The Worshipful Company of Engineers

(Incorporated by Royal Charter 2004)

The Swordsman Newsletter

CERTARE · INGENIO

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CONTENTS

COVER PHOTOGRAPHS

Top Left	Christs Hospital, Horsham
Top Right	The Master and Wardens
Bottom Left	Painshill Park
Bottom Right	Behind the scenes at the Royal Opera House

FUTURE EVENTS

13-16 September 2007	Out of Town Meeting	Portsmouth
1 October 2007	Election of Lord Mayor	Guildhall & Wax Chandlers' Hall
3 October 2007	Ladies Luncheon	Wax Chandlers' Hall
26 October 2007	Annual Banquet	Mansion House
10 November 2007	Lord Mayor's Show	Wax Chandlers' Hall, Riviera Restaurant
11 December 2007	Carol Service	Tower of London, Thames Cruise Dinner
6 February 2008	11th Bridge Lecture	City University
26 February 2008	Election Court and Service	Wax Chandlers' Hall, St Vedast-alias-Foster
7 March 2008	United Guilds Service	St Paul's Cathedral, Wax Chandlers' Hall
22 April 2008	AGM (Common Hall) and Installation Dinner	Butchers' Hall

EDITORIAL

Welcome to Issue 18 of The Swordsman. In order to avoid the news becoming a little too old I am introducing a third edition this year. This edition covers the first four months of the new Master, Rear Admiral David Bawtree's, year. Thank you to all my contributors who give their own particular view of all the events.

As Company Archivist, John Banyard has made a very good start at creating a record of the history of the Company. It is very important that an effective and robust record is made of all of the Company's activities so that nothing is lost and before too many memories fade. If anyone would be prepared to assist John in this important work as an Assistant Archivist, John or the Clerk would be very pleased to hear from you.

Raymond Cousins

VISIT TO PAINSHILL PARK, SURREY

17April 2007

Painshill: romantic landscape park, tranquil gardens, rich man's folly or work of art – probably all of these, and more, and therefore an enduring enigma and one that we were able to enjoy during our April visit. When a number of us met with the Master and his Lady for lunch at Denbighs' vineyard it was still grey and overcast but once at Painshill we were rewarded with the fine weather that had been forecast.

The top brass wait for the stragglers to arrive

The Hon Charles Hamilton was born in 1704, educated at Westminster school and then at Oxford. As was fashionable he took the eighteenth century equivalent of a gap year and after university studies went on his "Grand Tour", repeating the experience again a few years later. He returned laden with purchases – marbles, paintings and busts - and also with a lifelong obsession, (and eventually commensurate debts), to recreate some of the great vistas that he had so recently experienced. So in 1738 he began to acquire land at Painshill until eventually he could start to sculpt and plant the 250 acres that he owned.

It is important to recall that at this time the gardens of grand country estates were usually of strict geometric form, with straight avenues lined with trees, other plantings of various sizes and shades of green and virtually flowers. In contrast to this Hamilton created a "natural" landscape, a romantic park with surprises as each new vista comes into view. There were groves and thickets and, as you walk around on paths that meander, you stumble on the vineyards, the cedars of Lebanon, the lake, the river, the amphitheatre, the ruins of an Abbey, the Chinese bridge, the Mausoleum, the Grotto, the waterwheel, the Gothic tower, the Elysian plains and the Turkish tent. Only the temple of Bacchus has gone, the North portico and four columns removed to replace a verandah at Painshill House in 1925 and the remainder demolished. Was this a bold prediction of the types of "goings on" that might take place within the house or simply an appreciation of the fine design possibly attributed to Robert Adam?

Many of the plantings at Painshill are a consequence of the arrival of exotic species from various parts of the New World: these included flowering shrub species such as the rhododendron and azalea as well as the flowers from which to make the herbaceous borders which many of us now take for granted and think of as the quintessential component of an English garden. All this, and much more, was explained by the excellent volunteer guides of the two groups into which we split, Jacquie Jenkins being our leader: you learn so much more about a place when an expert is there to explain and reveal.

Sadly Hamilton eventually ran out of money and had to sell Painshill in 1773: thereafter various private owners "cherished their possession" whilst simultaneously presiding over its decline. Much to their credit Elmbridge Borough Council eventually purchased part of the original estate in 1980 and with the help of organization such as the National Heritage Memorial Fund, the Painshill Park Trust and the Manpower Services Commission are restoring what is now a Grade I listed landscape to its former glory.

Simon Waldram

COMMON HALL AND INSTALLATION
24 April 2007

This year's Common Hall was held at the Plaisterers' Hall on London Wall. Plaisterers' Hall is one of the largest in the City and has recently been refurbished to the highest standards of modern plastering.

After the private Court Meeting for general business the Court reconvened in the main reception room with many guests and standing room only for latecomers.

The Master welcomed three new members of the Company, Dr Graham Owens, Mr Peter Morgan and Professor Michael Brown and invested them with the Livery.

The Court Meeting then closed and the Master, Commander Bryan Gibson MBE, opened the Common Hall of the Company, gave his report on the year and presented the accounts. At the end of his report the Master signed a Memorandum of Understanding with Martin McCann the new Chief Executive of RedR.IHE to continue the support that the Engineers' Company gives to this most important charity in the field of disaster relief.

The Master then installed his successor, Rear Admiral David Bawtree, CB, DL as Master for the year ensuing following which the new Master installed Tony Roche, Chris Price and John Robinson, all members of the Royal Academy of Engineering, as Senior, Middle and Junior Wardens respectively.

In thanking the Company after his installation the new Master said that he had never been elected to anything before and so was very humbled, but delighted, to be installed as Master.

The Master then announced that Peter Blair Fish and David Johnson had been elected to the Court and they were duly installed as Assistants of the Court.

After closing Common Hall the new Master and Wardens received the many guests who enjoyed looking around the magnificent Hall and engaged in good conversation before sitting down to dinner.

The new Master's first duty at dinner was to present a Past Master's Silver Goblet to Commander Bryan Gibson expressing his thanks for an excellent year. After a delightful meal, during which The Connecting Arts Brass Quintet entertained us, the Master proposed the toast to the Guests to which the Surgeon General, Vice Admiral Ian Jenkins, CB CVO FRCS responded.

Raymond Cousins

Annual Report by the Master

Master-elect, Wardens, Liverymen, Ladies & Gentlemen.

It is now my pleasure to introduce the Annual Report and Accounts for 2006 copies of which have been circulated. These are for the calendar year 2006 which does not coincide with the Master's year in office so the first four months were during Bob Hawley's year. When I took over this time last year it was clear the Company was in good heart and, in modern terms, very much fit for purpose. This year I will, with one short break in 2003, have been an officer of the Engineers' Company for 21 years starting with my appointment as Clerk in 1987. Looking back, there is one decision which was probably the most important one taken by the Company to date and that was, in 2002, to lease an office in Wax Chandlers' Hall. It completely changed our way of working allowing us to employ both a Clerk and a Beadle but, more significantly, it provided a central City base in which Wardens and Court Assistants could become more fully involved in our day-to-day activities.

During the last five years we have enjoyed very cordial relations with our landlord and it was perhaps appropriate that my first external engagement should be to attend a Wax Chandlers' Livery Dinner. We were fully briefed before the

Wax Chandlers started the refurbishment of their Hall but none of us had any idea of the increased work that would be required nor the noise, dust and general inconvenience of the last 8 months. The completion date has been changing on an almost daily basis which has made the planning, scheduling and rescheduling of events extremely difficult. Throughout it all, Graham and Stephen have not only delivered their usual high standard of service but have also provided a haven of calm at least when the Master has been in the office.

The up-side has been no rent or service charges being payable during the building works together with the opportunity to visit other Halls. The down-side has been the increased costs associated with the use of other Halls. There are now 39 Livery Halls within the City and during the last 12 months I have visited 28 of these, 11 on Company events and 17 as a guest of other Companies or City Organisations. Court Meetings have been held in Glaziers' Hall, Watermen's Hall, Pewterers' Hall, Barber Surgeons' Hall and tonight here at Plaisterers' Hall. Company events have also been held in Skinners' Hall, Glaziers' Hall, Armourers' Hall, Coopers' Hall, Carpenters' Hall, Barber Surgeons' Hall, Cutlers' Hall and the Mansion House.

In keeping with my theme of "Engineers and the City", we had excellent visits to the Mansion House, where we were able to view the City Plate, and to the Old Bailey with the curious sight of the Clerk in the dock of No. 1 Court. The Clerk to the Chamberlain's Court continued the theme with a talk on the Freedom of the City at the Ladies Luncheon. Mary and I, with Graham and Margaret, had great fun organising the Out-of-Town Meeting to Cornwall last September and we were delighted the programme seemed to be so well received. Raymond Cousins does an excellent job editing the Swordsman and in arranging for members to write up the visits. The last two issues of the Swordsman will be major items in our scrapbook of the year.

In 1999, after his year as Master, David Mitchell created our first web site and he has been the webmaster ever since. His enthusiasm and computer skills have enabled us to enjoy a very good site at minimal expense to the Company and I know many of us are regular visitors provided we can remember the code to access the members' area. David has now handed over the duties as Webmaster to Assistant Clive Walker and I would like to record our appreciation of David's work over the last eight years.

In a year of many happy and successful events, there was also a sadder side. We have in the last twelve months had the deaths of a number of very supportive wives whose presence at our functions will be sorely missed. Early in 2006, we had the death of a Founder member Sir Alan Veale followed by the loss of Past Master Len Weaver, Founder Master Sir Peter Gadsden, Liveryman Maurice de Rohan and very recently Liveryman Air Marshal Sir Geoffrey Ford. We will miss them all.

Our membership numbers continue to rise and we are currently seeing an increase in membership enquiries. A few years ago, the Court agreed that Chartered Engineers who were not yet Fellows of their Institutions could be admitted to the Freedom although their progress to the livery would still be dependant on obtaining Fellowship. The first Freeman to be admitted under these new procedures has been successfully in obtaining Fellowship of his Institution and was admitted to the Livery in February. I very much hope this will be the first of many young engineers to follow this route.

Finally, I must record my thanks, and those of the Court, to Graham and Stephen. Only a few of us really appreciate how much they do and we are indeed fortunate to have two such dedicated members of staff. The Remuneration Committee has kept their conditions of service until regular review and we have agreed bonuses to Stephen to recognise the very difficult conditions under which he has had to work since last September. As many of you will now know, Stephen has since been appointed as Assistant Clerk and Beadle and we have also recognised his 20 years of service to the Company by the award of the Honorary Freedom of the Company.

Our Charitable Trust Fund is an independent registered charity and the report and accounts have already been approved by the Trustees but there are a number of points which I believe are important.

At the end of 2006, the Balance Sheet for the Trust showed total assets of £504k of which £257k was in restricted funds and £247k in unrestricted funds. The total assets at the end of this month have risen to £534K. We made grants totalling £9,675 and

£8,130 was spent on medals and prizes. Over the last few years, the Awards Committee has overseen a review of all our prizes and the funding needed for each award. A major part of the review was a reassessment of the awards to the Armed Services to take account of the changing structures within the Ministry of Defence. The new pattern of awards was introduced in time for the Awards Dinner last July. We have received many favourable comments from the Armed Services on the new awards structure and the Trustees are extremely grateful to Graham Skinner for steering the recommendations through to a successful conclusion. I don't believe we would have achieved so much if we hadn't had an ex-serviceman familiar with the MOD as our Clerk.

The overall general policy for the disbursement of funds was agreed by the Trustees in 2005 and the Trustees directed at their meeting in July 2006 that a continuation of a prudent level of giving was necessary in order not to prejudice the good work in recent years to contain costs and to build up funds.

The Company has a number of awards which have been established over the years, and today sees the formal launch of our latest and without doubt our most well endowed prize: The Fiona and Nicolas Hawley Award for Environmental Engineering.

The award was established by Past master Bob Hawley and he has used his contacts to obtain donations and support from over thirty sources both individuals as well as organisations ranging from household names through to professional engineering institutions and to date the total contributions amount to £120k.

The award will be made annually to recognise excellence in Environmental Engineering to a resident of the UK, who must be under 30 years of age, at the date of submission, and must also hold a graduate or post-graduate degree in engineering or science from a recognised UK university. The initial value of the prize is £5,000.

This is an award for applied research that has reached a stage where a prototype has been developed and there is a real expectation that the technology will be developed commercially. Submissions will be judged against the triple principles of "Social; Economic; and Environmental sustainability. The award is open to all branches of engineering and science and is not restricted to narrow environmental research.

This is a first class initiative that demonstrates that this Company is up to date and aware of current issues as befits a modern livery company. We are extremely grateful to Past Master Hawley for all of the hard work that he has put into the creation of this new award. Tonight the Award is formally launched and detailed information on its criteria, application process etc is being made available nationally to all our sponsors and other interested bodies. Please could you play your part and give this new Award the visibility in your own individual environments. In future years we will follow the normal awards timetable and cycle for the Company with competition in the early part of the year and winners at the July Awards Ceremony but for the F&N Hawley Award, in its inaugural year, we have decided to announce the winner at the Annual Banquet and I hope that many of you can be there at the Mansion House in October to see the first recipients honoured by us.'

The Company is a patron, and the only Livery Company to be so, of RedR – Engineers for Disaster Relief and the International Health Exchange. There were collections during our two Church Services held during 2006 and a total sum of £2,350 was provided for the general use of RedR/IHE. Further support of RedR/IHE was discussed with them during the year including an agreement on a joint Memorandum of Understanding which formalises a future 4-year mutually supportive arrangement between us. Not only to provide a regular source of funds for RedR but also to help respond quickly to requests for emergency relief through communications with our membership data base. Additionally there are to be linkages introduced across our web sites to improve our knowledge of the work of RedR especially in its outstanding role of training for expertise in disaster management. I am delighted Martin McCann the new Chief Executive of RedR is with us this evening and I would now to invite him to join me in signing the formal Memorandum.

Bryan Gibson

Response on behalf of RedR

RedR plays a crucial role in ensuring that humanitarian aid agencies have the right expertise to make a real and lasting difference to the lives of people suffering from disasters and conflicts worldwide. Although we support the most essential element of humanitarian relief – humanitarian workers – most of our vital work is carried out behind the scenes away from the media spotlight and public attention.

In order to fund our work, we therefore aim to establish relationships with professional people from the engineering and other relevant sectors that

The Master and Martin McCann
Memoranda with RedR

understand and can relate to the importance of professional expertise in relief and development.

The regular income which we receive in the form of a Patron donation is vital to RedR, giving us the security to develop and grow confidently and to budget for the future. The commitment from companies such as The Worshipful Company of Engineers gives us the freedom to respond quickly and effectively to disasters as and when they happen. With increasing political and environmental instability across the globe, it is vital that we have these resources in place.

I would like to thank The Worshipful Company of Engineers for all their support over the years and for their commitment to supporting us into the future.

Martin McCann
Chief Executive RedR

Installing the New Master, Rear Admiral David Bawtree CB, DL

New Master's Speech

My first duty in Common Hall was to clothe the Immediate Past Master, Bryon Gibson, with his gown and badge, and to thank him for the immense contribution he and Mary have made to the life of this company over the past 12 months. It is my first duty at this dinner to complete the presentation with a Past Master's goblet. Bryan and I go back a good many years to the Royal Naval Engineering College at Manadon, Plymouth, of blessed memory, when Bryan was very important and on the staff and I was a poor student chasing Ann and trying to learn something about Ordnance Engineering. Such was the close relationship between staff and students, largely because they earned more than we did, that this goblet would have come in handy at the many dinners we were required to attend. So I hope this will bring back many happy memories of your extremely successful year as Master and it is a pleasure for the pupil to present this to his teacher!

The New Master and Wardens with Vice Admiral Ian Jenkins

Toast to the Guests

The Immediate Past Master
Receiving his Past Master's Goblet

A very warm welcome to you all to Plaisterers' Hall and to our Installation Dinner. It is a delight to see so many here, unlike the Bishop who went to preach at a small parish church. Seeing there were few members in the congregation he ask the Vicar if he had told the Parish he was coming. "No, replied the Vicar, but I'll find out who did!" We thank the Master and Wardens of the Plaisterers' Company for the use of this magnificent hall, and we thank the staff for the excellence of the cuisine and service. It has been a bit of a weight-watchers' Waterloo! I am reminded of the fact that the Japanese eat very little fat and suffer fewer heart attacks than the British or Americans. On the other hand, the French eat a lot of fat and also suffer fewer heart attacks than the British or Americans. Maybe it is because the Japanese drink very little red wine that they suffer fewer heart attacks than the British or Americans. However, the Italians drink excessive amounts of red wine and also they also suffer fewer heart attacks than the British or Americans. So I conclude that it's speaking English, particularly at an occasion like this, that kills you! I am also grateful to Simon Sturgeon-Clegg and his Connecting Arts Brass Quintet that has been playing for us this evening.

I welcome all the personal guests of our Liveryman and our official guests, together with our 3 new Liverymen who were clothed earlier this evening. I hope you all enjoy the occasion. Perhaps I could also be allowed to welcome my wife and family. I asked my wife if ever in her wildest dreams she thought I would one day be Master, to which she replied "Whatever made you think I thought of you in my wildest dreams!"

I believe the formation of our Company some 24 years ago brought a very important new dimension to the City of London within the square mile. Back in the early days the Guilds, from which we have developed, were vitally important to the City to ensure that professionalism was preserved and that standards were identified and training given. Our contribution to the City reminds everyone that engineering is fundamental to the success of this country, and now even to our survival, as engineers seek inspirational and creative ways of meeting and reducing the threat of global warming.

They also must be at the forefront of responding to increasing legislative requirements in the areas of employment, environmental regulations, research funding and education. This is not something we can leave to our grand-children to do. Engineers are key to the development of new technologies and young men and women coming into our profession are in for as exciting a career as the Chartered Engineers of today. Although engineering has been developing over centuries it seems to me it is only relatively recently that the contribution of engineers has been integrated into the mainstream of social acceptability. We are still considered too often as more a blue collared worker than a white collared technocrat. In my own profession it was well after the advent of steam and iron ships that engineers were allowed into the Wardroom of a ship, and only then because the Navigating Officer realised that he had to speak to the Engineer Officer because the steering gear of the ship had been upgraded from rope and pulley to being driven by a steam engine.

I was fortunate to have been told by my Housemaster at the school I went to, Christ's Hospital, that as I had no other ideas I had better join the Navy, a suggestion to which I readily acquiesced. This decision led to me being presented with a silver watch, engraved across the back with the words "David Kenneth Bawtree; Christ's Hospital Royal Mathematical School 1955; acier inoxydable". Feeling that I should know what this Latin motto meant, a gerundive perhaps, I turned to a teacher who told me "you fool! It's French for stainless steel". This led to a very happy career of 38 years, finishing up in charge of the Naval Base at Portsmouth. At my farewell parade I asked a young sailor in the Guard if he was happy in the Navy. "Yes, Sir" he replied. "What were you

before you joined the Navy?" I asked. "Much happier, Sir" he said! I hope that many of you here tonight will be able to come and look at a little bit of my home town of Portsmouth during our out of town visit in September, and particularly enjoy dining on board HMS Warrior with your families and friends and children who are old enough to appreciate the occasion. I think there are around 140 of us dining there so far, but she can accommodate over 300! This is the ship where Jackie Fisher served as Gunnery Officer and where Sir John French was an Able Seaman before being so sea sick that he left to join the Army. Jackie Fisher was reputed to have remarked one day that "Engineers should be kept in a cage until something goes wrong!"

The vital importance of engineering is an obvious theme for my year as Master. However Engineers don't grow on trees, so another aspect of my year will be to focus on what is happening to our education. This is so important to the future of our profession. A recent House of Lords report stated that one third of 16 year olds were not worth teaching a vocation as they could not read nor write. This cannot go on. There are places where substantial changes to young people's lives are being made, so we plan a visit to Christ's Hospital, a remarkable ex City of London school, that is wonderful at helping children achieve their ambitions, the majority of whom come from disadvantaged backgrounds and where fees are according to the parent's means, which often means nothing at all. Education is a wonderful thing but youngsters can get the wrong end of the stick. A small boy came home from school and asked his mother what the Karma Sutra was. With a sigh his mother embarked on a lengthy explanation. "Oh I know all that stuff" said the boy, "but why did King John have to sign it?" One way in which this Company recognises the results of education as young people pursue their careers is to present professional awards at our annual Awards Dinner in July. I have invited the Headmaster of Christ's Hospital to speak at this occasion.

I mentioned earlier the importance of being involved with the City of London. As Liverymen we have our role to play in approving the election of the Lord Mayor. We work with other Companies so it is a real pleasure tonight to welcome as our official guests the Masters from the Worshipful Companies of Plumbers, the Blacksmiths, the Shipwrights, the Master Mariners, the Scientific Instrument Makers and the Chartered Architects, together with our Auditor from Myers Clark and the Chief Executive of RedR, one of the main charities the Company supports. These are all Companies with whom we share many professional interests. The contribution the City makes to the life of this nation is immense, so it is right that we all play our full part. Within the City are eminent music institutions so I have another ambition this year to provide opportunities for us to listen to the young men and women who make music. Precisely how to achieve this is still unrolling and I need to approach this rather carefully as my wife's unfavourite joke is the story about two musicians and a soprano! This is akin to the story about two people and a woman!

A few years after I left the Royal Navy I became involved with the NHS in Portsmouth, and particularly with the Royal Hospital at Haslar. Many of you may know that this very fine historic and greatly loved institution is due to close later this decade, amidst great clamour and concern by the local population. I came to know Haslar well during my time at Portsmouth, not least because it still had a laundry that could starch the Naval nurses' uniforms. I had a garden and a gardener in my house in the Dockyard and in return for a couple of pounds of leeks and a few sprouts our dinner napkins were washed and starched! And all this happened under the authoritative eye of our guest of honour this evening, Surgeon Vice Admiral Ian Jenkins, who retired recently from the top medical post in the Ministry of Defence - the Surgeon General - an appointment he took up in 2002. With a name like Jenkins he has to be a Welshman! He joined the Royal Navy in 1975, and served in HMS Ark Royal, the Royal Naval Hospitals Haslar and Gibraltar, the Royal Marine Surgical Support Team and HMY Britannia. He was appointed Professor of Naval Surgery in 1988 when he became the Medical Officer in Command of RNH Haslar, and in charge of its excellent laundry. His efforts have been directed to establishing British military medicine on a sound scientific and evidence base for the 21st century and to fully exploit new and emerging medical technology in the battle space. Following Martin Strel's remarkable achievement to swim the full length of the Amazon to raise money for tele-medicine it seems that this is a challenge Ian might like to take on in his spare time, down the great, green, greasy Limpopo River! Ian, you and Liz are very welcome this evening but before I ask you to say a few words I would ask all members of the Company to join me in the toast to Our Guests.

David Bawtree

THE BROOCH LUNCH
25 April 2007

The Brooch Luncheon took place at Coopers' Hall on Wednesday 25th April. The immediate Past Master's wife, Mrs Mary Gibson handed over the Brooch to the new Master's wife Mrs Ann Bawtree.

The Immediate Past Master's Lady, Mary Gibson
And the Master's Lady, Ann Bawtree

Coopers' Hall was chosen owing to the continuing renovation of Wax Chandlers' Hall but it is quite close by, just a couple of minutes walk from Liverpool Street Station. The hall is one of the oldest buildings in London used as a Livery Hall. It was built circa 1684 during the reign of Charles II on land which was originally the kitchen garden of the Duke of Devonshire's house.

The ladies gathered for pre-luncheon drinks in a basement room which houses a small museum to the Coopers' trade, then went up to the cosy Livery Hall where the ample table seated them and a fourteenth guest, Stormont the bear, who was there just for the benefit of the superstitious.

The menu was delicious and included such delights as 'pistachio crusted goats cheese, slow roasted breast of guinea fowl, and slow roasted white peach', this was all washed down with some interesting wines, one of which was a Chilean chardonnay from "Organic Vineyards"

At the end of dinner Mrs. Mary Gibson told the ladies how much she had enjoyed her year as the Master's Lady, and how many 'highs' there had been, one of which was memorable for many reasons; it was the outing to the Cornwall Show in the summer. All the Livery Masters were asked to support the attendance of the Lord Mayor, and wear their full Master's attire to parade around the agricultural show ground. The day was one of the hottest. Some of the Master's attire was made of real fur, over a hundred fox hounds close by got a scent of this, and were 'raring to go'. There was also a very obstinate bull which sat down, and wouldn't move for over an hour. Eventually the Masters were able to parade in the show ring, (but had to be careful where they were treading).

Mrs Ann Bawtree in turn said she was very much looking forward to her coming year, and recalled that at her first day at grammar school she sat in a double seated desk next to a girl, (who became a lifelong friend) who always doodled during lessons, these doodles were always the same, a very pretty girl with a lot of luxurious curls piled high on her head, when Ann asked why her friend always did the same doodle, her reply was "these are the Gibson girls, haven't you heard of them?" Ann recently googled the 'Gibson girls, the internet informed her, these girls were sisters, were extremely pretty, gifted, and intelligent – parallels to be drawn there.

Lady Crawford, Sylvia Price and Margaret Skinner

This was a most pleasant luncheon, and we all wished Ann a very joyous and successful year ahead.

Sylvia Price

ROYAL OPERA HOUSE, COVENT GARDEN

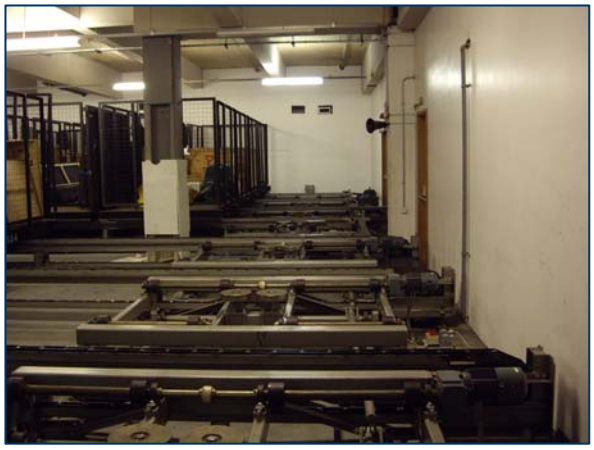
3 May 2007

Our morning tour began in the area under the stage (at stage level minus two…. S-2) Those familiar with *The Phantom of the Opera* will know that there is a lake under the Paris Opera House but here at Covent Garden is housed some of the handling

The party look to Heaven

machinery which enables the House to sustain five productions in the repertoire at any one time. In particular, we saw the five "stage right" elevators used to raise and lower parts of the floor above our heads.

Next we moved up to the stage (S) level and what a contrast! Five vast floors; each the size of the main



Part of the Storage Area at the foot of the Largest lift in the world

stage from which we were separated by an enormous red acoustic door. On one floor we saw technicians assembling the set for *Fidelio* and then on the next we saw the set for *The Seven Deadly Sins*. All these floors move, which enables the House to rehearse one production on the main stage in the morning; have a second for a matinee; and yet a third for the evening performance. Covent Garden is the most intensively used opera house in the world. All equipment was specified and designed by the Opera House and is being copied elsewhere. As we moved on past the graveyard from *Fidelio* a young women in a striking red dress passed through our party followed shortly by a man in an ornate jeweled and sequined white costume.

Our next move took us up to the fly gantry (S+4) where, as a special treat, because we were unable to go into the main theatre, we looked down on a rehearsal of *Pelléas et Mélisande*. Immediately we realised that the couple we had encountered earlier were Simon Keenlyside and Angela Kirschlager making their way to rehearse in the title roles. We saw technicians being given safety training in the use of an hydraulic "cherry picker" which extends over the whole stage area. The House has a good safety record. All the moving elements are interlocked and can only be moved in areas within sight of the operator. From the gantry we looked up to see the fly tower reaching way above our heads despite the fact that we were already five floors above street level.

Still at level S+4 we moved past the ballet room where principal dancers were in class; caught intriguing glances of the area where costumes are modified for each individual performer; and across to the Linbury Studio Theatre which was set up for a production of Benjamin Britten's *Owen Wingrave*. The Linbury is, in contrast with the main stage, a small and utilitarian but a very versatile performance space.

Our final stop was back down at level S-2 where we saw one of the standard storage cages (the size of an articulated lorry trailer) moved from "the largest lift in the world" into the automated handling area. It was an interesting contrast to see Odette's coach from *Swan Lake* being transported in such a prosaic manner.

Is this really the Junior Warden?

Whilst the engineering was impressive and fascinating, the highlight of the morning for my wife, Elizabeth, was a close encounter with Carlos Acosta hot and panting from his morning rehearsal class! ….. Thanks to all.

Norman and Elizabeth Dawson

PERSONALIA

New Assistants

We welcome new Assistants to the Court Elected on 24 April 2007

Peter BLAIR FISH FICE

David JOHNSON FICE

WARDEN'S LECTURE
8 June 2007

This years Warden's Lecture was given by the Junior Warden, Mr John Robinson, and chaired by the Senior Warden, Mr Tony Roche. Held in Brewers' Hall it was well attended by Liverymen and guests who were treated to a brilliant exposition of new insights into the 'micro' of Engineering. Some of the highlights and a synopsis of the lecture are given below in an article by new Court Assistant Peter Blair-Fish.

Raymond Cousins

Senior Warden – Tony Roche

HOW TO GROW ONE FORESKIN TO THE SIZE OF A FOOTBALL PITCH

The title of John Robinson's lecture was "New" Engineering – a Portal for the Future. Traditionally, much of the most exciting engineering has been in large projects such as chemical plants or football stadiums. However, there are now significant engineering challenges in molecular science and tissue engineering. It is already possible to manufacture artificial human skin to replace the top layer of damaged skin. Artificial cartilage is being developed. The future challenges are to make artificial livers, hearts and other body components.

To grow skin, cells are taken from a cell bank (in this case, human foreskin) mounted on a biodegradable polymer scaffold, and grown in vitro in a matrix of human proteins. Biologists and chemists developed this technique on a small scale. Chemical engineering techniques have since been used to scale up production. The skin can be grafted onto areas of the body where skin is damaged or needs to be replaced as in serious burns or leg ulcers. With traditional skin treatment, such areas needed to be dressed by a professional nurse every day, at some cost to the health service. The new skin radically improves quality of life and reduces cost. The new skin forms the top layer of skin under which new layers of skin can grow. As the top layer dies, it is replaced by new underlying layers, so after six months there is no difference between the implanted and natural skin and there is no risk of rejection. It took over 5 years to develop this technique from small scale to clinical trials.

Traditionally, damaged cartilages are cleaned up by arthroscopy but the cartilage does not regenerate. After severe damage, the knee joint has to be replaced. An alternative is to replace the cartilage, though this requires an artificial component in three dimensions rather than two. A bioreactor is used to grow cartilage 5mm thick from a bio-scaffold. There are micro-engineering challenges in fluid flow and mass transfer and heat transfer at low Reynolds numbers and unusual flow regimes. Clinical trials have been performed to implant new cartilages in rabbits.

Smith and Nephew in the UK were leading the developers of tissue engineering supported by academic expertise at Manchester, Liverpool, Birmingham and Imperial College, but the Americans are not far behind. Research at other UK universities includes miniature chemical and biological systems at Hull, and the design of miniature processes at Newcastle.

Meanwhile, the tools used in arthroscopy have evolved over the past 30 years. Surgeons have to train in microsurgery techniques, first using knitting needles and learning to master the foot pedals and two manual controls for the blade, light source and miniature camera. Disposable blades were introduced in 1985, to reduce the risk of infection.

Curved blades have been used since 1993. Further developments were made in 2002 to reduce bleeding. Smith and Nephew have sold over four million blades in a business worth US$240 million / year.

Engineers have made a significant contribution to biosciences and orthopaedic surgery, which now keep people mobile who in earlier times were in wheelchairs. Engineering research in the biosciences must continue.

John Robinson answered a number of wide ranging questions. These included training the right number and quality of engineers; the continuing need to unify the engineering profession; the increasing difficulty of measuring processes at small scale as production moves from two-dimensional skin to three-dimensional cartilage and heart valves; the challenge of avoiding rejection in cartilage where there is no blood flow or regeneration and the need to use cells from individual patients to grow heart valves and liver; the need for rigorous clinical trials and the time taken for approvals of new bio-components by regulatory agencies especially in the USA; potential ethical issues in improving rather than just healing people; the use of artificial skin in military field hospitals; and the communication of these new challenges to inspire a new generation of engineers.

Peter Blair-Fish

'NEW' ENGINEERING – A PORTAL FOR THE FUTURE

8 JUNE 2007

Junior Warden –John Robinson

I chose the title for the lecture, as I have become increasingly aware that the public view of engineering is based on the past – engineering which began in the mid 19th century, with grand names like Brunel and Telford. Engineering is often seen as part of the "old" economy, lost somewhere between science and technology and so it is often considered boring.

This is where most of us grew up. Big plant, big structures. In my 20's I was Plant Manager of a 900 tonnes per day Nitric Acid/Ammonium Nitrate plant. The bigger it was, the prouder we were. But times are changing. Many living in 50 years' time will have a very different experience.

It is very important that this misapprehension be changed, as engineering is an essential portal for the future, fundamental to wealth creation and therefore to the economic wellbeing of our society. Many of us believe that the future in this country is about knowledge and the knowledge economy – the use of our brains and engineering is key to this.

So what is "new" engineering? Engineering was defined by a working group of the Royal Academy of Engineering, chaired by Sir Robert Malpas, which produced a document called "The Universe of Engineering".

Engineering is the knowledge required and process applied to conceive, design, make, build, operate, sustain, recycle or retire something of a significant technical continent, for a specified purpose – a concept, a model, a product, a process, a system, a technology.

A very broad definition, way beyond that which engineers of 100 or so years ago, would have thought. It recognises that science is the fundamental knowledge, that technology is the enabling package of knowledge, and engineering is used to create technology and also, of itself, uses technology.

Malpas also defined the two components of engineering: engineering knowledge and engineering process.

Engineering knowledge is the growing body of facts, experience and skills in science, engineering and technology disciplines: coupled to an understanding of the fields of application.

Engineering process is the created process which applies knowledge and experience to seek one or

more technical solutions, to meet a requirement, solve a problem then exercise judgement to implement the one that best meets constraints.

Engineering knowledge is the part that tends to be taught and researched and yet the process is where people like me came in, using our knowledge and experience. Engineering process needs more focus in both research and teaching in universities. This is another important issue but I shall not digress.

Malpas drew three important conclusions from the concept of "new" engineering.

Firstly, engineering is practised by a much wider community than the "engineering profession". For example, scientists converting something into practical use and computer experts devising new hardware and software, are practising engineering. Malpas estimated that using the definition quoted, there are probably 2 million people in this country practising engineering, of which only some 600,000 are members of engineering institutions.

Secondly, engineering is not always carried out by individuals, but in groups, in fact more often in groups, than individuals.

Thirdly, in the business world, engineering is a key to success. A key that can be used in many areas way beyond manufacturing, industry and construction, with which engineering would normally be associated. For example, in pharmaceuticals, transport, oil and gas, chemicals and software.

Engineering is part of the spectrum of knowledge, overlapping with science and technology. Knowledge of science, engineering and technology, form a band, or a spectrum; molecules and genes, pure science over at one end and applications at the other. Across this spectrum, we have a whole variety of knowledge. Trying to draw lines on it, defining it into disciplines, is a useful thing – in fact an essential thing – for undergraduate teaching, as we have to teach and sell courses somehow. But this is not the way the real world exists. In both academic and industrial research, much of what we do covers whole areas of the spectrum and is not in clearly defined "disciplines" or departments.

Our Victorian forebears created "disciplines" in engineering, from the Civils came the other "Big Four" institutions. Then from this grew almost 40 chartered institutions, all claiming to be discrete disciplines and owners of knowledge. We know the real world is not like this, it confuses and, frankly, bores people. I long for the day, if it could be, when we recognise one "Engineering" with specialist, changing, forming and reforming, specialist groups. But there are too many vested interests.

Let me show you how the "new engineering" approach has worked in three projects which I have come across.

Tissue Engineering is a field which has burst into prominence in the last ten years or so, emerging from the science of cell biology, biomaterials and engineering.

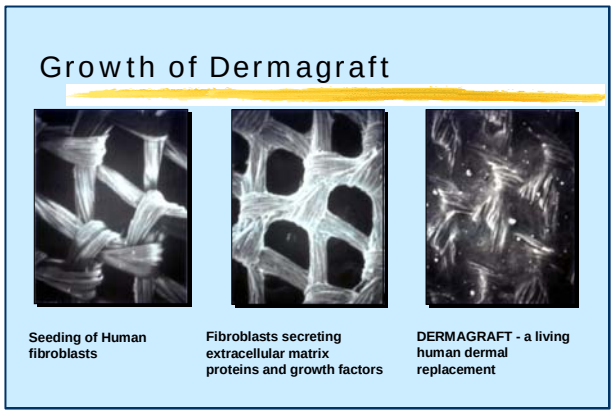
Engineering new tissue to restore or improve function of damaged areas can arise from a number of routes, but perhaps more often than not, is considered to be replacement of tissue, using that grown from cells. The range of tissues to which tissue engineering may be applicable is large, although the scale of the scientific and technological hurdles will vary enormously from, for example, a replacement epidermis or dermis of the skin, to replacement organ tissue, for example, liver.

Basic tissue engineering is done by taking appropriate cells and putting them into a reactor on to a biodegradable polymer scaffold. Over the next ten years, as procedures develop, one would hope to see various body parts produced in this way, skin, cartilage, bone, urethra, intestine.

Skin was one of the first tissues produced. Smith & Nephew was the first company to exploit this commercially. Dermagraft is a human dermal replacement. It was designed essentially for diabetic foot ulcers, which are extremely difficult to heal, as are all wounds of the extremities of the foot. Diabetic foot ulcers can lead to hospitalisation, surgery and frequently amputation of parts of, or the whole of the foot. To make these heal gives huge clinical benefit but also significant cost savings to the healthcare system. A bio-absorbable scaffold is used, in this case, polyglycolic acid. Human fibroblast cells are added to the scaffold, the cells used in Dermagraft production come from a skin bank of human foreskins. In the bioreactor a solution is passed over the cells, which is similar to body fluids. In the correct conditions, the cells secrete growth factors and human matrix growth proteins and they subsequently multiply, producing

a living, metabolically active, human dermis, which can be transplanted.

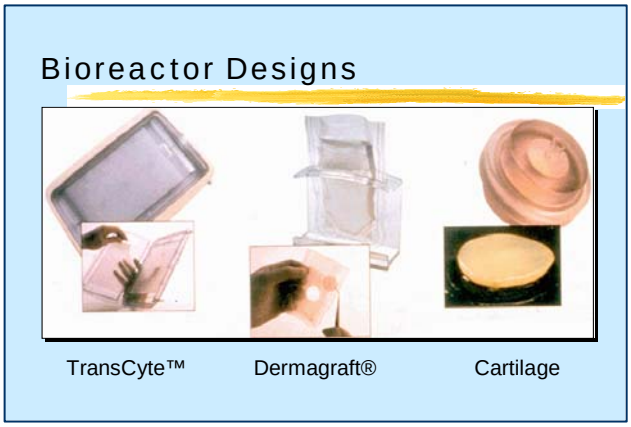
The manufacturing process, is different to that most chemical engineers would expect to see, in that there are many small parallel units. Skin is essentially two-dimensional. The problems with the manufacturing programme have now been largely overcome but it took an extremely long time to develop the process. Only when people with chemical engineering background and biochemical engineering background were introduced into the team, was significant progress made. Problems



were not very different from those which I found as a young chemical engineer, when I started work dealing with chemical reactors, where the scale-up process was, by and large, "suck it and see". Now of course, chemical reaction design is much better understood and scale-up can frequently be done from a theoretical basis. One sees over the coming years similar progress being made with tissue engineering.

However, much bigger challenges come with three-dimensional tissues.such as cartilage, which is much more difficult to produce. Compared to skin, where you have a very thin material, here one is actually passing the fluids through the structure. The cartilage material can be up to 5mm thick. The problem is how do you get appropriate nutritional flow, without damaging the cells. The resistance to flow changes as you move from a situation where you have no resistance to flow, to one which is essentially solid.

This area of tissue engineering is one where the UK has a strong position in its science base. At the engineering level, however, most of the know-how is in the US at MIT and Georgia Tech. Whilst now there are centres at Manchester/Liverpool Universities, Imperial and Birmingham, there is still nothing like enough investment in this country to make us internationally competitive in the tissue engineering field.



Many people say to me "Is this engineering?" I indicated earlier that we only really started to make the process work when chemical engineers got involved and I think that this is the heart of the skills that I learned as a chemical engineer.

Small Scale Reactor Engineering

Conventionally, reactors that sit on a laboratory bench would be regarded as the province of scientists, chemists or biologists. Engineers have been concerned with large plants, be they large machines, where in my background they were large chemical plants or biological reactors.

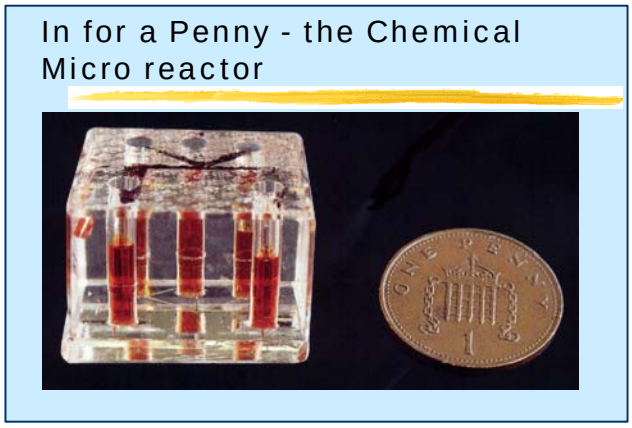
Now however there is a lot of work being done using engineering process, engineering knowledge on very small reactors. The advantages include:

- The ability to carry out reactions that can only be done on a very small scale (for example, requiring very short residence times).
- Ability to carry out processes very close to the point of use, as against transport the finished product.
- Ability to have a much higher level of process control.

The skills required are definitely engineering skills. Particularly key is the understanding of different flow regimes and its impact on the reaction process.

A group in the Department of Chemistry at Hull University, a multi-disciplinary, multi-university

group. This group is targeted at establishing theoretical and practical capabilities of miniaturised chemical and biological systems.



Another group, based at the University of Newcastle, calls its work Intensive Process Design. From a chemical engineering point of view, this is a little more conventional.

Reactions are continuous, whereas in more conventional reactors, often only batch processing is possible. The reactor takes up little space and consequently can often be installed at the location where the product from the reaction is required, as against large central plants shipping the finished products over significant distances. Small size means that there is less risk of losing control, as reactor control can be more precise. There is little waste because there is little material being used. Very short residence times means that some reactions can take place which are impossible in larger reactors, for example, where this can be tolerated for extremely short times.

Finally, development times are much shorter because no scale-up is required. The pilot plant is the finished reactor!

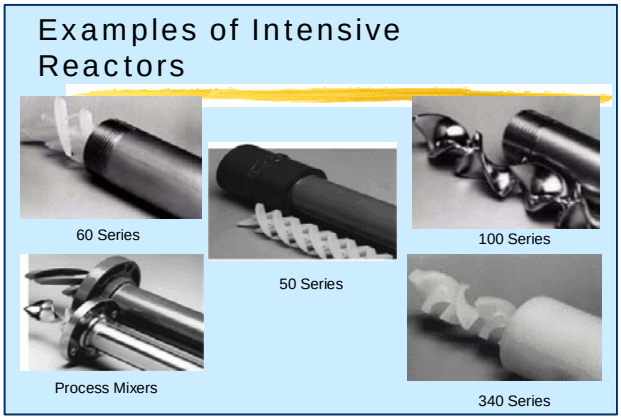
Minimal Invasive Surgery

Arthroscopy, which is minimally invasive surgery for orthopaedics, is an excellent example of multi-disciplinary engineering, creating a new industry through progressive high technology development.

Arthroscopy is about removing damaged tissue and bone, to reduce or remove pain in arthritic or damaged joints (usually through sports injuries).

The illustration shows the four components of the system. There is a highly sophisticated control logic unit, which provides power to the blade and controls the blade operating regime, based on the surgical procedure. The foot pedal receives commands from the surgeon to adjust blade speed, the hand piece contains the motor that drives the blades and also has optional hand controls to alter speed and direction. The blade itself is the cutting tool that removes tissue and bone.

The illustration shows they key developments over the last 30 years, starting in 1976 with a simple shaver blade removing torn soft tissue – cartilage only – followed up by a burring tool to remove

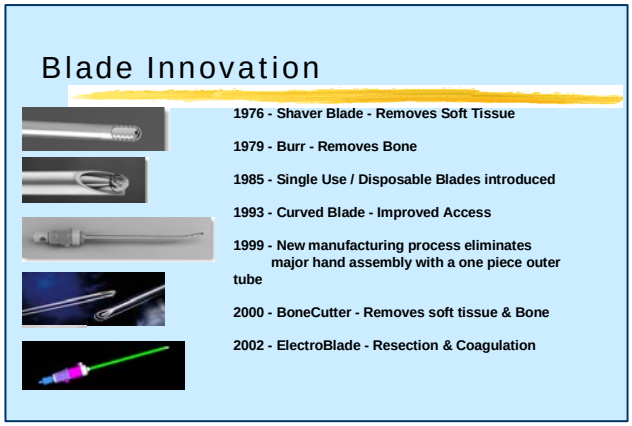


bone. A huge step forward was made in 1985, when single use disposable blades were introduced and clever technology with curved blades, allowing improved access.

The benefits which minimal invasive surgery have brought to society are incalculable. People, especially the elderly or athletic, are kept mobile, with substantially less pain. The cost of treatment is dramatically reduced, with far shorter convalescing times. This is an excellent example of the use of more traditional engineering across disciplines, creating new industry – and large social benefit.

Conclusion

In conclusion, I hope that by looking at the areas of tissue engineering, small scale reactor engineering and minimal invasive surgery, that I have shown you how important I think that engineering, differently applied, is for the present and future well being of society. Not only is new engineering a portal for the future, but it is one of the most important portals.



The explosion in science is largely in biology, medicine and methods of healing the body. I became an engineer because I was excited by the science of the 1950's. The next generation will be excited by today's science and on this depends much of our economic future.

John Robinson

VISIT TO CHRIST HOSPITAL SCHOOL – HORSHAM 5 July 2007

On Thursday, 5th July 2007 the Master, Rear Admiral David Bawtree and his wife, Ann, escorted the Company's visit to the Christ's Hospital School, Horsham. Though many of us were aware of the School's existence, having seen pupils wearing their traditional long woollen gowns and yellow stockings from time to time, it is doubtful if most of us had any concept of this extraordinary institution.

The Master, David Bawtree with the Headmaster Dr Peter Southern

Considering it is so close to Horsham, the school is very well concealed. The 100 acre campus of impressive buildings, which are set around a large central quadrangle, are contained in a 1200 acre estate,. Those arriving by car found few signs and from the visitors' car park, finding the coffee venue required a good degree of intuition. Once there, however, we had incredible revelations in store.

Our Master is an old pupil and Governor of the school, and he was warmly greeted by Dr Peter Southern, Head Master for the past 11 years and just a few days short of retiring from the post. Dr Southern said that on arrival at the school he told his welcoming staff that the only feature of architectural interest associated with the school of which he was aware was the railway station. This perplexed the staff and he understood the reason why when he found that Dr Beeching had reduced the once great seven platform station to little more than a 'bus shelter!

There are some 850 pupils at the school, comprised of an equal number of boys and girls. We learnt from Dr. Southern that the culture of this impressive fully boarding school is one of 'ordinariness'. The aim being that the students will be equipped to fit in with society and respect one another, through finding strength and companionship from attending this school. For their accommodation, children in the 11 to 17 year groups are split, 7 pupils from each year up to the lower 6th form, into one of 16 Houses, each 42 strong and segregated for boys and girls. Known as 'Grecians', the upper 6th formers are in exclusive accommodation called Residences. All pupils wear the long blue woollen gowns at school and when they get wet Dr Southern said they can smell like wet sheep!

In 1552 the original institution, in Hertford, was a 'hospital for foundlings', It was a refuge rather than a medical hospital in the modern sense. Its first pupil was a girl. This establishment was followed by one at Newgate, which was abandoned when the Horsham location was opened in 1902. In 1985 the Hertford

The School Band

facility closed. The school's founding principles were based upon giving care and education to deprived children and to this day the predominant number come from disadvantaged backgrounds. The school operates from a Foundation with only 16% of income typically deriving from parents. The school's Administration published for 2005/6 shows income from investments at around £12 million; grants made to the School for running expenses were nearly £15 million and capital expenditure was about £5 million.. At inception the school was very well endowed and since then 'Old Blues' have continued

to re-endow. Donors, known as Governors, can present potential applicants and if selected then their progress through the school is followed by the associated Governor.

The process of pupil selection, involving 25 people, concentrates on some two thirds academic achievement and a third on social aspects. Each applicant has to show that he or she would be able to cope academically and would benefit from boarding, with a need to be in a caring community. We were told that it is very difficult for any family with out need to buy education for their children. The Prospectus indicates that only 6% of the school complement can be full fee paying. Whatever difficulties these children may come from, those that we saw were obviously very happy and confident. They had a pleasant bearing and were proud to be wearing their distinctive uniform in this privileged community. Apparently, only the House Masters know of the pupils' backgrounds, the teaching staff does not have this information.

Matching the great social achievements of the school are the high levels of academic performance. Nearly all go onto higher education and get entry to their first choice Universities.

After the Headmaster's informative introduction our party began a tour of the school. One of the senior boys, Christian, was nominated to be our guide. He had mastered the disconcerting technique of walking backwards while talking. We were taken to a physics laboratory where pupils eloquently demonstrated their solutions to a project for the safe transport of a hen's egg in a carrier, sliding down a wire at speed and stopping dead at the end of the run. Next we were shown the magnificent dining hall with its oil painting, said to be one of the largest paintings on canvas in existence, 26.5m long by Antonio Verrio called: "The Granting of the Royal Charter by Charles II to the Royal Mathematical School". That school, set up by Samuel Pepys for the education of sea captains, was integrated with Christ's Hospital.

We progressed through one impressive building after another; notably the theatre in-the-round with its clever mechanical adaptability; the extensive new sports complex and the chapel. The interior of the chapel is reminiscent of that at Eton except that this building is considerably longer. The pews are inward facing in tiers either side of the central aisle in front of full length wall paintings. The Master's son, Adrian, is the school's organist and he played a demonstration piece to us on the Mander organ. This instrument has its pipes set in the four corners of the chapel. We gathered in the centre of the aisle and the quadraphonic effect was quite a remarkable experience which, probably, few have ever had the opportunity of hearing.

Going into the Dining Hall for Lunch

To complete the visit there was one more surprise awaiting us, namely, the pupils' disciplined entry into the dining hall for lunch. The famous school band, led by its mace hurling drum major, marched into the quad and took up a central station to play the pupils into lunch. Each house marched in separate 'squares' from opposing sides of the quad, turning left and right respectively, into two separate doors. We were told that this ceremony takes place every day in term time with the exception of Sundays.

Before leaving the school our party enjoyed an excellent lunch in a private room. This was hosted by Dr Southern with some members of staff plus a number of pupils. The latter had been selected because they had expressed an interest in Engineering and were keen to meet with us to learn more.

The Master and the school are to be thanked for organising this Company visit, which everyone thoroughly enjoyed. It was inspiring to see the work being achieved by this school and the obvious pride that the pupils exude in enjoying the privilege of their surroundings.

Henri Pageot

THE AWARDS LIVERY DINNER

10 July 2007

It was a capacity house of nearly 150 people at Ironmongers' Hall in the Barbican on Tuesday 10th July 2007 for the Awards Livery Dinner 2007. Together with an eminent top table there were with 3 table sprigs full of the colourful mess dress uniforms of our 3 Services together with the familiar black tie of other civilian guests and our Members in the wood-lined traditional Hall setting.

The Master presenting a cheque from the Charitable Trust to Christ's Hospital

The presentation of the Company's medals, prizes and certificates was made by The Master, Rear Admiral David Bawtree together with Dr Peter Southern, the outgoing Headmaster from Christ's Hospital School, Horsham. The Clerk introduced formally the individual winners to be acclaimed appropriately by those present and each was given a rousing accompaniment from The Light Orchestra of the Corps of Royal Engineers during their walk forward with a suitable piece of music– for instance, it was Handel's Water Music for the recipient of the Water Engineering Award and the various regimental marches for the appropriate Servicemen. Where the Awards were given jointly with other organisations, senior representatives of these who were present also congratulated the recipients. In particular, Mr John Baxter, President of the Institution of Mechanical Engineers and a Court Assistant, gave congratulations to both of the Stephenson Award winners. Major General Keith Cima, presently Governor of HM Tower of London, represented the Chief Royal Engineer for the Royal Engineers' Award and, very recently knighted, Air Marshal Sir Barry Thornton KCB as Chief of Material (Air) in the Defence Equipment and Support organisation and the senior RAF engineer received the RAF Operational Award winner. Altogether, these particular top-table guests provided a really personal touch to acknowledge the deeds of each of our Award recipients.

Overall there were 18 individual winners, the vast majority of whom were able to be present to receive their awards and their justly deserved accolades personally. There was one new Award this year, the Heritage Engineering Award, which used the residual funds of the former British Gas Technician Award to give grants to individuals or organisations contributing to the understanding and development of engineering. It was especially pleasing that the first award was made to the Ironbridge Gorge Museum to prime their redevelopment project at Blists Hill for an industrial mine railway. The new Chief Executive of the Museum, Mr Steve Miller, received a cheque for £2000 towards their rejuvenation project. For the second year, the Services Awards placed more emphasis on acknowledging the outstanding deeds of operational engineers in support of the various actions of HM Forces around the world and the citations made stirring reading in the areas of building up Camp Bastion in the Helmand Province and of the Tristar airbridge to the middle east theatre, for example. A full list of all the Awards and the winners is given below:

At the end of the slightly delayed Awards ceremony, The Master expeditiously and succinctly welcomed our other guests present including the Master Lightmonger, Master Environmental Cleaner and Master Mariner. He introduced Dr Southern as one of the most experienced and influential headmasters in recent times who had been at the helm of a school with very close links to the City of London and Livery. Dr Southern, spoke warmly, wittily and

wisely to the assembly on behalf of the Guests ending with our traditional toast to the Engineers' Company. Overall, it was a full and enjoyable evening that enhanced further the reputation of the Company in the wider community.

Graham Skinner

THE ENGINEERING AWARDS

Cadzow Smith Award

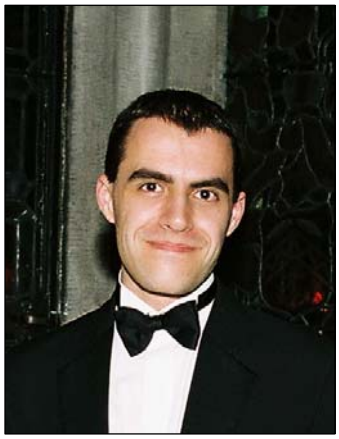
Established in 1996, the Cadzow Smith Engineering Awards were endowed by the Eastern Group plc in recognition of the outstanding services to engineering of its former Chairman, Dr. James C Smith CBE FREng FRSE and now a Past Master. The awards are for excellence on an accredited undergraduate engineering 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 2007 (Prize £1500) - Claire Wilkinson, entered Imperial College to study Electrical and Electronic Engineering after a deferred year working for QinetiQ. She has developed not only a commitment to excellence in her chosen field of engineering, with a strong focus on energy supply, but also a recognition of the key roles of management and organisation in successful engineering enterprise. In making the award, the panel recognised the combination of academic excellence with her broader interest in music and involvement in voluntary work underpinned by a refreshingly clear recognition of the importance of engineering in shaping the future.

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 IET in selecting that award winner.

Winner 2007 (Prize £1000) – Jacob Meachen is currently in the final year of a BSc in Broadcast Technology at De Montfort University where his tutor states that he has shown extremely high levels of maturity, motivation, project planning and leadership. The judging panel thought that he had huge potential to make a significant impact on the engineering industry, being an excellent communicator, and a very focused individual. He has a wide technical knowledge in complex subject areas, and saw the link between theory and practice in a very effective way, demonstrating the true continuum between research and development.



Mercia Award

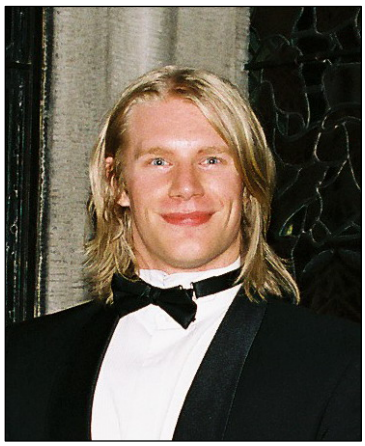
The Award is made annually to a student under 30 and provides a medal and bursary towards the cost of a taught or research programme of postgraduate studies in Medical Engineering.

Winner 2007 (Prize £500) – Frances Baxter gained an MEng Honours degree in Mechanical Engineering with French at Bath University. She was awarded a Research Student Development Fellowship from the Royal Academy of Engineering in December 2006, and is now in her second year of postgraduate study. In orthopaedics, there is a need to develop synthetic alternatives that can perform well as bone substitutes. Her research is exploring the electrical characterisation and biocompatibility of a new generation of bioceramic materials with piezoelectric properties for this purpose. She has demonstrated great drive and enthusiasm, particularly in the acquisition of interdisciplinary skills, and has already achieved conference presentations and publications.

Water Engineering Award

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

Winner 2007 (Prize £500) – Ryland Cairns gained a BSc(Hons) in Outdoor Studies at St Martins College Ambleside, and an MSc in Climate Change at the University of East Anglia, and is currently studying for an M Tech in Water Processes at Cranfield University. Ryland's paper was entitled "Investigating the Impact of Natural Organic Matter on Flocs formed during Drinking Water Treatment", and was based on research being undertaken with Severn Trent Water Ltd.



Stephenson Award

The Award is intended 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 150th Anniversary of the Grant of their Royal Charter. Donations in excess of those needed for the Loving Cup were used to establish the Stephenson Award and further donations were received in 2001 & 2005.

Winner 2007 (Prize £500) – Kath Walley is a physics teacher who has given almost 37 years of unbroken service to the teaching profession. In a career that has made a significant difference to the young people she has worked with, the quality of her contribution in the classroom has been matched only by her enthusiasm and commitment to engineering activities beyond the confines of the curriculum. She began her teaching career in 1970 at Lydney Grammar, Gloucestershire (now Whitecross Comprehensive). During this time she was responsible for the introduction of a new joint

Physics-with-Mathematics course and took a leading role in the establishment of an extremely successful Electronics Club. Her success is reflected in the number of her former students that remain in touch, among them a world expert in mobile phone technology. In 1975 she moved to Ulverston Victoria High School as Head of Physics, a post she still holds. She soon established a lively extra curricular ethos. With colleagues from other local schools she developed an Electronics 'INSET' course, subsequently introduced into the curriculum, providing a stimulus to students to go on to study engineering at University or to move into engineering apprenticeships. Since 1993 Kath has very successfully recruited and guided teams of students entered on the Engineering Education Scheme in which they undertake projects with local companies in the solution of real engineering problems.

John Baxter, President IMechE, ***Kath Walley****, The Master,* ***John Farley****, Dr Peter Southern*

Winner 2007 (Prize £500) – John Farley commenced his career in 1950 as an engineering apprentice at the RAE at Farnborough, he joined the RAF and trained as a pilot before eventually becoming Chief Test Pilot at BAe Dunsfold.

Additionally he has encouraged young people into mechanical engineering by initiating, developing, managing and actively participating in the renowned Schools Aerospace Challenge. In 1996, with colleague Graham Stark, he developed the idea of a summer school for 16 to 18 year old 6th formers. For two years a pilot programme was run at Bloxham School, Oxfordshire. Visits were arranged for participants to Rolls Royce at Derby, BAe Dunsfold and flying experience at Cranfield University. Through John Farley's energy, effort and connections, the Schools Aerospace Challenge has now developed so that it attracts the support of and sponsorship from such organisations as BAE Systems, Rolls Royce and the Defence Procurement Agency. The astounding success of this programme and his pioneering endeavours has resulted in the Eurofighter consortium deciding to support a new International Aerospace Summer School for 6th formers.

Heritage Engineering Award

The Engineering Heritage Award was established in 2006 using the residual funds of the former British Gas Technician Award. The purpose of the award is to make donations or grants to an individual or organisation that has made a significant contribution to the understanding and development of engineering through the interpretation of historical sites or processes. In considering nominations, preference is given to schemes which form part of an on-going educational programme. Awards normally consist of a grant or donation together with a certificate and medal.

Winner 2007 (Prize £2000) – The Ironbridge Gorge Museum Trust which manages 38 different areas on its World Heritage Site in Shropshire is the most significant independent museum in the country with its large education programme attracting in excess of 56000 schoolchildren in organised groups each year. To further enhance the Museum this year the Trust

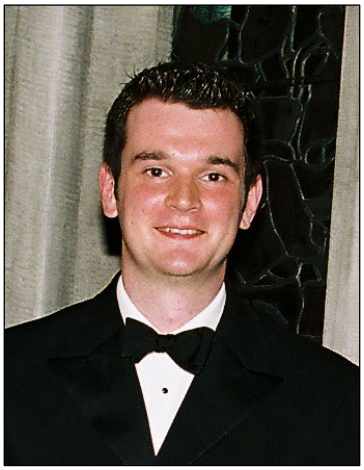
is embarking on a major redevelopment project on the Blists Hill site. In recognition of its outstanding contribution to engineering heritage The Ironbridge Gorge Museum is chosen for the 2007 award from the Company which will act as a trigger to release sufficient funds from other sources for the historic recreation of an industrial mine railway to run on the Blists Hill site next year.

Steve Miller, Chief Executive, accepting on behalf of the Museum

THE SERVICES ENGINEERING AWARDS

The Services Engineering Undergraduate Award

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



Officer Cadet D Richards gained a 2:1 Hons in MEng at Oxford University in 2006 after a Tutorial Commendation in Engineering Science from Magdalen College in 2003. During his time between university graduation and commencing officer training in January 2007, he travelled widely. He used this to develop himself and to gain qualifications to enable him to take his soldiers adventure training once commissioned, including an arduous 3 month Mountaineering Leadership Course in Canada. O/Cdt Richards was destined for a career with the Royal Engineers with whom he had attachments in Germany and Cyprus, but has unfortunately had to leave the Army under a medical discharge before this ambition could be fulfilled

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.

Major S M Hemns RE was awarded the top prize after graduating in 2006 at the head of his peer group studying for an MSc in Military Construction Engineering. He produced consistently outstanding academic and practical work

during the long, demanding course, including designing and constructing 2 motorway bridges. Major Hemns also produced several technical papers, including studies of procurement methods, environmental management and quality control. His MSc dissertation which investigated the discrepancies between budget estimates, produced during the development of an Early Contractor Involvement Target Cost Contract, was a sterling piece of work that demonstrated both intellectual creativity and engineering excellence.

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.

Royal Navy – Warrant Officer (2nd Class) Engineering Technician (Weapon Engineering) G H McPhee is an exemplary technical senior rating with a genuine desire to impart his knowledge to junior weapon engineering staff and prepare them for their roles at sea. He is a conscientious mentor and Divisional Officer whose un-questionable commitment to the RN is reflected in the quality of the personnel he has trained. He leads by the highest of examples and in his time in the Maritime Warfare School has provided impeccable tutelage to nearly 500 apprentices and over 140 senior rates at the start of their time as Non-commissioned Officers.

Army – Warrant Officer (2nd Class) (Artificer Quarter-master Sergeant)F M Quinn's contribution to engineering excellence within the School of Electronic & Aeronatical Engineering, Defence College of Electro-Mechanical Engineering HMS Sultan has been exceptional. His exemplary performance within Land Systems branch and contributions he makes to student development both in and outside of work make him fully deserving of this prestigious award. Professionally, he has achieved Incorporated Engineer status as a member of the IET and will begin upgrading his Engineering Degree to Honours in September.

Royal Air Force – Sergeant I Cowley RAF has for the past 3 years been responsible for the through-life design and implementation of the Aircraft Maintenance Mechanic Course at the Defence College of Aeronautical Engineering Cosford, currently delivered to all future aircraft mechanics and technicians of the Royal Air Force. Throughout this time, he has demonstrated extraordinary vision, insight, dogged determination and leadership in evolving the course to the stage it is at today. The graduating individuals are confident, accomplished mechanics who are easily able to assimilate new information and apply their generic skills and knowledge to the whole range of aircraft within the inventory operated by the Royal Air Force. His contribution to engineering training has been sustained, consistent and supreme, and has been pivotal to the maintenance of airworthiness.

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.

Royal Navy Operational Engineering Award

(Called the "Thunderer" award to sustain the heritage of this name within The Worshipful Company of Engineers)

Lieutenant Commander M Smith RN, as Air Engineering Officer of 829 Squadron, has delivered an exceptional level of operational capability to the Fleet under particularly challenging circumstances, significantly improving performance with Merlin flights exceeding their operational serviceability target by 6% and exceeding the Merlin average by 16%. This has been achieved though the application of outstanding engineering management skills and initiative, the main elements of which include the application of lean principles and the reorganisation of key areas to improve performance. In addition he has achieved the highest engineering standards and practices. This sterling performance reflects a truly excellent Engineering Officer.

Royal Engineers Operational Engineering Award

Major R Hewson RE commanded one of the largest Royal Engineer tasks since Korea – the construction of Camp Bastion, Helmand Province. Constructed on a bare desert site in just four months, the camp comprised 2250 bed spaces, a 50 bed Field Hospital, Headquarter complex, Joint Helicopter facility including 440m of expedient surfacing runway, ammunition storage areas and a C130 Hercules tactical landing zone. The construction also included all associated essential services and involved 105 service personnel and 180 locally employed civilians. The success of the construction effort is widely regarded as one of the Corps' most significant single achievements of recent years. For his application of professional engineering judgment as a professional qualified engineer and his significant contribution to operations in Afghanistan, Major Hewson is a worthy recipient of this award.

Major General, Keith Cima, The Master, Major R Hewson, Dr Peter Southern

Royal Signals Operational Engineering Award

Major J A Kennedy MSc R Signals studied the compatibility issues associated with the interconnectivity between the Bowman voice and data networks and the Apache Attack Helicopter Mk1 voice and data subsystems for his dissertation for his Masters degree in Communications and Information Systems Management. On graduation in 2002 he took up the appointment of SO1 (W) Comms at HQ Directorate of Army Aviation where he was able to continue his work to contribute to the operational effectiveness of the Apache AH Mk1. Evolving his MSc dissertation, Major Kennedy developed a technical concept for a system that allows the Apache's VHF radio to connect to the Bowman secure voice network. His concept was used as the basis for the development of a rebroadcast system, enabling the interconnection of two differently configured networks, without the costly integration of another radio into the aircraft. It has also enabled interoperability between Bowman and other NATO VHF secure networks. For his application of professional engineering judgment and technical innovation that has contributed significantly to the enhancement of operational capability, Major Kennedy receives this award.

Royal Electrical and Mechanical Engineers Operational Engineering Award

Major I J Phillips commanding General Support Company of 1 Battalion REME in Osnabruck, was directed to develop lean engineering techniques on the BATUS Winter Repair Programme in Canada. Major Phillips has shown an enduring commitment to engineering through his dedicated application of lean techniques. Throughout the year he has exploited and evaluated every opportunity to maximise the Battalion's chance of success in the most demanding of engineering challenges the Battalion has had to face. It is for his diligence, perseverance and commitment that Major Phillips is the recipient of the REME Operational Engineering Award.

Royal Air Force Operational Engineering Award

Flight Lieutenant S Hudson from 216 Squadron, Brize Norton has been critical in sustaining TriStar transport & tanker aircraft capability by providing inspired leadership and impressive engineering acumen. 216 Squadron's output in the past year has been crucial in supporting operations in Iraq and Afghanistan through the Strategic Airbridge and air-to-air refuelling. Flt Lt Hudson has applied sensible airworthiness risk management on a small and ageing fleet with levels of maturity ahead of his

Air Marshall, Sir Barry Thornton KCB, The Master, Flight Lieutenant Hudson, Dr. Peter Southern

seniority. Moreover, he has frequently discharged total responsibility for the delivery of logistic support on the Squadron and welfare of over 250 personnel. Accordingly, Flight Lieutenant Hudson's outstanding contribution makes him a worthy winner of this award.

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 material availability targets for any of the Armed Forces. The recipient would normally be chosen from the Defence Equipment & Support Organisation.

Lieutenant N Scholes RN is the Subject Matter Expert for Submarine Air Purification. Clearing a longstanding submarine escape system shortcoming, he brought into service a passive CO_2 removal system that provides a 7-day survival window for a stricken submarine. Deeply involved in the investigations following the Self Contained Oxygen Generator (SCOG) explosion in HMS TIRELESS, Lt. Scholes is playing a pivotal role in the restoration of confidence in the equipment. A first class engineer who consistently delivers great results, Lt Scholes possesses intuitive engineering judgement, strong leadership skills, infectious enthusiasm and a high degree of technical acumen. Lt Scholes is therefore fully deserving of this award.

PERSONALIA

New Liverymen

We welcome new Liverymen to the Company invested on 24 April 2007

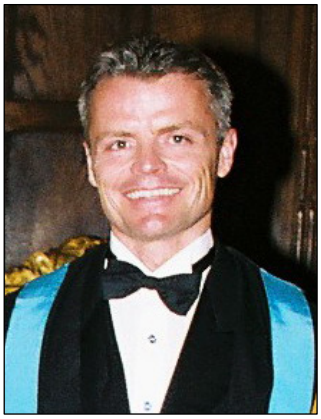
Dr Graham OWENS FREng, BSc DIC, FIStructE, MICE, MWeld

Peter MORGAN BSc, FICE, CIWEM

Professor Michael BROWN DL, BSc, PhD, EurIng, CPhys. FInstP FIET

and on 10 July 2007

Dr Piers Martin COPHAM BA(Hons), PhD, CEng. MBA



Francis Joseph QUAIL BEng (Hons) FIMechE, MIEI

We regret to report the death of Air Marshal Sir Geoffrey Ford, KBE, CB, FREng, who joined the Company in 1987 when he was Secretary of the Institution of Metals and John Campbell who wrote a report for The Swordsman on the visit to the Black Country Museum last year.

The Membership of the Company continues to go from strength to strength and there will soon be a waiting list!!!