultan Crown Copyright

Commodore Slawson was keen to emphasise that the site, while primarily naval, also provides engineering training to the other services and even to rail companies. Leaving details of the technical aspects of the training offered by the establishment to later speakers, the Commodore spoke about the establishment's role in the local community and about the emphasis on personal development of the trainees. Next to address us was the Head of Marine Engineering training, Captain Trevor Gulley, who outlined the training from that offered to junior rating entrants to the service through to that offered to potential and actual engineering officers.

The third address was by the Head of Air Engineering training, Commander Bowser. He outlined the range of training carried out on the repair and maintenance of naval aircraft, now, following the demise of the Harrier fleet, all helicopters. However, the range of helicopters assigned to and operated by the RN is growing with the addition of the Merlin and Apache aircraft.

The last two addresses were of a more personal nature and reflected the personal experiences of two individuals. Chief Petty Officer Burns is a young female Marine Engineering specialist who represents

the individuals who enter the Service today. She is clearly driven very strongly to take on every opportunity both in the direct line of duty and in associated social activities. Petty Officer Holland joined the Service many years ago as a 16 year old and is engaged on the air engineering speciality. Like CPO Burns he has taken advantage of many opportunities and has spent a considerable time seconded to the Army. By contrast, his time at sea over his many years service has totalled just 100 days. Like CPO Burns he commits much of his time to ancillary aspects, in his case the traditional Field Gun Run. He has trained a number of trophy winners (including an Army team!) and is presently heavily involved in the administration of these events. PO Holland arguably reflects a more traditional background than does CPO Burns but both exemplify the enthusiasm for engaging in a wide range of professional activities and for taking up a wide range of opportunities.

After the lecture session we repaired to the Wardroom for a splendid lunch. Lest anyone present felt the Navy was squandering hard earned taxpayers' money, we were assured the lunch was sponsored by a civilian contractor, Debut, who perform estate management activities on the site! After lunch we were again addressed by Commodore Slawson who was introduced with the remark that he always had a mischievous twinkle in his eye. He did not disappoint, opening his address with a comprehensive guide to introducing a goat to the Wardroom on a formal occasion. (The goat in question resided on one of the forts and I was reliably informed that it was not harmed in the introduction to the Wardroom.)

The Commodore then moved on to a more serious matter and one clearly very close to his heart, which he described as a national risk of "sea blindness". By this he primarily meant a national failure, both in the corridors of political power and among the populace at large to be aware of the role and importance of the Royal Navy. To this end he quoted the tonnage of trade carried to and from the UK by sea and pointed out the role of the Royal Navy in safeguarding it. He emphasised the range of activities carried out in Afghanistan by the Service, from the better known, such as the infantry role of the Royal Marines, through the extensive air combat and air support activities of the naval air arm to the little known (to this listener at least) facts that the Navy supplies both the medical and bomb disposal specialists. As Commodore Slawson pointed out, in summary, the RN provides many of the roles that most civilians might assume to be provided by the Army. He finished with an impassioned plea for those of us with contacts to go forth and spread the message. Serious, important matters, yet delivered

The Swordsman

with at least a hint of the mischievous eye twinkle throughout. Indeed, this listener could not but help being occasionally reminded of Ken Dodd by the delivery – and I suspect the Commodore will not mind my saying so.

After Commodore Slawson's address we proceeded to the site visits. There were in fact a considerable number of alternative sites to visit but only time for two. This Company's contingent chose to visit the Air Engineering craftsman training – primarily aimed at helicopter repair and maintenance and the simulation hanger. The simulation hanger is the location for the engine room control centre simulators where staff about to be assigned to a new vessel are given familiarity training prior to assignment. On the way, we were able to see the development of the control systems and also to discuss the advances in propulsion technology, currently being led by the all electric, high voltage, Daring class. We also saw the engine room simulators where staff receive training on real turbines and diesels set up alongside engine room equipment enclosures which allow staff to familiarise themselves with safety procedures as well as the direct machinery related aspects.



Engineers' Liverymen and hosts at HMS Sultan

After the tours there was a final gathering over tea and coffee when the Commodore made a further appeal for support on the Sea Blindness issue. By some strange coincidence Commander Mike Young, presently described by the Commodore as his "headmaster" turned up in desert uniform. This gave the Commodore the chance to point out that while he might have appeared to be a soldier he is in fact a member of the RN and is preparing for deployment to Afghanistan in the New Year to manage infrastructure development work.

Finally Team Engineers stood for a team photograph along with Commodore and Mrs. Slawson, near the centre, Captain Trevor Gulley, near the camera and

Issue 27

Commander Mike Young, dressed as for Afghanistan or, to quote the Commodore, disguised as a bush.

It only remains to record our thanks to the Commodore and all his staff for making our visit both informative and enjoyable and in particular to mention in this context our Liaison Officer, Jamie Walker RN.

David Cooke

THE MASTER'S MUSINGS



It really is quite incredible that as I sit down to write these notes, I realise that Judy and I are already almost 6 months into the Master's year. I can tell myself that actually I will have a 54 week year because of the vagaries of Easter, the date of which varies with the full moon, I can also take solace from the fact that the period includes

the latter half of July and the whole of August during which Livery activity is very low; but however I cut the figures the fact remains that the halfway point is fast approaching, and by the time of the Annual Banquet at the Mansion House, it will indeed be passed. So perhaps it is appropriate to take stock of where we are.

As Master I am invited to numerous functions, which are not all dinners for which my waistline is duly thankful. But it does provide the opportunity to discover what goes on in other Livery Companies and what problems they face.

First let me eliminate the Great Twelve, (the first twelve in the order of precedence), and with them probably the second twelve as well. These are all long established and extremely wealthy companies who cannot be used as a rule to measure others against. Statistically speaking they are separate populations.

Thereafter, there is more of a shared experience, there are still many wealthy Liveries and some of those are found among the Modern Liveries. But equally there are quite a number of Liveries who are finding the recession is impacting on their affairs. Many

companies are finding a reduction in support for Company events, particularly in respect of personal guests invited by Liverymen. Some well established companies have limits on numbers of Liverymen in excess of 250 but are finding increasing difficulty in maintaining half that number. At the same time other Livery Companies, are inundated with new applicants and have opened their doors to limitless Freemen, even though the Livery itself is full. Effectively there are a large number of Freemen, who participate in the majority of Livery activities, but cannot vote; they are content to wait in the wings until vacancies occur. I initially thought that this was a trend among the more successful of the Modern Companies but have been surprised to find that it is a common practice among several of the companies that predate the modern era. At this point it becomes apparent that the vintage of a particular company is no indication of its' current relevance or success. And so I start to ask myself what does make a successful Company?

The answer must be that it provides something that its members value, be that "Status" i.e. a high number in the Order of Precedence; or a programme of events that members wish to participate in. While the Engineers can do nothing about being 94th in the Order of Precedence, it is worth remembering that the first Modern Company was the Master Mariners, who became a Livery Company in 1932, they are themselves 78th in the order; there are now 108 Livery Companies, and a little maths shows that we are around halfway in terms of the Modern Liveries. Even so no one is going to join us for the status conferred by either view.

So it must come down to what we offer our members, the most tangible offering is of course the programme of events developed by our Programme Committee , and here we are doing very well. In my Masters year, we will hold 18 events open to members, and excluding other functions that members may elect to attend such as lectures and entertainments like the Sheriff's Opera. This includes the Out of Town Weekend and the Theatre visit which were really multiday functions. This really does compare well with most other companies it is more than many provide. Of course it all comes at a cost in terms of the workload on the Clerk and the Beadle.

A Past Master once said to me that no-one really understands what is involved in running the Company until they are able to oversee it from the top. I think this is correct, but perhaps we should seek to raise the awareness. In addition to the social functions, the Office also organises 17 Committee and Trustee Meetings and 5 Court Meetings during the year. This

is a significant work load, and I think we should all be grateful to the Clerk & Beadle for the huge amount of effort that they put in. I would also like to congratulate the farsightedness of previous Masters, Wardens, Clerks, and Assistants who had the foresight to see the benefits that an office within the City would bring to the Company. I realise that at the time it was a difficult decision, particularly financially, but one that has paid off handsomely. It gives us a real presence in the Livery movement, it means that our officers are an integral part of Livery Life, and not on the fringes, and it gives our members a focal point. I am sure it makes a significant contribution to the success of our company.

So what about our social programme? Judy and I have been absolutely delighted with the level of support for the programme: the backstage theatre visit and performance at Stratford was so heavily oversubscribed that we had to arrange a second afternoon and evening to fit everyone in; the Out of Town to Edinburgh was the highest attendance for several years, with 104 people visiting the Scottish Capital, and the Ladies Lunch also attracted a large attendance and exceeded the expected time span. Additionally the Golf Day and visit to HMS Sultan were well supported. Incidentally it was a delight to see Elizabeth Monk at both the Out Of Town meeting and the Ladies Lunch and Doris Mills at the Ladies Lunch, we should be doing far more to ensure that surviving partners of former Liverymen are invited to participate in our social programme, this is part of our 25 year Strategy, which itself reflects back to one of the early aims of the original Livery Companies – to support the dependants of former members.

Finally the question that I am always asked "What has been the highlight of your year so far?" Well at the top of the list has to be the success of our programme of events, but if you are looking for something out of the ordinary, perhaps three events spring to mind: Introducing the Wardens and Past Master Chris Price to the Queen, The Duke of Edinburgh and the Princess Royal at a dinner to celebrate the Duke's 90th birthday; attending a dinner with Judy at Lambeth Palace, and on turning a corner realising that the hirsute gentleman in a cassock standing halfway down the corridor with his wife was indeed the Archbishop waiting to greet his guests totally informally; and finally a delightful low key ceremony for the dedication of the Lord Mayor's stained glass window in St Botolphs, Aldgate – absolutely charming and what a thrill for the schoolchildren who came from the less wealthy side of a very diverse parish – the City and Livery movement at their understated best.

John Banyard OBE FREng, Master 2011-12

VISIT TO EDINBURGH 22nd to 25th September 2011

In glorious weather, unusual in Scotland, the largest group of Engineers since 1999 started to assemble for the Out of Town meeting at the Radison Blu hotel on Canongate, The Royal Mile, in the centre of Edinburgh from mid day on Thursday, 22nd September. Some flew, some came by train and others, like us, came by car taking the opportunity to extend the week end to visit other places as well. When we got into the multi storey car park we wondered where we were going as we ascended many floors before reaching the reception only to find that it was at the Canongate street level.

The Master and Judith were on hand to greet us and we quickly found our rooms where a welcome pack of the final programme with details of the exciting places which we were to visit awaited us. Richard and Janet Groome had, as usual prepared an appropriate quiz for us all to try for which the entry fee was the vast sum of £2. Throughout the weekend the keener members amongst us were desperately trying to research the answers including trying to identify a number of different tartans. Others were just pleased to pay the fee not to submit their answers but Richard and Janet's efforts raised another £150 for the Charitable Trust and we are grateful to them. The Master also kindly presented each of us with a small glass engraved with the Engineers' 'Coat of Arms and Edinburgh 2011' so that we could have a wee dram when we returned home and remember an excellent visit.



We enjoyed a walk in the late afternoon sunshine up the Royal Mile to the Castle and then down to Princes Street which seemed to be a deserted Tram building site meeting lots of other Liverymen also exploring on the way. We then returned to the hotel to prepare for the Welcome dinner where the new Company ties were being proudly worn by the Officers of the Company. Although some Liverymen thought that they needed sunglasses sales appeared to be brisk. I now hand over, with grateful thanks, to the reporters for their stories of the individual events making up a most enjoyable visit.

Raymond Cousins

Welcome Dinner at the Hotel

On Thursday 22nd September 2011, some fifty Liverymen and their guests assembled in the Great Scots Hall of the Edinburgh Radisson Blu for reception and drinks. Circulating amongst the gathering and tweaking the remaining grey cells into motion, the annual task for those of us approaching dotage started as we desperately tried to put names to familiar faces. However it soon became apparent that, with the exception of our clerk and other gifted members, this was a common problem for most of us. So, with a glass of bubbly in our hands bonhomie took over and we settled into the start of a very pleasant evening.

Dinner was held in the Canongate suite and, after welcome greetings from the Master, our indefatigable Clerk briefed us on the mundane matters of safety. We then paid great attention to the revelation of the unearthly hour at which we had to board the coach next day. Would there be time for sleep?

Richard Groome (shamefully an Englishman) briefed us on the quiz on obscure Scottish matters and the 'Silent Auction'. The silent auction was for two events at the Albert Hall which had generously been donated and raised £900 for the Charitable Trust.

Having read the menu we then waited with some trepidation for our meal of Scottish Broth and chicken stuffed with haggis. And waited and waited.....Nevertheless the general hubbub of interested conversation showed that this was not a problem particularly with discussion on the content of our table's reply to the name challenge being treated very seriously.

The Master challenged each table to explain the links of the person named on each table with Edinburgh. This part of the evening has become well established and allows freedom for some of our most eloquent and lateral thinking colleagues to give full flow to their imagination. This year was no exception and the most tenuous of links were greeted with applause and disbelief by the audience.

To do justice to the speeches would probably take up most of The Swordsman but some of the more spurious connections that emerged included for the McGregor table, Hugh McGregor, Rob Roy McGregor, Euan and Ian which naturally lead to Margaret Thatcher, the Coal Industry and Arthur Scargill and eventually returned to that poetical cattle thief and protection racketeer, Rob Roy McGregor.

The Swordsman

The MacDonald table reminded us of Flora MacDonald who, after fleeing to Canada, invented hamburgers and margarine and begat Ronald and maybe Ramsay.

Maxwell, the founder of the Maxwell House dynasty could trace his ancestry back to one of the first Scotsmen who in Roman times discovered Mac's well. It then became more obscure as links to Mary Queen of Scots (the discoverer of coffee beans), the Wonder Bra, Robert Maxwell and Fred Goodwin were propounded.

Boswell apparently came from Bosses Well, designed turbine blades and was also Boswell Earl the lover of Mary Queen of Scots who reluctantly came from Scotland.

Watt, not James, but Sir Robert Watson Watt, improved our lives by not only his association with radar but that indispensable tool for the single male, the microwave.

Rankine and his cycle; Bell and his useless single telephone but welcome scotch somehow linked with McGonagall; Rennie the architect arrested as a German spy; and Stevenson, a man acidic in nature (it's not rocket science to see the pH missing), linked with Jim Lad who invented the haka, rounded off the entertainment.



Stevenson or Stephenson held by David Johnson with Marilyn Wedgwood and Richard Groome looking on

The Master thanked all for the ingenious presentations and we retired to our comfortable rooms to sleep off an enjoyable evening.

Hugh Vinson

Issue 27

Glencorse Water Treatment Works

The Glencorse water treatment works, visited on the Friday morning, is still under construction but close to completion. At the time of the visit the works were supplying partly treated drinking water to the two existing Edinburgh water treatment works. It is planned that by the year end the Glencorse water treatment works will take over the entire water treatment process from the two existing Victorian works.



The Grass Cover to the Huge Clear Water Storage Tank

The first view we were shown, during the visit, was of a grass covered area roughly the size of a football pitch. Below this area was concealed a huge clear water storage tank capable of holding around a days supply of treated water. This concealment extended to the two main treatment buildings of which only a single storey is above ground and this is surrounded by grass covered bunds, some of which were still in construction. The main treatment building is covered by the largest grass roof in Scotland.



The Gabion Retaining Wall for the Concealment Bunds Nearing Completion

It was explained to the tour that screening the works was an essential element in its design and construction. This is because the works are located in areas of natural scenic beauty enjoyed by large numbers of visitors and walkers. However, the site is situated on the route of the existing pipe lines.

The Swordsman

The tour of the Glencorse water treatment buildings, started at the point the untreated water enters the works. In this first building we were shown the mixing of raw water from three local reservoirs. The water from all three reservoirs is fed to the works by gravity and the water from one of these reservoirs is used to drive a water turbine to provide for energy recovery. This will eventually supply around a quarter of the works power requirements.



Discharge From One of the First Intake Pipes

The second, grass roofed, building, is constructed largely below ground level. In this building the main water treatment processes are undertaken. Initially the combined raw water is dosed with Aluminium sulphate to aid flocculation. It then passes through two processes, Dissolved Air flotation, and Rapid Gravity Filtration which are contained in a single tank, and the combining of the two processes in this way is known as COCODAF (Counter Current Dissolved Air Flotation). One of treatment tanks was undergoing maintenance work and we were able to see the construction of the tanks allowing a better understanding of the process. As all the remaining tanks were functioning at the time of the visit, it was possible for us to be given a demonstration of the filter cleaning process.



Dissolved Air Flotation Floc being skimmed off the COCODAF tank

Issue 27

Following the visit, or before it for half the group, we were given a presentation, by the Scottish Water Project Manager for the Glencorse water treatment works. This presentation addressed the design and construction of the works. However, it also focused on the implementation of the public relations policy adopted by Scottish Water and the building contractors. The presentation also showed details of the buried supply pipeline, which transfers the treated water to the site of the existing Victorian works at Fairmile Head, and hence onto Edinburgh. Although the raw water supply to the plant uses existing pipelines, a new supply pipeline to Edinburgh was required. This has been constructed from plastic pipe manufactured in a purpose built temporary factory situated adjacent to the route of the pipeline itself. This meant that the pipes were moved over the route of the pipeline and not on public roads. As a consequence, the construction of the pipeline had occurred mostly hidden from view.

The Scottish Parliament Buildings at Holyrood

On Friday afternoon we had a guided tour of the Scottish Parliament buildings at Holyrood. This building was opened by HM The Queen in October 2004 and has excited much controversy, because of its location, the choice of architect (Enric Miralles from Spain) and its design. Above all, when finally completed it was over 3 years late and the total cost was £414M, against an original estimate of £10M to £40M. The subsequent public enquiry criticised many aspects of the management of the project, but despite all this criticism the building has been widely welcomed by the architectural community and many former critics.



Some of the Complex Symbolic Detailing

The building won the Stirling Prize for Architecture in 2005. The building aims to evoke the landscape and people of Scotland, combining many complex shapes and themes into its design, often with much obscure

The Swordsman

symbolism. It has been described as a “Celtic-Catalan cocktail to blow both minds and budgets”.



Whilst we were waiting for our guides we saw a model of the Parliament showing the complex shapes and also the Three Honours Sculpture presented by the Queen when she opened the Parliament (both above). The Sculpture was commissioned by the Goldsmiths of Edinburgh following a design competition and made by Graham Stewart. The abstract sculpture represents the three honours of Scotland, Crown, Sceptre and Sword and is made of silver, gold and rock crystal. Graham also made the Engineers' Company's Thunderbolt Candlesticks presented by Past Master Jim Smith.

(Ed)

Our tour started with an overview of the site and some of its history. We were then guided to the Garden Lobby, which connects the MSP's office building, the debating chamber and the offices of the Presiding Officer (equivalent to the Speaker at Westminster), which are situated in Queensbury House, a Grade A listed building dating from 1667. The Garden Lobby has amazing roof lights, with complex interwoven elliptical shapes, made of stainless steel, and with glass work covered by a lattice of oak struts.

From there we went to the debating chamber (parliament does not sit on a Friday). This has 131 desks and chairs, made of oak and sycamore, arranged in a semicircle, providing seating for the 129 elected MSPs and two Scottish Law Officers. All debates are televised and voting is entirely electronic. The floor is of very rare Scottish oak, and the most notable feature is the roof, which spans over 30m without supporting columns, using a structure of laminated oak beams joined by stainless steel connectors, each individually fashioned.



The Chamber, Presiding Officer's Desk, Scottish Oak Floor and Mace Cabinet

Finally, we saw the Mace, made of Scottish silver inlaid with Scottish gold and inscribed with the words “Wisdom, Justice, Compassion and Integrity”, together with “There shall be a Scottish Parliament – Scotland Act 1998”.



One of the Node Connections

Whilst many of us were struck by the unusual design features, the visit also provoked more practical questions, such as the cost of maintaining such a complex building. Apparently the window cleaning alone costs up to £100,000 per year, requiring abseilers to reach the more difficult areas. In any event, the visit was of great interest to all and provoked much discussion over the weekend.

Simon Watts

Coach Tour of Edinburgh

It was a beautiful city, advertised as ‘*Inspiring Capital*’, draped across a series of rocky hills overlooking the sea. It was unusually wonderful weather which added to our delight. We started our tour from our hotel on the Royal Mile. The High street in the Old Town is a picturesque jumble of medieval tenements piled high along the Royal Mile. We then saw the Old College (law school), a 16th Century old building of Edinburgh University. It was at the

The Swordsman

University that it was named the ‘Athens of the North’, a name inspired by the great thinkers of the Scottish Enlightenment of high culture and lofty ideals, of art and literature, philosophy and science.



Looking up the Royal Mile from the Hotel

Next was the Scottish National Museum, recently restored and opened by HM The Queen. We passed a statue of a Skye terrier named ‘Bobby’, who spent the rest of his life (14 years) standing on the site where his deceased master was buried.



Bobby

We passed the pub called ‘Doctors’, where, it is alleged the locals called their employers to claim ‘I can’t come to work today- I’m at the doctors’. We then travelled to the Grass Market, which was until 1911 a real farmers market. It is now trendier but is still the site of several gibbets. The pub here is peculiarly called “*The Last Drop*”. Its past is also evident by the place where Burke and Hare plied their hideous trade of providing bodies they had killed to the medical school. This part of the city also inspired ‘*The Strange*

Issue 27

Case of Dr Jekyll and Mr Hyde. We went to the New Town and the elegant Charlotte square with a statue of Queen Charlotte built by Robert Adams. Then we went along George St, one of the three main streets of the New Town. It was in this area that we were in several traffic jams due to the partial closure of Princes Street caused by the controversial ‘*tram project*’ we also saw St Cuthbert’s church which has been a church for 1000 years.



Part of the Palace of Holyroodhouse

Then on to magnificent views of Edinburgh Castle and Holyroodhouse Palace. It was here beneath the Greek temples of Carlton Hill – ‘*Edinburgh’s acropolises*’ - which the Scottish Parliament now sits after a 300-year absence. In the opinion of most of our group it is an inappropriate and ugly building on the outside and extravagantly built on the inside hence costing 10 times the original cost. After our tour we had time to visit the Queens Gallery with its current exhibition ‘*The Northern Renaissance*’: Durer to Holbein



Inside the Queen’s Gallery

We then returned to our Hotel after a wonderful tour of Edinburgh.

Malcolm H Pope

Dinner at Edinburgh University

In the evening a few minutes by coach took the party to the venue for the Company dinner; the South Hall of the Edinburgh University Pollock Halls on the edge of Holyrood Park. Happily the evening was fine for the short walk from the coaches. The Master and his Lady received liverymen and their guests and the Hall provided ample space to circulate and socialise over reception drinks before dinner. The considerable height of the hall made for good acoustics for this type of event which can otherwise be spoiled by the general noise level of conversation.



Working Up to a Good Dinner

Following Grace the party had a most enjoyable dinner and at your scribe's table a very convivial evening was had by all. The dinner menu had a Scottish flavour including haggis neaps and tatties (in translation haggis, turnip and potatoes) followed by highland venison. It is fair to say that the venison could have been tenderer; in the Scottish vernacular it was slightly teuch, otherwise the meal and wine were very acceptable.



Following the loyal toast and a toast to members of the Royal Family with an engineering connection the Master proposed the toast to our guests. As on this occasion we did not have the usual ceremony with the loving cup and the associated protection from back-stabbing John stood with his back to the wall – a good idea as he could

see and address the whole company (and nobody could stab him with their sgian dubh). John welcomed our guests and expressed the particular thanks of the Company to all those involved in assisting with the morning visit to the new water treatment plant outside Edinburgh. He had obviously done his research for this visit to Scotland and made appropriate reference to the period of the Scots Enlightenment with important figures like Adam Smith and David Hume. He drew an analogy between the livery companies and the Company of Merchants of the City of Edinburgh which had established the foundation for so many of the private schools still operating in Edinburgh today.



Happily he avoided too much mention of the Edinburgh Tram Project – an engineering project best kept under wraps, and concluded with a toast to our guests. Mr. Ronnie Mercer, the Chairman of Scottish Water then responded on behalf of the guests, thus drawing a successful evening to a conclusion.

Colin Davidson

The Falkirk Wheel



The Falkirk Wheel in Mid Rotation

Saturday is a traditional day for leisure activities, such as a boat ride or enjoying the fun of the fair with a trip on the big wheel. We were able to do both at the same time thanks to the Falkirk Wheel, the world's first and only rotating boat lift, which lifts a canal boat 35m (115ft) in just four minutes from the Forth & Clyde Canal to the Union Canal. In an informative and entertaining introduction, Professor George Fleming

The Swordsman

explained the transformational role of canal transport in the early 19th century as what he described as ‘the engine of the industrial revolution’. The Forth & Clyde, built at a cost of £394,545 (at 1791 prices) was profitable throughout the 19th century, but then gradually lost out to newer transport technologies and was eventually closed to navigation in 1964. As David Lamont of British Waterways Scotland explained, canals are now making a comeback both for leisure activities and specialised freight, and the Wheel has made a significant contribution by to this by providing a gateway to Scotland’s Lowland canal network.



The Elevated Structure of the Upper Canal

We then split into two groups and had an opportunity to enjoy the ‘Falkirk Wheel Experience’, as we boarded a boat, entered the gondola and ‘sailed 35 metres into the air’ to join the Union canal, passed through a tunnel under the Antonine wall (built around 142 AD by the Roman army on the orders of emperor Antoninus Pius) and a mainline railway before returning over the aqueduct for our descent back to the level of the Forth & Clyde.



From the Boat in the Top Gondola Ready to Descend

Issue 27

The total 600 tonne weight of the water, with or without a boat, filled gondolas imposes immense and constantly changing stresses on the structure as it turns around the central spine. Normal welded joints of steel would be susceptible to fatigue induced by these stresses, so to make the structure more robust, the steel sections were bolted together. Over 15,000 bolts were matched with 45,000 bolt holes, and each bolt was hand tightened. Thanks to the ingenious design, the two gondolas turn at precisely the same speed, but in the opposite direction to the Wheel and the water and boats always remain perfectly level throughout the whole cycle, while only a small amount of energy is required to turn the Wheel. There was general agreement that this was an ideal example of an appropriate Millennium project, innovative, useful and a stunning piece of working sculpture.

Derek Miles

Stirling Castle

It was a glorious day when we reached Stirling Castle where we arrived via an uplifting experience on the Falkirk Wheel.

The Castle’s main buildings are arranged around an inner circle, a large enclosure at the highest point. The principal buildings are the Royal Lodgings, the Great Hall, the Chapel Royal and the Regimental Museum of the Argyll and Sutherland Highlanders.



One of the Sumptuous Rooms of the Palace

The Royal Lodgings within the palace contain the suite of apartments created by James V for himself and his new bride Mary of Guise, they married in 1538. The interiors were recreated in this year.

Within the palace is the Stirling Heads Gallery which contains the forty one remaining Stirling Heads which are renaissance style wood carvings commissioned by

The Swordsman

James V to convey Key Messages he wished to convey about himself and his court. James V also commissioned 250 sculptures which adorn the exterior walls of the palace.



One of the Stirling Head Wood Carving

The Great Hall was part of James IV's building programme and was completed in 1503 when it was the largest and grandest building in Scotland and was originally used on a daily basis as dining space for the humbler staff.



The Outside of the Great Hall

The magnificent Chapel Royal was built in less than seven months in 1594 to celebrate the birth of Prince Harry the first son of James VI. It has had various uses since 1603 when the Royal Court moved to London including a Garrison Chapel and even as a

Issue 27

store. It was restored to its current interior in the 1930's.

The Argyll and Sutherland Highlanders Regimental Museum is housed within the King's old building which dates back to 1496. The museum has many displays telling the story of the regiment from the Peninsular War (1807-14) up until more recent conflicts. The exhibits include weapons, regalia and spectacular regimental silver.

The history of Stirling Castle dates from around 1100 during the reign of King Alexander.



Commanding Views from the Castle Walls

The exterior attractions include the Queen Anne Garden, the Douglas Gardens and the outer close, all excellent places to relax on a lovely sunny day.

A thoroughly enjoyable, albeit all too brief visit.

William Edgar

The Scottish Crown Jewels and Dinner at Edinburgh Castle

It was clear that the Saturday visit and dinner at Edinburgh Castle was eagerly anticipated, as for the first time our coach from the hotel was not late loading, but was able to depart slightly early!



Flaming Beacons at the Entrance to Edinburgh Castle

The Swordsman

Incidentally how many members noticed previously the latest manifestation of Dyson engineering innovation, in the form of a large bladeless fan, at the entrance to the Radisson Blu dining room?



Ascending the Hill inside Edinburgh Castle

The short trip to the Castle along The Royal Mile was followed by a walk across The Esplanade with its tall flaming beacons, where the grandstands for the August Military Tattoo were being dismantled, but not totally obstructing our view towards the Pentland Hills. The climb past the Gatehouse and then up a quite steep and cobbled tortuous route taking in the Halfmoon Battery, the Portcullis Gate and General Wade's Argyle Battery tired some, but by no means all of us. There was also Mill's Mount Battery, which is supposed to fire every day at 1pm, though I confess I did not hear it myself on Friday.

The castle is sited on what was a volcanic plug, eroded in the last Ice Age, and with the first evidence of human habitation being chewed herring bones dated to 800 BC.



Nearly There

In the Palace itself we passed along an historical display with The Honours of Scotland in the Crown Room, entered and left through massive Chubb strong-room doors, no doubt intended to ensure that The

Issue 27

Stone of Destiny is not extracted from its glass case and stolen yet again. In 1950 Scottish nationalists "removed" it from Westminster Abbey to Arbroath for several months but after being returned to London, moved there when originally stolen by Edward I from Scotland in 1296, it finally returned to Scotland in 1996. Perhaps it should really have been returned to Perth, where under its alternative title of The Stone of Scone, it had been the coronation throne of all Kings of Scotland at Scone Abbey.

We also saw The Sceptre, the Sword and The Crown. The plain Stone looked slightly incongruous lying immediately next to the sumptuous Crown Jewels.

Our formal dinner was in the grand surroundings of The Queen Anne Room and the meal itself was an excellent one, starting with traditional Cullen Skink and for once (thankfully?) not including Haggis. Although in theory there were to be no speeches, but only the traditional toast of 'The Worshipful Company of Engineers-may it flourish root and branch for ever', in practice there were a few words.



The Presentation

The Clerk, the Beadle and Graham Skinner were thanked for their organisational skills, Scottish Water were thanked for our visit and for turning off the rain, and commiserations offered to John Banyard for the lack of a Banyard tartan. Particularly however, the Junior Warden proposed a vote of thanks to The Master John Banyard and Judith for masterminding an excellent and varied Out of Town Meeting to Edinburgh and presented them with a Silver Quaich.

Philip Ashworth

Blair Castle

Thirty guests enjoyed a well planned “guid day oot”. Our expert guide, Christine, briefed us well as we left the bustle of Edinburgh and headed for Blair Castle through the ever changing scenery and the beauty of the Sma Glen. She pointed out places of note enriched with snippets of history. We also saw preparatory work for further wind farms nestled away from many of the beautiful views. For travel through the Highlands the weather was sunny enabling us to enjoy the colourful onset of autumn. As we arrived at Blair Castle we were struck by its imposing white form and location within the extensive Atholl Estates, complete with well laid out gardens and an active display by the resident peacocks and domestic chickens.



Blair Castle

Blair Castle dates back 740 years and has seen several stages of development, each suited to evolving roles. With roots in the Thirteenth century, a dangerous period of clan rivalry, Blair Castle served as the gateway to the Grampians en route north to Inverness. The building was well fortified with soldiers, equipped with the best current weapons to resist attack, and kill the invaders.

The Atholl family first made their home in Strath Garry, and built a castle. Over nineteen generations the Stewarts and Murrays of Atholl have backed winners and losers, been in and out of political favour, won battles and lost them. They have been adventurers and politicians, Jacobites and royalists, entrepreneurs and agriculturists, soldiers and scholars. Almost all of them have made their mark on this castle. The castle has been transformed a number of times in a manner that makes it hard to tell what was built when.

Cold and draughty, the first major change began in 1740, by the second Duke. Architect James Winter

removed the castellations and turrets and re-modelled the castle as a Georgian mansion, with pitched roofs, chimneys and fine interiors by the stuccoist Thomas Clayton of Edinburgh.

100 years later, and with influence from Queen Victoria the 7th Duke, with his medieval original for inspiration, had Edinburgh architect, David Bruce put back the earlier tower and crenellations and build a new entrance hall and front gates. This was crowned with a splendid ballroom. Conveniences such as telephones, gas and bathrooms were installed. In 1908 a hydroelectric scheme was built on the estate. The castle now has central heating and bustles with visitors from all over the world.



Inside the Castle

The Castle is in fine form with friendly staff working hard to keep the building and its adornments in showroom condition. There are comprehensive displays of early weapons of war, including some that have been used to kill. The rooms are fitted out with fine furniture that was used in the different periods in the life of the house. There are family portraits and paintings depicting outstanding events within the history of the families.

Good company throughout the day made sure it will be happily remembered.

John Coplin

Blair Atholl Distillery

As we descended the mist and drizzle shrouded road from the Highlands in to Pitlochrie we could almost sense the smell of single malt whisky in the air. The smell became truly palpable as we got off the bus at Bell's Blair Athol distillery and we found out later that this was the 'Angel's Share' of the spirit that evaporates every year from the storage casks. 2% of the whisky in every cask evaporates each year and across Scotland the total lost is estimated at 180 million litres. The Angels must be very happy!

The Swordsman

The distillery dates back to 1798, however, it is most famously linked to Arthur Bell who became a partner in the brewery in 1851 and formed the famous 'Bell's and Sons' Company in 1895 to market blended whisky based on the Blair Athol product.



Through the Scottish Countryside

We had a very interesting and detailed tour of the distillery, following a process that has changed very little for hundreds of years. Only three ingredients go in to malt whisky. Water, in this case from the Alt Dow burn that flows through the site, barley and liquid yeast.



Viewing the Copper Pot Stills

The barley is soaked and allowed to germinate to release the starch in the seed. It is then dried and milled to produce a fine powder called grist. Six tons of grist and 69,000 litres of hot water are mixed in a mash tun and the starch is turned to sugar which dissolves in the water to give a liquid called wort. The wort is cooled, yeast is added and after 52 hours of fermenting an alcoholic liquid at about 9% ABV is produced. The fermented liquid is distilled twice in stills that are a unique design to the distillery and then placed in oak casks to mature. Whisky for blending is

Issue 27

matured for only three years in American oak casks that have previously held Bourbon whiskey. Blair Athol single malt is matured for 12 years in European oak Oloroso sherry casks that contribute to the unique taste of the product.

We had a chance to sample the single malt which has a sweet and fruity flavour that was not quite to my taste nor, interestingly, to our guide's. We both prefer the peaty malts from the islands! Only 0.3% of the distillery's output goes in to the single malt which is only sold on site, the remainder goes in to blended brands.

One last thing we learned was that you can check if your whisky is genuine by giving the bottle a good shake and then tapping it. If it sounds dull it is genuine. The alcohol bubbles that form when you shake it give the liquid high internal damping and dull the natural ring of the bottle.

Altogether a fascinating, and very enjoyable, visit.

Mike Goulette

ANNUAL BANQUET THE MANSION HOUSE 28th October 2011

It is a real privilege to be able to hold the Company's Annual Livery Banquet in the splendid surroundings of the Mansion House and this year's event truly lived up to expectations. Nearly sixty members supported the Banquet, with one hundred and thirty guests including our very own Court Assistant Michael Bear the Lord Mayor of the City of London, the Sheriffs of the City of London and the principle guest Lord Stafford.



The Master, Wardens and Their Ladies

Our Beadle, carrying the Engineers' Sword, led the top table in to dinner to a fanfare from the balcony by the

The Swordsman

Live Brass Quintet and the traditional hand clap. As we sat down in the glorious Egyptian Hall the band started up again with the Fanfare for the Common Man, just to bring us back to earth. The dinner and wine were excellent, starting with a Cornish Crab Soufflé, which was as good as it was unusual. Dinner was followed by the sung Grace, though by the time everyone searched for the words and scabbled for reading glasses we were on about the third line! Then came the Loving Cup Ceremony. Guests who had studied the notes were still glad that the ceremony started at the top table so that they had a chance to see it performed before it was their turn.

The Master John Baynard, proposing the Civic Toast, referred to the success of the Lord Mayor's Appeal supporting CORAM and RedR, which the Company itself supports. He presented a cheque for £5,000 towards the Appeal from the Company. He also highlighted the government's plans for an engineering prize and the awards created by Lord Stafford the former pro-Chancellor of Keele and Harper Adams Universities, welcoming him as principle guest. The Master reflected on the changed environment in which engineers work now compared with 1983 when the Company was formed. He highlighted the huge shift from the public to the private sector and greater need for engagement with the financial markets. In response, the Lord Mayor welcomed us to his "Council House" and wondered whether he should exercise his right to buy having enjoyed his year so much. A priority this year had been the promotion of British engineering abroad, contributing as it does over a half of UK exports. The Lord Mayor concluded by presenting the Master with a handsome coaster set with an original Spitalfields Market Porter's badge.

The Junior Warden, John Baxter, formally welcomed the guests with a toast. Responding, Lord Stafford said that he set up his Awards some 13 years ago because he saw the need to bring together the bright ideas of the academic world and businesses looking for a competitive edge. He summarised some of the many examples of universities benefiting from engaging with business including Keele and Harper Adams of course but also De Montfort, Lincoln's new School of Engineering, Coventry, Aston and the JCB Academy. He quoted examples of SMEs benefiting from technical advances as well as many larger global companies engaging to enhance their research and ensure the flow of skilled personnel for the future. In closing Lord Stafford proposed the traditional toast to The Worshipful Company of Engineers – may it flourish root and branch forever.

Issue 27

Thanks and congratulations go to the Clerk Tony Willenbruch, to the Assistant Clerk and Beadle, Stephen Grundy, and to all those involved in organising yet another superb and memorable Banquet.

Michael Rolls

The Master's Speech



The Master John Banyard OBE FREng at the Mansion House

Welcome to our annual banquet in this magnificent setting of the Egyptian Hall. I must immediately thank Alderman and Court Assistant Michael Bear, for making his London home available to us tonight.

The Company is extremely proud that Michael has an alter ego as the Lord Mayor of London, and whenever he is required to appear in the guise of this regency super hero, he emerges bedecked as you see him tonight.

To be serious Michael has been a wonderful Lord Mayor, hard working, yet down to earth and approachable. Additionally, he has organised what I believe is probably the most successful Lord Mayor's Charity appeal ever, supporting two well known Charities, CORAM and RedR.

The Worshipful Company of Engineers has been a Patron of RedR for many years, and has recently completed an agreement to continue that patronage, and we are absolutely delighted that the Lord Mayor selected RedR as one of his beneficiaries. It therefore gives me great pleasure to present you, Lord Mayor, with a cheque for £5,000 towards your Appeal.



The Master John Banyard Presenting a Cheque to The Lord Mayor for his Charities

Of course the Lord Mayor has not been alone in his endeavours; he has at all times been supported by the Lady Mayoress, Barbara, who has been outstanding. She has been most elegantly attired at all functions, and many ladies believe that she has some Tardis-like wardrobe in which to store her clothes and hats, because the Mansion House just isn't big enough!

In addition she has found time to host lunches for the partners of Livery Company Masters. After these events Barbara has conducted her guests around the private apartments, including the Lord Mayor's bedroom and dressing room. Judy has been privileged to attend two of these tours and, on the first, the Lady Mayoress explained that the Lord Mayor's clothes were laid out for him, but before tours she went in and removed his underclothes as they seemed to give rise to hilarity. Do they have an ursine motif? I asked myself. The question was answered on the second visit where something had gone wrong, possibly some servant had spotted that the items were missing, and replaced them. On entering with the party, the Lady Mayoress immediately removed the offending articles, but not before my eagle-eyed wife had noticed that the Lord Mayor has his name sewn inside his garments. Now, why does he need to have his name sewn inside? Is he planning to go back to school? Or possibly enter some form of commune at the end of his year? I don't know, but I can reveal a second alter ego – he is indeed Saint Michael!

On a slightly more serious note, the Government is going ahead with its plans for a Nobel style engineering prize and a formal announcement is expected soon. Several members of the Livery have been involved in this initiative; it can only be a good thing for the UK's reputation and the proposal to expand engineering to help rebalance the economy.

Engineering is a broad discipline, not simply manufacturing, although our politicians do seem to equate the two. The planned expansion includes increased focus on small and medium sized enterprises.

If SMEs are to meet expectation they must engage with today's technology and need encouragement to utilise the expertise to be found in Universities, which is why the Awards created by our principal guest Lord Stafford are so important, and I am delighted that he is able to be with us tonight.

Surrounded by history as we are here, it is easy to forget how much has changed in the relatively short life of the Engineer's Livery.

Our Company was formed in 1983, and that was a very different world to the one that we now live in.

In 1983, mobile phones did not exist in the UK; the privatisation programme had started and a few companies such as British Petroleum, British Aerospace and Cable & Wireless had slipped the shackles of Government ownership, but other household names like British Airways, British Telecom, and Rolls Royce were still within the nationalised industry fold.

I wish to look briefly at why it was the 1980s before the Engineers Livery was founded and why it is still relevant to Engineers of the 21st century.

Engineering has an identity problem that probably started over 2,000 years ago when Vitruvius carelessly named his book "De Architectura" instead of "De Ingerere" - I should admit that, according to my Latin master, nobody's Latin could be more careless than my own.

The profession then had to wait until 1750 when John Smeaton, coined the Term 'Civil Engineer' to distinguish his work from that of 'Military Engineers'. He also founded the Society of Civil Engineers which was renamed the Smeatonian Society and continues today as the oldest Engineering Society in the world. However, with membership of only 48 first class

The Swordsman

members, it was never going to meet the needs of an expanding profession.

In 1818 the Institution of Civil Engineers was founded, which established professional standards, examined potential entrants and created a benevolent fund. In many ways it resembled the functions of the early Guilds and Livery Companies.

But there were problems and in 1847 the Mechanical Engineers formed their own Institution; legend has it that this followed a spat between George Stephenson and the ICE, but that is probably an apocryphal story.

A further fracture occurred in 1871 with the Telegraph Engineers who became the Institution of Electrical Engineers, after that the fragmentation continued apace with numerous other engineering institutions being created, with associated rivalry.

In parallel the Livery Movement was going through one of its less glorious periods, and had ossified. In 1709 the Fanmakers were incorporated and a mere 100 years later were granted Livery. They were the last Livery Company to be created for over 200 years.



The Lord Mayor and Lady Mayoress Enjoying the Master's Speech

Livery companies had become complacent, they were wealthy, and controlled many aspects of City life; while the country went through the turmoil of the Industrial Revolution they saw no reason to change. Inevitably those outside the movement questioned its values, propriety and governance. It all came to a head in 1880 with the establishment of a Royal Commission of Enquiry. After four years of deliberation the Commission gave a reasonably clean bill of health to the Livery movement, vindicating the stewardship of their funds, and praising their contribution to education. But at the same time it concluded that change was necessary.

Issue 27

Even then change was slow; the aftermath of the First World War provided the catalyst. In 1926 the Master Mariners were incorporated and became a Livery in 1931. Over the last 80 years 36 new Livery Companies have emerged reflecting modern trades and professions including the Engineers.

It is doubtful whether the Engineers would have formed a Livery but for the insistence of The Duke of Edinburgh that there should be a unified body of eminent Engineers to represent the views of the profession resulting in the creation of the Fellowship of Engineering in 1976 – now the Royal Academy of Engineering. After that it was but a short step to the creation of the Engineers Livery Company – and how far-sighted that was.

The privatisation programme transformed much of the Engineering environment; instead of working in nationalised Industries funded by the Treasury, Engineers had to come to terms with working for organisations where availability of capital was controlled by the markets, and success or failure was judged by shareholders. Of course many engineers had always been in that position, but just consider the scale of the change: Airports, airlines, aerospace, ordnance factories, steel production, the utilities, ports, transport, ship building, and many more had to become accustomed to the new regime.

Over the years, financing vehicles have become ever more sophisticated, and Engineers have had to become familiar with the workings of the financial markets and the City of London.

The Livery movement provides an opportunity for Liverymen to cross professional boundaries to the benefit of the City and the Country as a whole.

My Lord Mayor, we are delighted to be a part of the tradition of this historic City.

And now, I ask you to join me in a toast to ... ‘The Lord Mayor, the City of London Corporation and the Sheriffs’.

Extracts from the Speech by The Rt Hon The Lord Mayor of London Alderman Michael Bear

Master, Wardens, My Lord, Sheriffs, Ladies and Gentlemen,

A very special welcome to the Mansion House – my humble council house for the year. We have enjoyed our time here so much that I'm thinking of exercising

my right to buy! Notwithstanding Vince Cable's Mansion House tax!

Now I only have 15 days, 2 hours and 30 minutes until I gain that unfortunate title, the late Lord Mayor.



The Rt Hon The Lord Mayor Alderman Michael Bear

Since I became Lord Mayor I have spoken at around 80 livery company lunches and dinners. Each one unique in its own way.

To mention a few – with an element of ursine humour:

I started at the Ironmongers' a little bit *rusty* but I did manage to *forge* some new links.

At Ironbridge I had 90 Masters absolutely *riveted*.

I had the Haberdashers in *stitches*.

I told the Chartered Surveyors that success as a property Lord Mayor is down to *loquation, loquation, loquation*.

And at the Bakers, I had to *bring my own crumpet*...!

But tonight I hope you'll *bear* with me after this *pun*-ishing schedule, because this is a very special speech - to a company I am proud to belong to.

And to mark this special evening I am wearing a replica of the Lord Mayor's collar of SSs, to which Sir Peter Gadsden, engineer Lord Mayor and the Company's founder Master - made a generous contribution.

I am also glad to see such a *galaxy* of distinguished and interesting guests here tonight. I am reminded of the story of Dr Kissinger at a similar function, who

said he had not seen so much elegance, intellect and erudition in one room since he had stood *alone* in the Great Hall of Mirrors at the Palace of Versailles.

Kissinger also recounts that during a moment of silence at a banquet in China he turned to his host Deng Xiaoping and said: "what do you think would have happened in the world if Khrushchev, the Russian President, had been assassinated, not President Kennedy?"

Deng paused, thought for a while and then replied: "If President Khrushchev had been assassinated and *not* President Kennedy, we can be sure of one thing. Mr *Onassis* would not have married Mrs *Khrushchev*."

Master, it has been a privilege to be the first Lord Mayor from an engineering background for many years – from the real economy.

With 38 years in the construction industry, it is true to say that buildings are in my bones – in fact, Barbara, the Lady Mayoress, tells me that talking to me is like talking to a brick wall!

I have enjoyed a busy year, building on the work of previous Lord Mayors – in the best *unpaid* job in the world.

And I am a "green" Lord Mayor. With around 900 speeches to give this year I promised to do my bit for sustainability by "recycling" a large portion of them.

Wherever I have travelled I have had an excellent reception, speaking as a client of financial services.

I have sharpened the business focus of the Mayoralty, highlighting the vital link between what we do in the City with industry, investment and exports and strengthened our partnerships, especially with the CBI and our Trade and Investment Minister, Lord Green.

I will continue to do that after the Mayoralty, as Lord Green has asked me to join his Strategic Advisory Group. To advise Government on helping British business export and foreign companies invest.

Brand Britain and Brand City remain strong throughout the world. And we must not forget we are the 7th largest manufacturer in the world!

My overseas visits have complemented the Prime Minister's focus on commercial diplomacy.

In total, I have visited 22 countries over 92 days, and travelled 100,000 miles. That's 4 times around the

world. I have strengthened our relationships with emerging markets – where I have spent the majority of my time overseas. *Their* growth is crucial to *our own* future prosperity.

Promoting British engineering in these key markets has been one of my top priorities because the success of British engineering abroad will continue to be crucial for our future prosperity. Engineering is responsible for over half of all UK exports, and makes up nearly a fifth of the UK economy.



The Lord Mayor Presenting the Master with a Memento of the Banquet

Our success in delivering the facilities for the Olympics has showed to our international partners that British engineering is still a world leading industry. But it is clear that if we are to seize these opportunities we must continue to improve the flow of newly trained engineers – and reward and recognise excellence in our profession. Engineering UK estimates that the UK needs to train an additional 500,000 skilled engineering and manufacturing workers by 2017.

The Company has its own important part to play in promoting excellence – not least through the awards it sponsors and the bursaries it awards. Your own theme, Master, of “innovation” chimes with my own view - that this is our main competitive advantage, especially in our export markets.

Engineers have made a huge contribution to the success of the City. By working on some of the iconic buildings that help us meet the needs of modern business and technology and by delivering the infrastructure that we need to stay competitive. It is engineers – and members of this Company – that have made this possible.

Lord Stafford’s Speech

Some 13 years ago I set up The Lord Stafford Awards because at the time I was privileged to be Pro Chancellor at Keele University and I saw world class academics with brilliant ideas but with no concept as to how to take those ideas to the market and businesses who were looking for a competitive edge not knowing how to access Universities. By bringing to the two together there have been some remarkable results. During that time I have seen over 650 businesses working with Universities and many of those have been engineering companies.

By way of example as to the diversity of companies now working with Universities there is Magnacell working with Keele who have devised a way of getting gene therapy into the body via a non invasive way. They do this by placing two magnets either side of the body enabling gene therapy through the lungs which will have a dramatic effect in treating such diseases as cystic fibrosis. Another company Camira have worked with De Monfort University designing a machine which takes the fibres from the outside of stinging nettles which are then woven with natural wool creating a fire resistant material. This can then be used in cinemas, railway carriages and office furniture. A company we saw this year called Molecular Solar have designed the third generation of solar panels which are not much thicker than a laminated piece of A4 paper and which will be incorporated in all our mobile phones and ipads so that they will no longer need to be recharged from an electrical socket.

The big cry has been we need more engineering students which is certainly true. What I have seen however is that we need more engineering education and we need more businesses to work with Universities to encourage more students to see just how diverse and how important engineering is to all our daily lives

In the Midlands there have been prime examples of this. Sir Antony Bamford at JCB has been so exasperated with the lack of skilled labour coming into his company that in April this year Prince Charles opened the doors on the new JCB academy which now takes in 240 students in years 10 and 11 and a further 300 at sixth form. I can tell you it is extremely impressive to visit the site which is an old cotton mill which now has been fitted out with all the latest 3D technology. These students are taken from an 18 mile radius within the Staffordshire and Derbyshire education authorities and the students have all the facilities of other surrounding schools but they are

expected to behave as if they are in the work place not in a school.



Lord Stafford

What is key, however, is that much of the curriculum is helped and designed by business partners who include Rolls Royce, Toyota, Bentley Motors and Network rail. At a recent open day this summer 1500 people came to see the academy. Sir Anthony also has links with the HE sector (higher education) at Harper Adams because Harper is now the only University in the country doing agricultural engineering since Newcastle, Cranfield and Whittle College in Essex closed their Agricultural engineering departments down. Harper has some 270 students doing degree and masters courses of whom a number have scholarships with JCB.

I also visited Aston University Engineering Academy with brand new state of the art buildings which opened last month. This will be taking 120 students at year 10 and 11 and a further 60 from across Birmingham at sixth form. The partners involved with Aston are the National grid, The Royal Air Force, E-on and Goodrich.

Only two months ago with the Lord Stafford Awards judging panel we visited Lincoln University and the collaboration they are doing with Siemens. Although Lincoln University is only 10 years old, Siemens have invested heavily in the University as they want the best and brightest students. This is an entirely business decision by them as they make no bones about the fact that the top 15 students will come and work for them. Siemens now do all their staff training at Lincoln, they will bring their clients there and they have done away with all their research as this is now done by the University. I asked how did they recruit so many students when Lincoln is the heart of wheat production not engineering. They told me that along with the University, they work with local schools and sixth form colleges encouraging students not to take media

studies or photography for A level but exams which will help them to get better qualifications. Lincoln now has 200 applicants for 90 places.

There are other examples with Coventry University working with the automotive industry, Birmingham linking up with Unilever, Boots and Cadbury's, The famous Warwick manufacturing group is a spin off from the University and that is the most impressive and most successful in the country. We also visited the new Manufacturing Technology Centre based in Coventry which is like a James Bond setting and has of their links with Rolls Royce, Air bus and Aero Engines.

It is happening out there but more needs to be done to encourage students to take up engineering as it is you engineers who will determine our lives and determine how we can better use the resources we need to survive on. Napoleon said of Britain 'it is a country of shop keepers', well in the Midlands it certainly is not and if Napoleon were alive today I would invite him to come and see for himself and tell him the best way to get there was to catch a train from Waterloo.

MANSION HOUSE LECTURES

During his year as Lord Mayor, Alderman Michael Bear organised three events at the Mansion House on aspects of the evolution of the City – past, present and future. Additionally he has recently been appointed as honorary president of the London Festival of Architecture, and we offer him our congratulations on that appointment.

London and the City, April 2011

The first event – a lecture by Dr Simon Thurley, CBE, Chief Executive of English Heritage - reviewed the history and development of the City. Thurley looked at a number of major events such as the Black Death, the Great Fire of London, and the Blitz and explained how each of them had had a major impact on the way that the City as we know it has evolved. A somewhat surprising factor was the legislation in the 17th and 18th centuries that had curtailed the power of the Livery Companies and Guilds. In this respect London had been at least 100 years ahead of its continental rivals, the other European capitals. The knowledge that immigrants would be free to practise their trades and professions had led to a large influx of highly skilled individuals, with the result that City's commercial expertise evolved far more rapidly and to a higher level of sophistication than in other European cities. This in turn laid the foundations for the worldwide reputation that the City enjoys today.

The Modern City, 18th July 2011

The second event explored how urban design and open spaces contribute to the effectiveness of the City as a modern workplace and how these might further enhance its international competitiveness. Three leading urban thinkers and planners (Peter Bishop, Peter Head and Sir Terry Farrell) reviewed how cities grow.

Introducing the event, Peter Bishop (recently deputy chief executive of London Development Agency) emphasised the need for green public spaces, to enable city workers to interact with each other. He commented that perhaps this should be given greater priority, and pointed out that the £28 million per mile spent widening the M1 motorway would pay for lots of green public spaces. Outside the City, the legacy from the Olympic Park may help to regenerate the Lea Valley and East London.

Peter Head CBE (head of Arup's global planning practice and an expert on sustainability) stated that growing cities do not enjoy economies of scale: they need more resources – more public transport and space for walking and cycling. As a guideline, he recommended that about 1% of GDP per year should be invested in public transport. China, for example, invested 5% of GDP in high speed rail lines in 2010. To reduce emissions, electric vehicles should be used, and goods delivered at night from distribution centres. Private ownership of land constrains the layout of London. However, the internationally renowned architect and planner Sir Terry Farrell pointed out that as the City owns much of the land it can influence

development. Also, control over the development of the centre of London is less stringent than of the centre of Paris, as tall buildings such as the Shard being built at London Bridge testify. Mixed use developments are beneficial for a vibrant city. The City has been enhanced by the development of



Broadgate; Spitalfields; Cheapside; the public open space in the Barbican and at Paternoster Square; and

subtle changes at Smithfield, which has evolved without a master plan.

During the discussion (moderated by Paul Finch OBE, distinguished architectural journalist, chair of the Commission for Architecture and the Built Environment, and deputy chair of the Design Council), there was a call for better use of the Thames as a working port with bridges to regenerate use of the river, and better management of water including sustainable drainage of storm water. The Olympics may have less impact on the City than Crossrail or the extension of the Tate Modern. A possible increase in the overall population of London by 1 million by 2030 will require much more infrastructure in areas such as Park Royal, Kings Cross, Nine Elms, and Old Oak Common - the latter is closer to the centre of London than the Royal Docks.

Cities of the Future, 18th October 2011

The third event focused on cities of the future, with presentations by Francis Salway of Land Securities, Lee Polisano of PLP Architecture, and Peter Rees the City Planning Officer. It reviewed how they might look, how they will operate and what local and national leaders can do to ensure they evolve sustainably.

Salway argued that the growth of cities depends on four things: people and talent, public transport, rules, and vitality.

Talented people are attracted to open societies: the USA leads the league table of Nobel Prize winners, but not all of them were born there. In its favour, London is the only capital city with a world class university. Many talented people come from overseas to study in London, but their chances of subsequent employment here are hampered by changes to immigration policies. New developments in the City no longer provide car parking spaces. Public transport is used by most people but needs further improvement to reduce congestion. Crossrail and High Speed 2 are vital. Furthermore, internal community politics should not be allowed to constrain increased airport capacity, and therefore access to Asian economies, when our closest economic competitors - France, Germany and Holland - have already built more runways.

Rules include laws, taxes and regulations. Laws and regulations are more reliable, quicker to resolve and more cost effective in London than in New York. Between 1995 and 2005, London grew faster than New York.

The Swordsman

A city's vitality depends on amenities for rest and recuperation close to the work place, with green spaces more valuable than restaurants. Maintaining or recreating original streets is important. Buildings of high quality materials, whether traditional or modern, can themselves generate a feel good factor.

Lee Polisano reviewed the development of urban skylines. To make real impact, he said, required development of areas typically 600 metres by 600 metres by 600 metres tall. Educated populations in cities such as Cairo create the enterprises that make cities grow. Although London, New York and Paris are expected to rank as world class cities in 2025, most of the growth is expected to be in Asia and developing countries.

Cities may anticipate change, react (or not, as in not building new infrastructure such as new airports), experiment (as in the new zero carbon city in the United Arab Emirates), or do nothing.



The Millennium Bridge from St Paul's Cathedral

Finally, Peter Rees attempted to put the foregoing into a UK/London perspective: Much of the world has land use planning, but in Britain town and country planning was introduced in the 1940s to constrain the development of towns, except for new towns such as Stevenage, Welwyn Garden City and Milton Keynes. The image of London has evolved from the post-war black and white photograph of commuters walking over London Bridge, with limited choices of places to eat or gossip after work. Now, the image is more that of tourists crossing the Millennium Bridge from the South Bank to St Paul's Cathedral, and there are many new places to eat, sleep and shop. Over the next 25 years, the mix of residential and commercial space is unlikely to change. Good buildings from the 1980s and 1990s, together with the cluster of towers now being built, should provide a vibrant city for the future.

Further insights emerged in response to questions from the floor. London Underground has a funded project

Issue 27

for a new entrance to Bank station. Gas and electricity supplies in the City have been renewed. Also, the City has no less than eleven fibre optic networks. It is a business community, with a resident population of less than 10,000, down from 140,000 in 1949. Nevertheless, it has some vibrant night life. Transport is easy, so there is no need to live close to the workplace. About 95% of City workers commute by public transport. As buildings consume about 50% of the world's energy, they need to be more efficient and use off-peak energy for heating and cooling. One third of the City is a conservation area, and there are already many listed buildings.

At both the second and third events, it was noted that some recent buildings deserve to be listed, but not now at the age of 25-30 years as to do so would constrain the evolution of the city.

Peter Blair Fish

COMPANY NEWS

July Court Meeting

At the Court Meeting held on 12th July 2011 two new Liverymen were invested

Professor Kenneth Walter Grey CBE, FREng, BSc(Hons), PhD, DSc, FIET, FIoP



Following his study for a doctorate in the UK and research at Columbia University and Rockwell International in the USA Ken joined the MoD at the Radar Establishment at Malvern where he became Deputy Director. Ken then joined Thorn EMI and later formed Scipher plc in a management buy out. Since 2004

Ken has been assisting with SMEs and is a visiting Professor at Nottingham University and an advisor to Surrey University

**EurIng Ian Ronald Sutton Watson
BEng(Hons), CEng, FIMechE, FIET,
CEnv, MCGI**



Ian started his career as a Fitter & Turner completing a recognised 4 year Mechanical Apprenticeship that was run by the City & Guilds Of London Institute. After this successful start to his career Ian took a first class mechanical engineering degree and became a Fellow of the Institution of Mechanical Engineers in 1999 and of the Institution of Engineering and Technology in 2006. Ian is Group Development Engineering Manager of IMO/ARC Car Wash Group Ltd who are Designers, Manufactures, Installers and Operational Managers of Complete Automated Conveyor Car Wash Equipment for sites located within a network of 14 Countries worldwide.

October Court Meeting

At the Court meeting held on 11th October 2011 four new Liverymen were invested

**Dr Eur Ing Lucius Chidi Akalanne
B.Eng, PhD, CEng, FIMechE**



Lucius was awarded a PhD in Fluid Dynamics from Bath University and also has a Patent in Thermal Management. As a Consultant Engineer in Alcatel-Lucent he is responsible for driving continuous product evolution through innovation.

As Chairman of Alcatel-Lucent's Thermal Council he advances thermal technologies and design methodologies for next generation corporate products and also has additional responsibilities to determine the patentability of new inventions.

He is a regular external speaker at Seminars to participate in knowledge transfer activities that engage and inspire young engineers. Lucius is also a Managing Director of Therna Consultancy a new start up Consultancy Company.

**Colin Norman Newsome MBA C Eng
FICE**



Colin Newsome is a Civil and Structural Engineer by training. Having designed and installed bridges in his early career, his experience broadened into Infrastructure Management and the sponsorship of major, rail related schemes. He gained an MBA from Aston University focussing on "Supplier Development in the railway industry".

Currently employed by Network Rail in the capacity of Policy Development Engineer, he has a particular interest in the introduction and application of new technology and how this can lead to revised Standards. He has a responsibility for the development of technical training for technicians and engineers.

**Eur Ing Paul Richard Merrick CEng
FIMechE**



Paul is 54, married to Sue and has two children and three grand-children. Paul and his wife live just outside Buxton in the Peak District. Paul is a graduate with first class honours in Mechanical Engineering and holds a Master of Science in Pharmaceutical Engineering, both from Manchester University.

Paul started as an apprentice mechanical technician in 1972 and worked his way through various Engineering

The Swordsman

roles within ICI's Quarrying industry for 17 years and since 1990 within AstraZeneca Pharmaceuticals. Paul took early retirement finishing at AstraZeneca in 2007 as their UK Packaging Engineering Manager.

Paul is Chairman of Process Industries Division and past Chairman of the Pharmaceuticals Technical Activity Committee at the Institution of Mechanical Engineers in London. He was also a founder member of the Consultative Forum of Pharmaceutical Engineers. Paul is a visiting lecturer in Pharmaceutical Engineering at University of and a Science and Engineering Ambassador mentoring young children in local schools.

Paul is Director of his own consultancy specialising in Pharmaceutical Engineering & Packaging, LEAN Manufacturing, Continuous Improvement and Professional Development

Julian Francis Osborn Ranger BSc (Eng)Hons CEng FIMechE



Julian's career in engineering started with graduation from Imperial College, London with a BSc (Hons) in Aeronautical Engineering in 1984. From 1984-86, Julian worked for EASAMS as part of the team developing the avionics for the Tornado F3 fighter aircraft. Working initially on simulation

and avionics hardware development and integration, Julian became responsible for integration of the JTIDS/Link 16 communications system into the F3.

Julian left EASAMS in 1986 and was co-founder and CEO of STASYS Limited which he sold to Lockheed Martin in 2005. Julian was responsible for the growth of STASYS from founding to a business with 230 staff, with subsidiaries in USA, Germany, Australia and Malaysia. Based on several technical innovations, notably the iSMART process developed by Julian, STASYS had a worldwide reputation in Defence and Air Traffic markets for network centric consultancy, interoperability management and systems support.

Following acquisition by Lockheed, Julian was Vice President International Strategic Development,

Issue 27

responsible for development and execution of the international strategy for the Systems Integration business group of IS&S, Lockheed Martin.

Leaving Lockheed in 2007, Julian continues to build new businesses through his innovation hub, iBundle, and is an active investor in technology businesses, for example putting an autonomous rover on the moon in 2014 through Astrobotic Inc. Julian also supports various initiatives to foster greater STEM take up within the younger 6-13 age group, and in cooperation with the Royal Society, sponsored the production of the When STEM report by the IMechE.

MEMBERS' NEWS

Honours

Congratulations to Mike Howse and to Terry Hill on being made Commanders of the British Empire Order in the Queen's Birthday Honours List. Terry Hill has also been appointed the next ISO President to take office in January 2013 for two years. Terry is the first British President since 1958.



Mike Howse

Terry Hill

At the Institute of Physics Annual Awards Evening on 6th October, three Liverymen received the Institution's most prestigious award, the Glazebrook Gold medal, for their work in establishing and nurturing University Technology Centres at home and around the world. Professor Ric Parker, Dr Mike Howse and Professor Phil Ruffles were honoured, according to the citation, 'For the creation, development and expansion of the Rolls-Royce University Technology Centre (UTC) network, widely held to be the exemplary model for university/industry interaction'.

The medal was named after the first Director of the National Physical Laboratory who was also the

Golden Wedding Anniversary

Congratulations to David and Ann Bawtree who celebrated their Golden Wedding Anniversary on 19th August 2011



David and Ann aboard HMS Victory at the Out of Town Meeting in 2007

Obituaries

We are sad to record the deaths of six Liverymen, Monty Williams, Donald Young, Robert Shannon, AVM Michael Brown, Dr Donald Pritchard and Dr Richard Pike. Richard died in July at the age of only 61 and was Chief Executive of the Royal Society of Chemistry. After a career in BP Richard became director general of the Institution of Mechanical Engineers from 1993 to 1998 and was passionate about trying to reverse the falling standards in public examinations and warned how meaninglessly easy science examinations were harming British Business.

Diamond Wedding Anniversary

Congratulations to Phillip and Gwen Edwards who celebrated their Diamond Wedding Anniversary on 18th August pictured below just 60 years apart.



The Late Lord Mayor



Congratulations to Liveryman and Court Assistant Alderman Michael Bear on a most successful year as Lord Mayor of London just finished.