Imperial ENGINEER

MINERS NEEDED
NEW CGCA PRESIDENT
WATER – LIFE'S NECESSITY
CENTENARY COUNTDOWN

ISSUE FIVE *AUTUMN 2006*

For members of The City & Guilds College Association and The Royal School of Mines Association

ISSUE FIVE AUTUMN *2006*

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COVER PICTURE: Rather than produce yet another article about Isambard Kingdom Brunel, we are publishing a picture of fireworks over Clifton Suspension Bridge which marked the 200th birthday of one of the most inspirational engineers of the 19th century. Picture: britainonview/Pawel Libera

Imperial ENGINEER

EDITORIAL BOARD
Bill McAuley (Managing Editor)
Leah Glass
Paul Holmes
Chris Lumb
Colleen Shilstone Richardson
Teresa Sergot

PRODUCTION EDITOR
Lynn Penfold

PRINTING
Alpine Press, Kings Langley

CORRESPONDENCE and ENQUIRIES
Teresa Sergot
Engineering Chapter
Room 1.30, Royal School of Mines Building
Imperial College, London SW7 2AZ
Tel: +44 (0) 20 7594 1184
Fax: +44 (0) 20 7594 1185
Email: t.sergot@imperial.ac.uk
Chapter website:
www.imperial.ac.uk/engineering/about/alumni/

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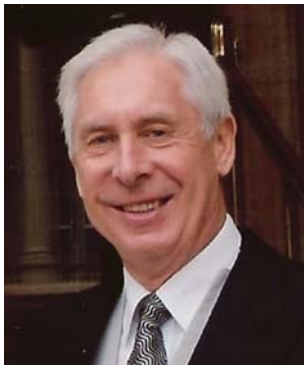
The editorial board of *Imperial Engineer* reserves the right to edit copy for style and length.



John Banyard

2006 is the 40th anniversary of my graduation from Imperial College, and the latter half of my presidential year will coincide with the Centenary of the College. It is strange to realise that my professional life has spanned 40% of the College's own existence. When I received my degree I never dreamed that I would one day be President of the Alumni Association. I am greatly honoured to have been elected to do so.

The engineering profession today is very different to the world of the 60s. For most laymen, the most obvious change has been the introduction of computers and the dawning of the digital age. But the changes have been far more extensive, with increased emphasis on commercial matters and management, together with the emergence of consumer orientated societies. globalisation and environment.

The ancient Egyptians represented human life as a tree with five birds sitting on the branches. Four looked to the right and one to the left. The birds were the five ages of man, with four looking to the future and the fifth looking the other way because he was dead: at which point there is only a retrospective of what has been. There is a great danger in any organisation like CGCA that it will focus too much on what the world used to be like and fail to take sufficient account of the realities of today's profession. Any organisation that falls into that trap will simply become irrelevant to its younger members and eventually perish.

I am delighted to say that over the last few years, the need for change has been recognised and much has been achieved. It is my intention to ensure that progress is maintained. CGCA will maintain those traditions that are relevant and seek to introduce new opportunities for members, while working with the College to ensure that the Association remains as relevant to Imperial and its alumni in the future as it has been for the first 100 years.

Finally may I encourage as many of you as possible to attend at least one of the events that are being held to mark the Imperial College centenary in 2007 and help to celebrate a great academic institution.

Roger Clegg

PRESIDENTS REPORT

AS ANOTHER academic year looms, I would like to take this opportunity to reflect upon some of the major challenges and events for the RSMA and the CSC (Clubs and Societies Committee – the old Union to us oldies) that have occurred over the last year.

As ever, the restructuring of the college and reduction in funding from the College has made the operation of the RSMCSC very challenging. As such, the RSMA has been working closely with the Union in supporting the more traditional events. The last academic year has seen the Association support the Freshers Dinner, the Christmas Ball, the Bottle Match and the Final Year dinner, overseas trips to Canada and Azerbaijan and the rebuilding of the RSM mascot, Clem. The Trust meanwhile continues to provide vital support for individuals in the form of hardships loans and grants as well as UROP (Undergraduate Research Opportunities Programme). However, it is gratifying to see that the CSC (Union) executive has been particularly active in raising additional funds, especially in the form of external sponsorship. Given the current strong commodities' market and the record profits recorded by mineral resource companies, it's a valuable source of income I hope the new executive continues to tap into.

There is now even more reason for us to continue supporting the welfare, educational and social needs of the students of the RSM. At the last RSMA committee meeting it was agreed that RSMA membership subscriptions would be increased from £10 to £15 a year for all members with the exception of life members. No one can actually remember how long the subscription levels have been static but it is definitely decades and over that period costs have continued to rise.

You as members may rightly ask 'what do I get for paying an extra £5?' The answer is that your valued subscriptions go towards helping the students achieve a rounded education which is getting more expensive each year. If this extra funding means that more students can graduate from the RSM and take its spirit with them into the wider world, then that has to be worth it. There are a number of logistical and technical difficulties in changing standing orders for existing members, so we are relying on you to voluntarily change your standing order with your bank!

Lastly, I would like to thank our outgoing Treasurer Paul Atherton who has provided a tremendous service to the RSMA, despite his work taking him overseas for much of 2005/6.

CGCA welcomes new President

CGCA'S new President, John Banyard, comes to the role following a distinguished career in the water industry, for services to which he was awarded an OBE in 2004.

John joined Severn Trent Water in 1974 and was a main board director prior to his retirement in 2004. He held overall responsibility for the Company's asset management and capital investment programme and for its R&D activities.

He has lectured extensively in Europe and the US on the topic of asset management and in 2004 delivered the Fifth International Brunel lecture for the Institution of Civil Engineers.

Amongst his many current commitments he lists membership of the Water Industry Commission for Scotland; Deputy Chairman of the West Midlands Innovation and Technology Council; Court Assistant to the Worshipful Company of Engineers, where he is also Archivist, and membership of the Worshipful Company of Water Conservators. Despite these 'distractions' he assures us that CGCA will receive his utmost attention!

He has been happily married to Judith for 38 years and has two children, Helen and Richard. He has a passion for scuba diving – but only in warm water!

We welcome him to his new responsibilities and promise him that any water we get him into will NOT be cold!

Bill McAuley

REMEMBERING 1926, when six Guildsmen formed the Links Club, 20 times as many Guildsmen and guests celebrated the 80th anniversary at a black tie College dinner in the Sherfield Building. Starting with a tour of new College erections and demolition, a reception at the Tanaka Building was followed by the mandatory group photo on the steps of the Albert Hall.

Links came from around the world, including Europe, Canada and the USA, some seeing each other for the first time in 30 or 40 years. Yogi Bishop even travelled from Melbourne Australia to be there. Chris Gosden (Hon Sec of Links) was the master of ceremonies and Rod Rhys Jones addressed those assembled with tales from the previous century.

Images of the event are on www.linksclub.org db@numerousbenefits.com

Countdown to Centenary

IMPERIAL'S Centenary in 2007 is fast approaching. Centenary Communications Coordinator Carol Marsh is keen to stress that everyone can get involved with the celebration.

The Centenary programme, while celebrating the College's distinguished past, will focus on the impact of its academic enterprise on the future.

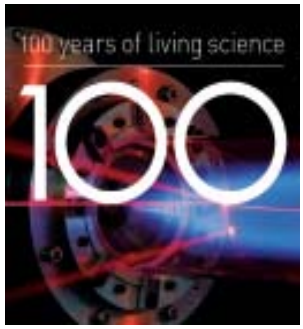
Its aims are to

- accelerate and enhance the effectiveness of Imperial's fundraising campaign;
- promote the reputation of Imperial;
- help develop the sense of community at the College.

College events will include a formal Centenary launch event to raise money for special centenary scholarships; a series of prestigious public lectures; a celebratory staff event in July; and a programme of international visits by the Rector. Faculties, departments and the Imperial College Union are all developing special events.

For more information about Imperial's 100th birthday, visit the new Centenary website at www.imperial.ac.uk/centenary

You can get involved by



nominating which Imperial staff member or student, past or present, you think has had the greatest impact on society during the past 100 years. Send your thoughts and photographs to centenary@imperial.ac.uk or send a letter to Centenary Team, Communications Division, Level 4 Faculty Building, Imperial College London, South Kensington Campus, London, SW7 2AZ

Your memories will be added to the website with your name, degree/department and grduation year. Please state if you wish to remain anonymous.

If you would like details of Imperial's events delivered directly to your inbox every fortnight, please send an email events@imperial.ac.uk with subscribe in the subject line.

Barry bows out

CHANGES came to the fore at the City & Guilds College Association's AGM in May.

After two years in office, Barry Brooks was succeeded as President by John Banyard. He was presented, appropriately, with a ship's decanter to thank him for his dedication to CGCA. Bill McAuley resigned as Honorary Secretary to concentrate on his role as Managing Editor of *Imperial Engineer*. Chris Lumb was elected to serve in his place.

After the brief but successful meeting, the new President introduced speaker for the evening, Professor Paul Jowitt.

Recognition was paid to 32 students who had been awarded half colours and 17 who had been awarded full colours.

IN BRIEF

LEAH Glass has joined Imperial Engineer's Editorial Board. She was last year's RSMCSC president.

ROGER CLEGG (RSMA president) married Nikki Heather on June 3.

Dame Julia becomes Faculty Principal

PROFESSOR Dame Julia Higgins (right) has taken over from Julia King as Principal of the Faculty of Engineering.

Her predecessor, Professor King, has become Vice Chancellor at Aston University. Over the last two year she has overseen the launch of EnVision and the Energy Futures Lab. Imperial Rector Sir Richard Sykes commented that the Faculty has benefited greatly from her experience and enthusiasm.

Dame Julia remains Professor of Polymer Science in Chemical Engineering and Chemical Technology and was Director of the Graduate School of Engineering and Physical Sciences.

She is not only a leader in her own field, for which she has been recognised through fellowships of the Royal Society and the Royal Academy of Engineering, but is also a passionate advocate of science and engineering in general and for the raised profile of women in these fields.

Professor Christopher Hankin, previously Pro Rector for Research, is now Deputy Principal for the Faculty of Engineering. Among other duties, he will share responsibility for strategy and development with Dame Julia

Professor Dick Kitney, Professor of Biomedical Systems Engineering and latterly Dean for the Faculty of Engineering, is now Director of the Graduate School of Engineering and Physical Sciences (GSEPS), succeeding Dame Julia. He is remaining Senior Dean until 2007.

Computing's Professor Jeff Kramer is Dean for the Faculty of Engineering and the Business School until August 31 2009.

Online reading

Once again, high levels of contributions mean that some articles throughout the magazine have had to be abbreviated. To read them in full try going to www.imperial.ac.uk/engineering/about/alumni/imperial engineer.

Social dates

INCLUDED with this Issue of *Imperial Engineer* are booking forms for three key events.

First is RSMA's Annual Dinner which will be at the Polish Club. This time there is a return to elegance with dress code being black tie. Date is November 17.

The Decade Reunion Lunch, on November 25, is for those who left Guilds, RCS and RSM in any year ending with a six.

In recognition of the Centenary celebrations, CGCA's Annual Dinner on March 6 will be more glittering than ever. The venue will be the Carpenters' Hall.

See the address carrier and inserted booking form with this issue for these events.

CGCU's new President James Fok chats with CGCA President John Banyard as Treasurer Peter Chase listens at the In-Out dinner on June 9. This dinner is hosted annually by CGCA to recognise the departing Union officers and welcome the new ones.

No card needed

CGCA AND RSMA have abandoned the issuing of membership cards. 'The only reason people ask for them is that they want to use the facilities at the New Cavendish Club' says Chapter Manager Teresa Sergot. 'But there's no problem. Just tell the Club you're a member'.

Usually that's sufficient, but if there are any doubts, the Club should contact Teresa to confirm membership. Tell them to ring 020 759 41184.

Walk in Mayfair

THE LATEST 'Walk with a past President', on Saturday December 2, will explore the unique squares, mews and notorious Shepherds' Market of Mayfair.

'Much of the area's old layout is retained and this walk enables us to discover some of the history', says organised David Hattersley. Guide will be Malcolm L Dick, a specialist lecturer in the history of London.

Meet in the booking hall at Marble Arch underground station at 10.30am. The walk will finish in Bond Street.

New members and guests are most welcome. Contact davidhattersley@aol.com.

Jean receives highest accolade

Jean Venables

JEAN VENABLES (Civils 69 and 74) has been elected a Fellow of the Royal Academy of Engineering, one of the highest accolades that professional engineers can bestow on a colleague.

Jean works with husband fellow Guildsman Professor Roger Venables in Venables Consultancy and Crane Environmental. One of her major assignments is as Chief Executive of the Association of Drainage Authorities, the association for those involved in water level management. She is also a Vice President of the Institution of Civil Engineers and is in line to become President in November 2008.

As Britain's national academy for engineering, the Royal Academy brings together the country's most eminent engineers from all disciplines to promote excellence in the science, art and practice of engineering. Their strategic priorities are to enhance the UK's engineering capabilities, to celebrate excellence and inspire the next generation, and to lead debate by guiding informed thinking and influencing public policy.

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

All set for 2010

IN SEPTEMBER, the Faculty of Engineering officially sanctioned EnVision 2010, an initiative aimed at placing Imperial College in a sustainable position at the international forefront of engineering education.

Making engineering more attractive and relevant to new generations, and then inpiring undergraduates with an interest and enthusiasm for the opportunities engineering offers, will be key to making them able to become leaders and innovators in international industry;

EnVision is based on opinions gathered from over 3000 students, academics, alumni and representatives from industry regarding the quality and reputation of Imperial's engineering education and their own personal experience.

Over 30 heads of department, students, academics and external experts have been involved in analysing current provisions and developing ideas for change in three areas. These are

- developing the curriculum and teaching for undergraduates and coordinated schools' outreach initiatives;
- developing exciting purpose-built classrooms, lecture theatres and learning spaces;
- encouraging support and celebrating exceptional approaches to teaching.

Between January 2006 and October 2010, a significant programme of work will create change in these areas. Firstly, over next year, early work will include:

- developing hands-on undergraduate projects, such as the opportunity for first year aeronautics students to build and fly a light aircraft. These projects will be designed to motivate students, strengthen their understanding of the engineering fundamentals and develop their engineering skills and judgement;
- new outreach activities to inspire and motivate young people to consider studying engineering at university.

More information on envision@imperial.ac.uk or www.imperial.ac.uk/envision2010 .

Oars win combat

HAVING won virtually all the Henley events it is eligible to row in, Imperial was invited to donate a cup for this year's Royal Regatta. Named the Prince Albert Challenge Cup, it was donated for the Men's Student Coxed Fours and was won by Imperial's crew. Imperial also won it when the category was first rowed in 2004.

According to Professor Bob Schroter, Chairman of Rowing at the College: 'Being allowed to donate and name a cup is an honour no other university has so far received. It's a tribute to the dedication of all Imperial rowers, past and present'.

The victorious crew won out over Queen's University Belfast, Bristol and Durham on their way to the final, setting new course records in the process.

Imperial's women rowed to victory in the elite lightweight single and senior club eights events. The women's team includes under-23 world champion Mathilda Pauls, who won all her races in the singles event.

LEFT: The Prince Albert Challenge Cup, designed by silversmith Hector Miller, incorporates the College's crest and reflects Imperial's reputation for cutting-edge science.
BELOW: Imperial's crew – Ben Smith (bow), Olly Moore, Will Laughton, Ole Tietz (stroke). Ali Williams was cox and Simon Cox chief coach. Will and Ben are at the RSM.

Picture courtesy of Wokingham Photographic

30 years as role models

IN THE summer, tutors past and present celebrated raising youngsters' aspirations and achievement through 30 years of the Pimlico Connection, the UK's oldest and most successful peer tutoring scheme.

Among them was Alastair Kendall, one of the original group of 14 electrical engineering students who, with Professor Sinclair Goodlad, came up with the idea for their third year studies project.

Pimlico places over 100 Imperial students each year in 23 London primary and secondary schools, where they give one-to-one support in subjects such as science, maths and IT.

Pupils are those who want to move faster than the pace lessons allow and slower learners who need individual attention. Dr Annalisa Alexander of Imperial's Outreach Office, which runs the scheme, says: 'I've never met a more enthusiastic group of students. Schools tell us constantly how much of an asset it is to have them as role models.'

Chair celebrates Ceres' founder

A CHAIR in energy materials has been created in memory of Professor Brian Steele. Professor Steele, who worked in Materials for 37 years, was instrumental in the development of solid oxide fuel cells. He was also a founding member of spin-out company Ceres Power.

The new chair, which will be the first named chair in Materials, has been made possible thanks to a generous donation by Professor Steele's family.

Congratulations

PROFESSOR David Nethercot received an OBE for services to structural engineering in the Queen's birthday honours . He is head of the Department of Civil and Environmental Engineering.

The source of some of these articles and some of the words come from* Reporter, *newspaper of Imperial College.

Healthy position for next 100 years

Speaking at the City & Guilds' Fellows' lunch in June, Professor Julia King gave an overview of developments in the Engineering Faculty

HAVING explained that the Engineering Faculty incorporates the City and Guilds College and the Royal School of Mines, Prof King outlined plans made for Imperial's centenary next year.

She highlighted plans to celebrate the year through the achievements of 100 engineers from the first 100 years. In particular, she remembered Nobel Prize winner Denis Gabor and his invention of holography, and Eric Laithwaite and his innovations in linear induction motors. These are the basis of Japan's transport system and its Shinkansen trains.

More importantly the celebrations are acknowledging living engineers who have begun to make a huge impact on Imperial's second century – Molly Stevens and repairing humans, Prof Alex Bismarck and wearable batteries and Prof Chris Toumazou with bionic eyes and ears.

The Faculty is in excellent health, Dr King told the Fellows – 'or the past two years we have been ranked number one in Europe for engineering and technology by the Times Higher Educational Supplement survey'.

Research income has grown 30% in the two years Prof King has been at Imperial and undergraduate applications have continued to increase – up 10% last year, and a further 6% this year, bucking the national trend.

Engineering is changing fast, Dr King continued, using core knowledge and skills to go into new areas and solve new problems. 'We won't change human behaviour fast enough to combat global warming, but with support from engineering innovation we can do it. In a perverse way, this challenge for the planet could be the best recruiter of young engineers we have had for many years.'

Prof King then told the fellows about her own area of materials, where many exciting developments are coming from Imperial and went into detail about three.

Self-repair

Biomaterials and tissue regeneration is a rapidly developing area which is attracting lots of young people.

Dr Molly Stevens has developed a technique to grow new bone of the right sort to solve problems like a serious fracture that won't heal or certain degenerative bone conditions.

Currently a bone graft is a painful and slow process where bone is taken from one part, such as a rib, and grafted on to, say, a shin. It hurts where it is taken from and it may not take where it is put. Even if it works, it will take a long time to heal and grow properly because it will be the wrong sort of bone!

Leg bones are designed to work mainly in compression – we can push with our legs, but it is quite hard to pull. By contrast we do a lot of lifting and pulling with our arms – tension. So leg bone has short stumpy cells with thick walls to avoid buckling, whereas arm bone has many elongated cells with thin walls optimised for tensile strength. So the grafted bone has to regrow to match the local requirements – slow and prone to damage.

With Dr Steven's technique, bones are covered in a layer of stem cells – the pluripotent cells - in the periosteum. By injecting water through a tiny hole in this layer, you can form a cavity between this surface layer and the underlying bone. Injecting a calcium-containing gel into this cavity, new skeletal tissue gradually grows from the pluripotent cells and the calcium. The bone is easy to detach – less painful and heals faster than a graft, and you can grow the right cell structure and morphology.

Professor Julia King

Power dressing

New composite materials are being developed in which the interface between the strengthening fibres and the matrix can act as a capacitor-storing charge. In other words, a material which is also a battery. This is one of Dr Alex Bismarck's many areas of innovative research in Chemical Engineering.

A modern soldier can be carrying 40+ kg of equipment, much of it actually batteries for his mobile communications, sensors, detectors, weapons etc.

So what if all the casings of the equipment were actually batteries as well? What if we could make the composite thin and flexible enough to make clothes out of it? What would you do with an electric coat? Power dressing takes on a new meaning!

Silent aircraft

Shape memory alloys (SMA) have been around for many years, but they are developing and finding new applications. One is potentially making aircraft engines much quieter on take-off and landing.

Much of the noise comes from the fast, hot gas racing out from the core of the engine. The better we can mix this with slower gas from the outside by-pass duct, the lower the noise. However, we make the engine less efficient, so we only want to do this when we need to minimise noise. If we can put fingers or petals on the end of the exhaust which bend in to improve mixing/slow the gas near the ground and straighten out again during flight to maximise efficiency, it improves noise enormously – by up to 10dB. However, if we have to do this mechanically with lots of little actuated fingers, it's very expensive and very unreliable!

SMAs have a complex transformation, at a relatively sharp temperature, from one crystal structure to another. Thus, if they are shaped at one temperature, cooled through the transition and straightened out and then reheated, they will 'remember' their precious hot shape.

So if the fingers or petals contain SMAs, simple electrical heating can replace complex mechanical actuation to deploy them. Cheap, simple and effective.

Dr Dave Dye in Materials is working on SMAs with colleagues in IISc Bangalore and Rolls-Royce.

And that is why Imperial College is such a special and important place, Prof King concluded.

Donations needed for memorial to Spitfire Pete

THE RSMA is seeking donations to establish a prize to commemorate Peter Harding's outstanding contribution to the RSM and Imperial College over many years.

The target is to raise £5,000 to be invested to produce a prize of £150. It will be awarded annually to an undergraduate, postgraduate or alumnus of the RSM, Faculty of Engineering or Imperial College, who has demonstrated sustained commitment and an outstanding contribution to College.

Please send your donations to Teresa Sergot (details page two) making cheques payable to the 'RSMA Trust'.

To Gift Aid the money please write on the back 'Please Gift Aid this donation' and add full address (including postcode) and sign and date it.

HONORARY Chaps' member Alan Smith (Chem 68) reminisces about his great friend 'Spitfire Pete' Harding at a barbecue for over 75 on September 23. It was held to remember Pete (see obituary last issue) by bringing together his friends of all ages and eight members of his family, including from overseas. It was sad that Pete's widow, Sheila, was unable to be there as she had suffered a recent fall, but his sons Barry, Chris and Tim were. A screen carried messages for those who could not attend.

DIARY

Wednesday October 18
Engineering Careers Fair and Networking Reception. Starts College entrance 11am.

Friday November 17
RSMA Annual Dinner, The Polish Club, 55 Exhibition Road, 7 for 7.30pm.*

Saturday November 25
2006 Decade Reunion Luncheon, Senior Common Room, Sherfield Building, 12 for 12.30. *
Booking forms on reverse of address carrier for the last two events

Saturday December 2
Walks with a past President: Mayfair. Meet Marble Arch tube booking hall at 10.30.
** If you are interested in ths walk see cgca.org.uk to register interest or email David Hattersley at davidhattersley@aol.com Tel: 020 8504 8263.*

Thursday December 14
CGCA Christmas Lunchtime Seminar, 170 Queen's Gate, 12 for 12.30pm. Contact Teresa Sergot (as below)

Tuesday March 6
CGCA Annual Dinner, Carpenters' Hall, 6.45 to 10.45pm. Booking form inside magazine.

For more information and booking for any of these events, contact Teresa Sergot t.sergot@imperial.ac.uk or phone 020 7594 1184

Enjoyable evening follows RSMA AGM

RSMA'S AGM was short and to the point with Kurt Budge reading the President's report. Roger Clegg was on honeymoon. (See Presidents Report:: page three).

The committee remains the same for another year except that Treasurer Paul Atherton has had to resign due to working overseas. Rup Banerjee has replaced him. The committee also agreed to raise subscriptions to £15.

The Final Year Dinner, which followed, was very enjoyable with Nigel Kieser as guest speaker. Nigel, now with Rio Tinto, graduated from RSM with a BSc in mining geology and then a PhD. He gave practical advice to graduating students with amusing tips on how to build and survive a career in the mining sector.

Presentations were made to Chaps' medal winner Cynthia Muorah and essay winner Christine Dimech.

OC Trust support valued

The CGCA's trust fund (the Old Centralians' Trust) has distributed over £26,000 since October 2005 in support of student hardship and activities.

A hardship award of £3,000 was made to a student who lost family funding through family problems and showed considerable determination in finding well-paid employment, but still needed some financial help.

Accommodation Bursaries (renamed Student Activity Awards) of £700 were awarded to 12 students, who are involved in society and student activities.

The Undergraduate Research Opportunities Programme (UROP) was given £8,150 to support 15 undergraduates in research opportunities. The Pimlico Connection was given £1,600.

An electrical engineering student was awarded the £500 Jessel Rosen Overseas Travel award for a summer 2006 placement in Denmark, Postgraduate travel awards were made to six taking part in major conferences abroad.

This summer's IC Rugby Club tour received a £1,000 grant from the Holbein Fund.

The John Elliott Bursary Scheme helped key student CGCU officers with costs involved serving at this level.

Old Centralians' Trust Fund Chairman Chris Lumb writes: 'The OC Trust couldn't provide such a range of awards were it not for the generosity of CGCA members, particularly those who have remembered the Trust in their wills. We can accept Gift Aided donations, both one-off and by regular subscription, while legacies from UK residents will result in a reduction in the Inheritance Tax. Please consider whether you can help in any of these ways.'

RSMA Trust continues help

DURING 2005, the RSMA Trust paid one loan of £1,000. Repayments of £500 were received, leaving a balance of £2,000 outstanding at year end. The Dean's discretionary fund continues to be helpful and awarded two grants totalling £400.

The essay competition attracted five entries and the winner was Christine Dimech, a materials PhD student. She dealt with the problems of municipal and industrial waste in her essay entitled: 'From Household to Hazardous '.

The Trust continues to provide financial assistance to RSM students and would like to attract more donations. It is looking at using Gift Aid.

Website news

IT'S hoped the RSMA website will be launched in late autumn shortly after the launch of the RSM website.

Bo drives coast-to-coast – and beyond

BOANERGES, Guilds' mascot, has been out and about again this summer, in one of the most daring cross-country trips to be undertaken since his memorable London to Paris centenary drive in 2002. This time the main challenge was the English 'coast-to coast', from Whitby to Blackpool, then beyond.

Back in April, the car had been looking tired. Relatively little repair work had been done for two to three years and the list of outstanding jobs was getting longer all the time. At Easter the engine was removed, the opportunity being taken to send the two rear wheels away for repair since they had become cracked and bruised. All was quiet during the April and May exam period, but in June the frenzied rebuild began.

The paint was barely dry on the new rear wheels as 'Team Bo' eventually set off for North Yorkshire in the early hours of Saturday June 24. Travelling through the night, we eventually arrived on the quayside at Whitby and duly set about preparing the car for the first leg.

Expecting the car just 'to go' after so little re-commissioning was perhaps optimistic. But after several false starts, some re-aligning of the clutch linkage and a small engine fire, Bo was underway!

The first major challenge came rather sooner than desired. Pottering the first few miles over gently rolling hills, the car felt good – plenty of power. But soon after honking and waving through the picturesque coastal village of Lythe, it became clear why onlookers had been looking so concerned. Bo was now about to pay the price for the gentle two to three mile descent out of Whitby with half a mile of one-in-four. Into first gear he went, and remarkably, Lythe bank was accomplished without even slipping out of gear.

Onward then through Guisborough, Northallerton and Bedale until eventually we made camp at West Witton, just outside Leyburn. In the morning, Bo continued through the stunning scenery of the Yorkshire Dales, passing Hawes, Chapel le Dale, stopping to admire the famous Ribblehead viaduct – and a well-earned cup of tea. As we rolled along, everything seemed to combine perfectly to allow a most spirited run over the fells. Magic!

The 'coast-to-coast' part of this trip was completed on Monday June 26 as we arrived in Blackpool. Deciding that we could probably do without the expensive rides at the pleasure beach, we opted instead for a quick pint on the pier, a ride on the tram, before saying farewell to our loyal 'support crew' of ex-drivers. Bo was then put on the trailer again, before setting off for Telford and the beginning of 'stage two'.

Our first objective on Tuesday morning was to reunite Bo with his very first home, or rather the remains of it. Tong Castle in Shropshire had once been a fine country house but was eventually blown up in 1954, having been derelict since around 1910. All that remains of the house today are a few walls and arches buried in the extensive woodland which is used as a paintball range. And just to prove how some things change very little in 100 years, we were, remarkably, spotted driving through nearby Shifnal by the great-great-granddaughter of Bo's original owner.

Unfortunately our grand tour of 2006 was soon to be abruptly ended on Wednesday June 28 when, having reached Stratford-upon-Avon via the Severn Valley and Worcester, we discovered a fracture in one of the engine mounting beams.

Although not 'catastrophic', to go on was clearly out of the question and so we decided to call it quits. Disappointing in some ways, but there was much to be proud of. If Bo had a 'clock', we'd have put around 240 miles on it. That's London to Brighton – four times! ***David Horton***

David Horton, Simon Hamlin, Dan Lehmann, Yvette Phillipps and Matt Harris were present for the whole drive. They were joined by Paul Trompeteler, Jez Clayton, Pete Burge and Tom Williams. Pictures of Bo's trip can be found on www.teambo.fotopic.net. For more information about Boanerges see cgcu.net/motor/bo.php To contact 'Team Bo' e-mail, go to bo@cgcu.net

Bo returned home to Tong Castle.

...and Clem gets much-needed overhaul

SINCE last October, RSM Motor Club has been carrying out a massive and much-needed restoration of the RSM motor mascot, 90-year-old Clementine II, thanks to financial help from the RSMA. It was led by Matt Harris and Dan Lehmann. She took over from Clem I, 46 years ago.

A batch of special brake drums was cast and the propshaft was made in-house by the team, who also completed the re-wiring. A new RSM emblem was stencilled on. With nearly all the tyres needing replacement, the decision was made to buy up the remaining five tyres in the UK.

New team voted in

CITY & GUILDS Union President for next year is James Fok, who is taking an MSc in management in the Tanaka Business School, having graduated in mechanical engineering. He has previously been involved in the union through his work at the Lord Mayor's Show, as Sports Officer and member of the Formula Student. team.

Completing the CGU committee are VPFinance & Societies Boon Koh (BioEngineering); VP Activities Borja Sordo De La Pena (Electrical Engineering); Honorary Secretary Nick Simpson (Civil Engineering); Academic Affairs Officer Alexandra Martinsson-Dorff (Chemical Engineering) and Welfare Officer Emma Persky.

RSM Clubs and Societies' Committee President is Seb Turner who has just completed an MSc in geology and geophysics. He's now doing a PhD in tectonics and remote sensing also in Earth Science and Engineering.

Seb is supported by Hon Sec Elly Jay, Junior Treasurer Chris Lannin, VP Suzie Ogilvie and a core committee of 15.

SOME of the many visitors to the first Women in Engineering Open Day get to grips with practical aspects of a possible course. The student organisers thanked the Faculty for its support in this initiative. Due to considerable positive feedback, it will be staged again next year.

Honour satisfied on rugby tour

IMPERIAL Rugby Club's summer tour of Canada was sponsored by both CGCA and RSMA. 'It started in Edmonton with chances looking bright against the Edmonton Golds', writes Ben Gates (Materials). 'But with a new country came new conditions and new referees and we were unable to maintain our early upper hand throughout the game. Our spirits were soon lifted by the after-match food the Canadians provided and winning our first boat race'.

They tore their way through to the semi-finals of the sevens' tournament. in Calgary but were beaten by a team known as Melanoma by a mere point. Their XV's game against Calgary Irish left Imperial disappointed losers again, but after time in the Rockies and Banff national park they arrived in Vancouver with a will to win. They left Capilano rugby club out in the cold waiting for their conversions to sail overhead,

Ben continues: 'While in Vancouver we stayed opposite a communal rugby pitch. Rugby in Canada is still a minority sport but it's growing at an incredible rate and many locals were eager to learn more about the game and train with us'.

Honour was satisfied when they met their old adversary Melanoma in the Simon Frasier University Sevens Tournament and beat the hard-talking team by five tries to two.

Ready for next year

IN MAY, the RSMCSC, with the support of Minsite.com, organised a mining careers' evening to educate students from Imperial and a number of other European universities about extensive opportunities offered by the currently buoyant mining industry.

The evening was a huge success with over 150 attendees, including more than 50 representatives from a wide range of companies. It consisted of eight company presentations, followed by a networking reception in Harrington's Bar and Grill.

Following the success of this event and the resounding support and praise received from the industry, it will take place again next year, hopefully with an additional mining finance event along similar lines.

RSMCSC outgoing President Leah Glass writes

Wow, what a year!

I'M PLEASED to report that the RSMCSC is stronger than ever. Having raised over £8,000, thanks to generous sponsorship from a variety of companies and individuals, and by running some extremely successful events, we've gone from £2,500 in debt to nearly £3,000 in the black .

We also won the beautiful bottle for the 10th year running and I am still alive to tell the tale (just!)! But, more importantly, the RSM spirit is thriving, as demonstrated by legendary enthusiasm and participation.

This was made evident during the union elections in March. Every position was contested, with five people running for the presidential position alone. Best of luck to next year's president, Seb Turner, and the rest of next year's committee. The RSM is in safe hands!

Finally, I would just like to thank all those who have helped make this past year so successful and also so much fun. In particular, Roger Clegg and the rest of the RSMA committee.

It was through chatting to alumni and hearing their memorable stories that I developed much of my drive to not merely keep the RSM going, but also to try and build on my predecessor's efforts to make the RSM bigger and better than ever – fit to carry on for another 150 years.

With continued enthusiasm, involvement and support from both students and alumni it can only get better. Here's to a prosperous RSM future!

Continuing *Imperial Engineer's* the theme of sustainability, the following seven pages look at water, both as a necessity for life and its uses for power generation.

Two into one won't go

This article, by Max Wideman was first published in Project Management World Today*'s web magazine*

THIS IS about the availability of fresh water for human consumption. An odd title perhaps for such a topic, but it is clear that many people have a problem with the associated simple arithmetic, because perception is reality.

The problem is that more and more people are voicing concern about the diminishing supply of fresh water. Indeed, in many countries around the world, people are becoming desperate for water. Notwithstanding their plight, the reality is that in recent history the global potential for fresh water supply has been relatively constant.

Global problem

Not all water is 'fresh' of course. Here is a rough break down. More than 97% of all water on earth is "salt" water, and a large proportion of the remainder is stored in the world's ice caps at the north and south poles. As the ice caps melt, as they are doing in the face of global warming, the runoff runs to the sea and becomes 'salt'. So we should be concerned by global warming.

Of the remainder, only a very small proportion, perhaps only .01%, is available as a "sustainable" resource and accessible for a variety of human uses. So much for the supply side.

On the demand side, the world's population has been ballooning exponentially over the past decades, and doing so principally in those parts of the world where water supply appears to be shortest.

Indeed, the world's population is expected to increase by between two and three billion by 2025, with over 90% of that increase taking place in the so-called developing countries. We could digress here to rail at the lack of will by the world's politicians (who are but a reflection of ourselves), or the religious orders (who decry the notion of population control), or the Kyoto agreement (that will not solve the real environmental problem, but hide it). But let's stick to the point.

NO ALTERNATIVE: the Shasta dam which helps supply California.

As populations increase, so does competition for water for agriculture, industry, hydropower generation and personal use. The arithmetic is simple and the forecast bleak. It is estimated that about 70% of the World's fresh water is used for irrigation to grow food. Even using conservative assumptions, that could increase by 17% by 2025, and industrial and domestic demand increase by 50%.

In many countries there simply is not enough to sustain that growth. Already, some 10% of the world's food production depends upon groundwater with the result that ground water tables are falling. Worse yet, they are becoming contaminated by industrial waste, chemical-intensive agriculture and animal farming and community runoff.

Unlike the availability of oil, where substitutes do exist, there is no substitute for water. Water is a precious commodity indeed. An interim technological solution would be better collection, processing and more efficient use of the water supplies that do exist.

Indeed, it is estimated that less than 20% of the hydroelectric potential has been tapped in developing countries, so all of these should be a lucrative source of projects for project managers. But 'big' water schemes are rife with controversy: hydropower against fisheries, upstream benefits versus downstream impacts, natural versus the unnatural environment, agriculture versus industrial use and so on.

The future?

Moreover, all these schemes require immense infusions of cash, mostly through taxes, or fees for a commodity that most people have been used to getting for free. So, don't count on a glut of these projects any time soon.

You can read more about A Water Secure World, Visions for Water, Life and the Environment *at www.worldwatercouncil.org or* A New framework for Decision-Making *report of the World commission on dams at www.dams.org*

MAX WIDEMAN (Civils 47) specialises in project management consulting, writing many books on the subject, having gained worldwide experience. His latest book is* A Management Framework for Project, Program and Portfolio Integration. *He operates from Vancouver. See www.maxwideman.com or email max_wideman@sfu.ca

A unique outdoor lab for research into lowland rivers

Professor Howard Wheater outlines valuable work being carried out by the LOCAR research programme

WATER is in the news. The papers this summer have been full of the drought in SE England – water resources are under pressure, hosepipe bans are in place and, in the High Court, Thames Water is fighting Ken Livingstone over plans for desalination to provide extra water for London's future.

Changeable

Yet if we turn the clock back to the autumn/winter of 2000/2001 we will perhaps recall the wettest autumn since records began in the 1700s, with severe flooding in the SE. Floods are also in this year's news, with concerns over flood risk and the Government's plans for urban expansion in the Thames floodplain.

The rivers of SE England are under immense pressure – while floods and droughts are expected as part of natural climatic variability, there are concerns that climate change will lead to increased frequency of both.

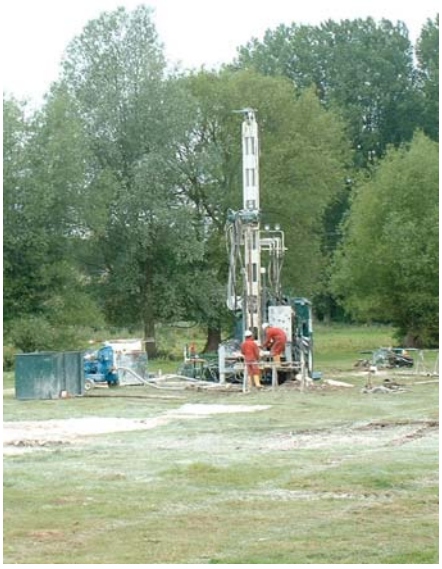
Urban development changes the response of rivers and leads to increasing demand for water supply, yet the natural water resources of SE England are fully (in some cases more than fully) exploited, with competition between water for domestic use and the need to protect fragile aquatic ecosystems.

Agricultural land use has intensified over the last 30 years, with effects on soils, runoff and water quality.

Floods, droughts and water quality are the province of the hydrologist, and Imperial College has been leading research and postgraduate training in hydrology in the UK for more than 50 years, since the Hydrology DIC course began in the Civil Engineering Department in 1955.

In recognition of the need for research into the lowland rivers of southern England, Imperial has spearheaded a major £10 million research initiative to provide the outdoor laboratory needed for hydrologists to improve their scientific understanding of how rivers and groundwater aquifers function. It also supports the management of the natural environment by providing new and improved modelling tools.

The LOwland CAtchment Research programme (LOCAR) is funded by an infrastructure grant to a consortium of universities and institutes, led by Imperial. LOCAR has instrumented three catchment areas to bring inter-disciplinary teams together to study groundwater-dominated catchments.



Chalk focus

The greatest focus has been on the Pang and Lambourn catchments, tributaries of the Thames, near Reading, and located on the chalk aquifer that is the dominant source of groundwater supply to southern England.

LOCAR is coming to the end of a five year phase of funding, so what has been achieved?

Diverse outputs already run to dozens of research papers, and work at Imperial has focused in civil and environmental engineering on understanding and modelling nutrient pollution and groundwater processes, and in physics on the use of satellite-based remote sensing to monitor the energy balance that determines evaporation losses from the catchments.

One significant outcome is a recognition of the complexity of groundwater systems. Chalk streams expand and contract seasonally and naturally dry up under drought conditions. They are fed by groundwater, which is recharged only in the winter, once soils have re-wetted. Hence the vulnerability to a sequence of two dry winters, as seen in the current drought.

Undefineable

Some of the rain falling on the Pang topographic catchment passes under the river and reaches the Thames, the actual area draining to the river varying seasonally. The groundwater feeds the rivers in some places and takes water from the river in others. Some important springs are fed by large fractures for which the source areas cannot be precisely defined.

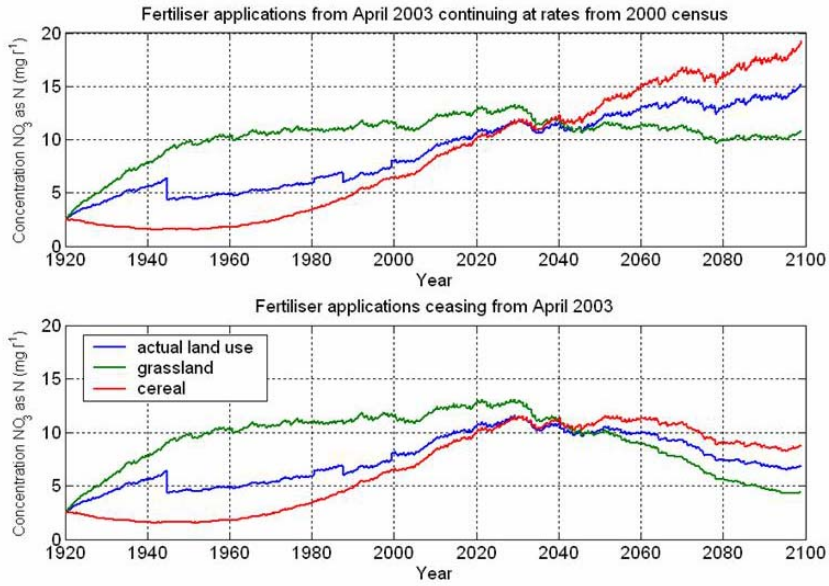
This means that to protect local habitats (and chalk streams include many protected Sites of Special Scientific Interest), effort is needed to measure and understand these local features, and there are new challenges to develop models of the groundwater system to represent the complex groundwater flows and their impacts on the river corridor.

A major management issue is a nutrient 'time-bomb.' Nutrients in rivers and groundwater are arguably the UK's greatest pollution problem. Nitrate applied as agricultural fertiliser moves with the flow of water from land surface to stream. Currently around half of the UK is designated as nitrate vulnerable zones – which restricts agricultural use of fertilisers - but nitrates in rivers and groundwater exceed drinking water standards in many places, and levels are increasing.

In the chalk, the water table may be

Forecast nitrate concentrations

Hadley Centre B2 HadCM3 climate scenario



OPPOSITE PAGE A drilling rig, part of the £10 million research initiative to provide an outdoor laboratory needed for hydrologists to improve their scientific understanding of how rivers and groundwater aquifers function.

BELOW: Part of the study area of the Pang and Lambourn catchments, tributaries of the Thames, near Reading, located on the chalk aquifer that is the dominant source of groundwater supply to southern England.

LEFT: The nitrate time bomb demonstrated by what is actually happening and what would happen even if nitrate applications had ceased.

80m or more below the surface, and there has been much uncertainty about the flow of water and solutes through the unsaturated zone above the water table.

Chalk has a high porosity, fine pore matrix, and an interconnected fracture system, and there is a conundrum that water tables rise within a few days of surface recharge, but solute profiles have been observed to move down at less than one metre per year.

The Imperial team has investigated fracture-matrix interactions through field and modelling research, and developed a new management tool for the Environment Agency. The bad news is that much of the nitrate applied over the past 30 years is still traveling down in the unsaturated zone above the groundwater; even if no nitrate were added, it would take 10 to 20 years for levels in groundwater and streams to reduce significantly. This is an area where EU legislation requires improvements by 2015!

What of the future of LOCAR? Several research initiatives are underway, including using the catchments to develop new methods for risk assessment of groundwater flooding.

AFTER a first class engineering science degree and a PhD in hydrology Howard Wheater joined Imperial and is now Professor of Hydrology. He heads the environmental and water resource engineering section of the Civil and Environmental Department and is director of the hydrology and postgraduate programme. His research interests include surface and groundwater hydrology (especially in arid areas), water resources, water quality and waste management. Howard was invited by the Japanese government to give a keynote address on water scarcity to the 2003 Kyoto World Water conference.

Locar success

LOCAR has succeeded in bringing together interdisciplinary teams from key institutions in and around London and this is leading to new work at the interface between hydrology and ecology. There is also a new research grouping of Imperial, UCL and Queen Mary in London, Reading University and the NERC Centre for Ecology and Hydrology and British Geological Survey at Wallingford to focus on the considerable scientific and management challenges of water in SE England.

There is a renewed interest in harnessing tidal power around the British Isles and, in particular constructing, the long-discussed Severn Barrage. Your Editor, Bill McAuley visited Brittany to see how our Gallic neighbours do these things.

APRÈS-EU

THE DEBATE about the Severn Project would lead the lay observer to the conclusion that such a project is cutting edge science. Unbelievably, however, Electricité de France (EDF) has been quietly operating a 240MW tidal power station in Brittany for 40 years!

Situated on the Rance River estuary between the resort of Dinard and the picturesque port of St. Malo, the barrage produces an annual average of 600 GWh of electricity. This is enough to power a medium-sized city of 300,000 people.

Fuel saving

In addition, it provides a haven for local fishermen and the four-lane highway along the top cuts the Dinard-St Malo driving distance by 30km. With up to 6,000 vehicles making the transit per day, the fuel savings are substantial.

Harnessing tidal power is not new. Tidal water mills date from antiquity, and were in use in the Rance estuary by the 12th century. However, it was not until the industrial production of electric power got under way in the late 19th century that serious interest was developed in large scale projects.

The Rance project was under study in the 1920s but construction had to await the development of the specialised materials and equipment required. Engineering design commenced in 1961 and the plant was commissioned in 1966 and opened by President de Gaulle himself !

The technology used is deceptively simple, however, the devil is in the details! The Rance estuary is a tidal basin which conveniently narrows as it approaches the sea. Tides are high, as they are elsewhere in the English Channel, with heights reaching 13.5m at the spring and autumnal equinoxes. The maximum throughput reaches an astonishing 18,000 tonnes of water *per second* !

The energy is captured by a series of 24 10MW turbines located in venturis on the sea bed. The generators are in hermetically sealed 'bulbes' and each unit can be isolated for inspection and maintenance. The turbine vanes are moveable and are reversed as the tide advances and recedes. Cathodic protection is used to minimise corrosion by the seawater and has proved very effective.

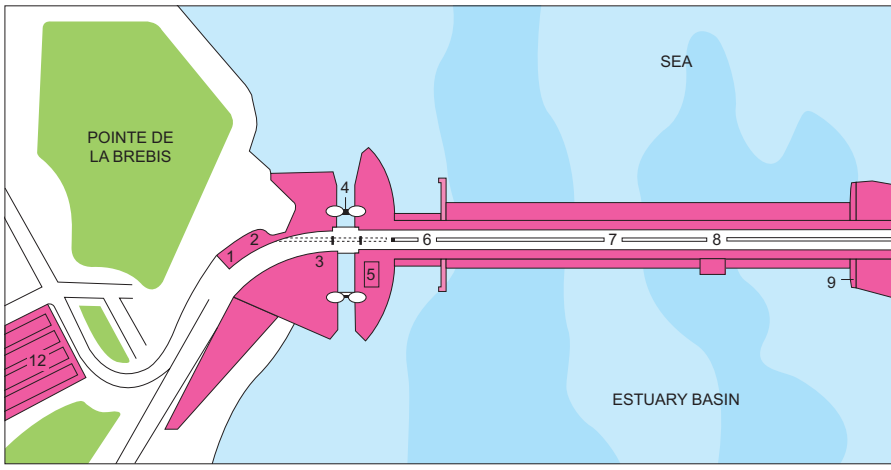
The operating record is impressive. During its long life the power station has averaged over 90% availability and whilst detailed data was unavailable, this has probably improved with time. With modern automation the manpower requirements for routine operation are minimal and are, in fact, exceeded by the personnel required for the 24/7 operation of the lock adjacent to the turbines. There is also a full-time maintenance crew supplemented by EDF central specialists.

And so to two delicate questions. As we contemplate similar schemes on this side of the Channel, two issues loom large – economics and environmental impact. No economic information is published regarding capital or operating costs.

Plan of the Rance B

KEY

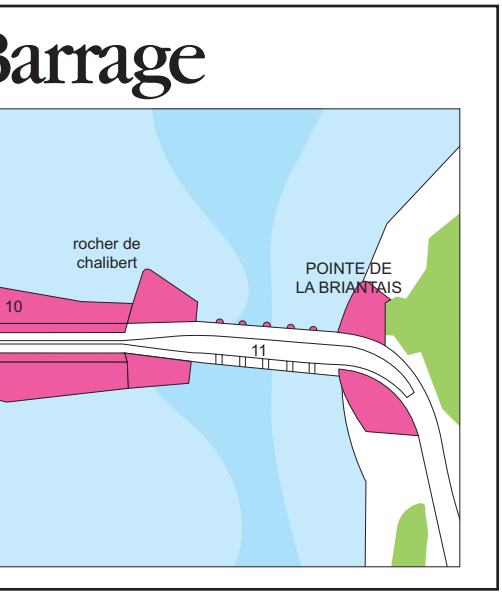
1 Access building for large equipment
2 Lifts for larger equipment
3. Access gallery 7m below the lock- about 80m. long
4 Navigation lock – 65m. by 13m.
5 Administration building and main entrance
6 Rails for material unloading and maintenance equipment
7 24 turbine group bays
8 Control bay
9 Plant end wall and support to breakwater
10 Rock breakwater
11 Six sluice gates equipped with 15m. by 10m. gate valves
12 Export sub-station with three lines at 225 kV



UX LA BARRAGE?

However, your editor's estimate is an operating cost of about 2.5 euro cents per kWH, which compares very favourably with fossil fuel installations. Regarding CAPEX, even if historical data were available it would be meaningless in today's context.

To date, the Rance remains the only project operating on a commercial scale, although there are about a dozen schemes under consideration worldwide. Within France itself, there are apparently no other suitable estuaries, although this may as much be an economic judgement as a technical one.



Recovery

Environment was not a major issue in the 60s and the estuary was isolated completely from the sea for three years during construction. As a result, essentially all marine species disappeared. However, within a few years after the estuary was reopened, all the species re-established themselves and there is some evidence to suggest that fish stocks are now higher than before the plant was built.

Certainly your investigating team saw ample bird and marine life, including a seal basking on a jetty and tolerating curious humans with relative good humour !

Probably the construction method would not be politically tolerable today, but once in operation it seems that the technology can be made to operate in a fairly benign manner, particularly considering the green advantages of the technology.

As with nuclear power, EDF's operating experience should be very useful to developers of similar projects, although the Severn has the potential to be an order of magnitude larger with a capacity of 5,000 MW.

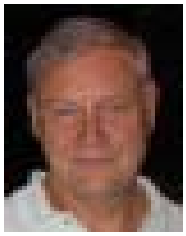
Implications for other projects

One of the reasons for the relatively benign environmental impact during construction was the presence of a number of other estuaries and inlets along the Brittany/ Normandy coast. Birds and other species had to shift their habitats but not too far.

A project in the Severn would not only be much larger but displaced species would have fewer options if the estuary were isolated during construction. However, if such a project could be built in modules, the level of disruption could be minimised.

The Rance experience suggests that the operation of the plant may even be beneficial since the profile of the estuary and water flows within it are not greatly altered (unlike a conventional hydro project), and the barrier mitigates the effects of major storms.

Whatever the future of tidal power, the Rance Barrage is a positive reminder of the contribution imaginative engineering can make to green energy development.



When not wearing his Imperial Engineer Editor's hat, Bill McAuley (Chem Eng 64) acts as a consultant from time-to-time on major projects He made his career in the energy and industrial gas industries, running subsidiaries for major companies including Koch Industries and the BOC Group.

Alumni share their views on water-related subjects...

What role do dams play?

FROM EDWARD ASHFORD
(Aeronautics 87)

HOW ABOUT the impact of the Hoover and Grand Coulee [or Coolie] (as immortalised by Woodie Guthrie) dams? The USA was villified for not signing up to the Kyoto Protocol, but in fact has pretty huge hydroelectric supplies. These have more or less wiped out the salmon population in the Columbia River, which is mainly in BC - another country. This is something a lot of dams have in common. http://en.wikipedia.org/wiki/Grand_Coolie_Dam

The attached websites cover a pretty wide range of issues: www.utubc.com/meeting/meeting22.htm a dam that never was.

The Aral Sea: en.wikipedia.org/wiki/Aral_sea is another cautionary tale for engineers and the Chinese may be heading down that road as they attempt to control flooding on the Yangtze .

I believe Syria may have a dam that could nearly flood Mesopotamia if it burst: www.syriagate.com/Syria/about/cities/Al_Raqqa/alfuratdam.htm

On a more happy note, Northern Ireland is fairly determined to develop Lough Neagh and the river Bann, both as a recreational and economic resource: www.loughneagh.com www.bannsystem.com en.wikipedia.org/wiki/Lough_Neagh, 212.58.240.132/1/hi/northern_ireland/4491127.stm. We await the outcome of the ownership question with bated breath.

Edward.Ashford@uk.fujitsu.com

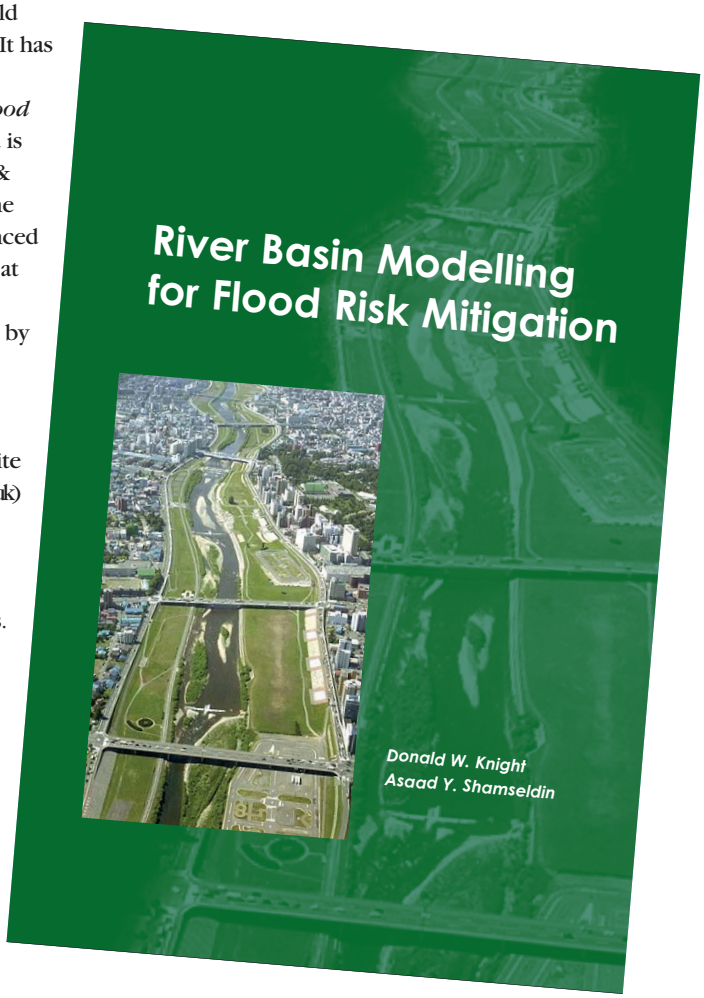
NUCLEAR UPDATE

THE NUCLEAR debate continues and *Imperial Engineer* will continue to follow it up when the government's views become more clear.
In the meantime, log on to www.icjt.org/INLA2005 for Peter Riley's (Elect Eng 58) paper at Nuclear Inter Jura 2005 – *Justification of the Continued Development of the Peaceful Use of Nuclear Energy.* Or email peterriley@ntlworld.com

Water expert publishes book on flood risk

FROM DONALD KNIGHT
(Civils 63)
Professor of Water Engineering
The University of Birmingham

I THOUGHT you might like some 'blurb' about a new book on a water-related topic by an old student of Imperial. It has the title *River Basin Management for Flood Risk Mitigation* and is published by Taylor & Francis (£99). It is the outcome of an advanced study course we ran at Birmingham a few years ago, sponsored by the EC.



If you are interested in other 'water' issues, I have a website (www.flowdata.bham.ac.uk) where much experimental data is stored for use by numerical modellers and others.

I have a chair at Sichuan University, Chengdu, China, which I visit regularly and where I also engage in joint research, mainly to do with rivers. The Conveyance Estimation System (CES) project in the UK is one that I have worked on a lot recently. The website (www.river-conveyance.net) can be used to obtain all the project outputs to date. The open-code software should be released by water engineering specialists HRWallingford and the Environment Agency later this year.

Best wishes with your next edition on what is undoubtedly a good topic, but I might be a little biased!

d.w.knight@bham.ac.uk
0121 414 5075

Plumb Imperial's depths!

FROM ROBBY ROBINSON
(Mech Eng 38)

MAY I suggest that someone, maybe a professor, write on wind, wave and solar power because, I think, their cost is such that they need massive subsidies to compare with coal, gas and oil.

The horror of wind farms needs exposing if their cost requires amortising over many many years. This kind of article is what the Imperial Engineer wants. A well-informed 'read' and the new Faculty has got the best brains to make it a major source of tomorrow's thinking !

Email: Robjuneco@aol.com

Severn barrage or not?

by Ashley Catterall (Materials 52)

NOW THAT the government has published its energy review, including a re-examination of the Severn Barrage and an enhanced effort on wind power, it could be worth examining the effect of a wind farm in the estuary below any barrage. It could pump water into the barrage at all tide levels.

Its several advantages could be increasing the barrage capacity beyond the tidal range; using it as a storage facility for wind energy, and improving the economics.

I was a member Department of Energy study group in the early 80s which looked at the feasibility of a Severn barrage. Interest in the project was stimulated by the high price of oil and the opportunities offered by a tidal range in the Severn of up to 13m.

The group included representatives from universities and public and private economists, particularly considering heavy electrical and civil engineering.

The planned barrage would have run from Brean Down to Lavernock Point, taking in Steep Holm and Flat Holm on the way –a distance of some nine miles. It was expected to generate between 4000 and 5000 MW; the equivalent of two or three normal power stations. By incorporating two basins in the barrage, it was considered possible to tune the power output to make it almost independent of the tide.

There appeared to be no inherent or impossible problems in the engineering, and indeed it would have been a magnificent achievement which would have lasted a great many years. But two fundamental difficulties emerged. The environmental and social consequences of increasing the flooded area upstream of the barrage were large. The problem of calculating the return on the large investment was also highly uncertain.

The barrage would have taken around 10 years to build. Beyond that, the barrage would generate electricity and begin to produce revenue. It would consequently be a long time before the original investment was recovered and moved into profit, and part of the calculation would involve how much one would be able to charge for electricity 10 years hence. The private sector would normally expect a much faster return on its investment than this. The Channel Tunnel is not an example likely to encourage a repeat performance.

j.catterall@amserve.com

Dunlins, among six species of international importance which could lose their feeding ground if the barrage were built. (Picture Andy Hay RSPB).

Engineers ready to build to reduce world poverty

'IF ENGINEERING is truly to to deliver the best possible outcomes to society, engineers must understand their role in this wider field and shape their work and their contribution accordingly.'

This was Paul Jowitt's theme , speaking in May at CGCA's President's evening. Paul is Professor of Civil Engineering Systems at Herriot Watt University, Executive Director of the Scottish Institute of Sustainable Technology and Director of Scottish Water.

Professor Jowitt began by exhorting engineers to tackle two of the eight Millennium Development Goals (MDG) – poverty reduction and climate change. He outlined the problem.

Historically, the civil engineer has played a significant role in development, public health and the alleviation of poverty, perhaps most famously – at least in the UK – through the works of Bazalgette and others in the 19th century. It is reckoned to have added an average of 20 years to life-expectancy through reducing water-borne diseases.

The consequence of climate change is sea level rise, depletion of fresh water resources, changes in the patterns of rainfall and drought and flooding. This will have the greatest impact on the most impoverished people of the world.

Colleen Richardson reports

Poverty is real. Even without the effects of hurricanes, floods, earthquakes and landslides, the immediate prospect for the urban and rural poor in many parts of the world is bleak. They have little or no access to even the most basic of infrastructure, education and healthcare.

Sir David King, UK Government's Chief Scientific Advisor, said, "The key to sustainable development in Africa is the creation of infrastructure. Part of this is a question of civil engineering. For economic growth, Africa needs good roads, railways, air and water transport facilities, energy and water supplies and telecommunications networks.

Of all the UN MDG targets, the most important are those relating to safe water supplies and waste water disposal.

Two billion people are currently without access to an adequate water supply. The UN target is to half the number by 2015.

Sustainable development now has to take into consideration global warming. Human activities are causing atmospheric concentrations of greenhouse gases to rise well above pre-industrial levels. Carbon dioxide levels have increased from 280 parts per million in 1750 to 375, higher than any level in the last 420,000 years. The earth's surface has warmed by 0.6ºc in the 20th century and this is expected to rise to between another 1.4 and 5.8ºC. The combined effect of ice melting and expansion from ocean warming could cause the mean sea-level to rise between 0.1 and 0.9 metres by 2100.

Paul Jowitt concluded: 'Engineering isready to unlock human endeavour, create international partnerships and build an infrastructure to reduce world poverty. It is ready to deliver on time, on budget'.

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NEVER SAY NEVER AGAIN?

Roger Clegg looks at the resurgence in demand for mining engineers. He is RSMA President and works with natural resources investment bank Ambrian Partners Ltd

THE GLOBAL mining industry has a combined market cap of over US$500billion and represents sales of more than US$100billion – "a sector renaissance." Led by the BRIC countries (Brazil, Russia, India and China), demand for minerals has resulted in 20-year high commodity prices.

The traditional cyclical nature of metal prices is undergoing a structural shift and many believe that we are entering a super cycle where high commodity prices will be the mainstay over decades rather than years - exciting times are ahead for our industry.And yet, there is a chronic shortage of skilled mining engineers to satisfy this long-term demand.

Past problems

This shortage stems from the 1980s and 90s when the mining industry was struggling with low commodity prices, as well as having poor appeal among young people.This meant a lack of skilled graduates coming through. A common misconceptionwas that the mining industry was a 19th century art. Today it's a vastly different picture.

The Australian mining industry alone has indicated that it needs an annual injection of 160 mining engineers purely to fill vacancies. In 2005, there were a mere 100 graduates across the country. On a global basis, it is expected that average demand for engineers is likely to be a conservative 500-800 engineers per annum.

In addition, the sector provides one of the most advanced, complex and challenging careers from university, that aside from it being great fun and an opportunity to see the world.

There are few careers like mineral resource engineering that require such levels of cross-disciplinary knowledge with an understanding and, more importantly, an acceptance of environmental and social awareness.

Engineering graduates' leadership and negotiating skills are such that they are also highly sought after in the corporate and financial world.The currentdemand for highly-trained and qualified graduates is reflected in salaries where newly-qualified mining engineers are being offered 60% more than graduates hired by investment banks.

This worrying shortage in the skill base is compounded by the fact that the mining industry is full of grey hairs – not to say that's a bad thing but there's no succession plan for the industry.

In 2004, a working group from industry was formed to determine the forces affecting minerals industry education around the world.The survey found that departments are closing all around the world.

In the last 20 years, 20 mining engineering departments have closed in Australia, Canada, UK and the USA.The closures were due to the lack of students doing maths and science at school (not usually a problem for Imperial entrants), high costs per student and the negative image of the mining industry.

Interestingly, the paper pointed out that there was currently a low point in the supply cycle for engineers which had coincided with increased demand. This problem has become even more acute in that two years since that paper was released.

So in summary, the demand for engineers is here for the long term. The industry has been modernised and is attractive to graduates. The pay is excellent. It's an exciting time in our industry.

Where is this leading, you may ask?

The discussion of whether the closure of undergraduate mining engineering in the RSM was justified or not is not relevant here. It was made by higher and certainly wiser authorities. However, with a robust sector and companies reporting record profits, surely there must be economic argument to reviewing whether undergraduate studies could be reintroduced.The cost of re-entering a sector is a lot less than starting up from scratch which a number of other universities are doing.

Industry support?

The big minerals corporations surely would only be looking after their own interests and their futures if they were to support such resurgence, at a relatively minimal cost to them.This may sound familiar – a model shared with the chemical and pharmaceutical industries' backing of top universities such as our own.

After all, we already have one thing going for us – we're graduates of the RSM and the reputation which comes with it – and that you can't buy for love nor money.

Climbing to the top with training at the Royal School of Mines.

Roger took his figures from the paper* Global Survey of Mineral Industry Universities – Mining Engineering *by James Davison.

As promised last issue, the following is an expanded version of Commodore Shirley's remarks about the 1851 Royal Commission at CGCA Christmas Lunch. Commodore Shirley is the current Secretary of the Commission.

Prince Albert's memorial

NEXT TIME you walk up the steps from Prince Consort Road to the Albert Hall, pause to look at the pedestal supporting the Prince's statue. On it you will read the vital statistics of the Great Exhibition, his brainchild and the genesis of the Kensington Gore Estate on which the original buildings of Imperial College stand.

Prince Albert was President of the Royal Society of Arts in the 1840s when it decided that there was an opportunity to stage a world exhibition– the first-ever world fair.

So the Royal Commision was assembled under his chairmanship and the Crystal Palace was built to house it – in four months!

Queen Victoria opened the Exhibition on May 1 1851 and it was a huge success, generating a profit of £186,000 – or over £10 million at today's prices.

Albert's vision was to use the profit 'to increase the means of industrial education and extend the influence of science and art upon productive industry'. Under his direction, the Commissioners purchased the South Kensington Estate of 87 acres and set about creating an educational centre of world–renown.

Central to our interest, of course, are the two leases given to the Royal School of Mines and to the City and Guilds of London Institute for their 'Central Technical College for Instruction in Applied Science'.

In addition to the site now occupied by Imperial, the original purchase also included the land upon which the museums now stand, as well as a large number of other properties.

The Commission retains the freehold to about half the original land including the entire IC site and, very interestingly, the Albert Hall. Some of the properties (*eg* Albert Hall Mansions) are leased at commercial prices but only nominal rates are charged to educational and cultural institutions.

The Commission today enjoys an annual income of about £1 million, derived from both investments and rents. This is used to endow research fellowships and scholarships, including overseas scholarships – programmes which have been enormously successful.

In Commodore Shirley's words: 'Imperial is the jewel in the Crown of the Royal Commission Estate and we are very proud that since 1891 our Fellows have won, between them, 12 Nobel Prizes. I hope that people at the College realise that the work done by the Royal Commission is due to the legacy, imagination and drive of Prince Albert'.

By Bill McAuley with thanks to Colleen Richardson for her contribution to the article. For more information go to the Commission's website www.royalcommission1851.org.uk

CAN YOU HELP?

We're looking for more advertising for* Imperial Engineer*, especially from companies which provide our members' employment base and would benefit from exposure in something read by people now working in their diverse industries.
Can YOU, our readers, approach your own organisations?
The editors will be happy to follow up your lead if needed.

Please forward all ideas and contact details to Teresa Sergot in the Chapter office (details page two).

Indian call

DINAKAR PURUSHOTAM DANI (Mech Eng 39), now 92, has written from his retirement home in Pune, India. He's contactable on +91 25896297.

RSMA SYDNEY

Where are they now?

RSMA in Sydney held its first reunion in a decade earlier this year. Despite a fair number of regretful apologies, 18 attended.

'It was very successful and all agreed that we should repeat the function with some divergence of opinion as to whether it should be held once or twice a year' reports Ron Butler.

Ron is continuing to update an address list of RSM alumni in the area. At the end of 2005, the list contained 256 names, of which 73 were not confirmed.

'The latter are Minesmen (and women) who are known to have been resident here, but whom we have been unable to contact so far' he says. 'Mostly we only have old telephone numbers for them'. Let Ron know if you would like a copy . Ring 02 4862 2352 or email rbutler@acenet.com.au

ALUMNI NEWS & VIEWS

Seven pages of who's doing what and where

Pictured in Sydney, from left, are Peter Lewis, Tony Bradshaw and Mike Noakes with John Horsburgh and Sue Border.

Hot spot

KARL DRAGE (Mech Eng 95) has recently been elected Chairman of the Ground Source Heat Pump Association. This is a new trade association instigated by the National Energy Foundation under the DTIs remit.

Karl is Operations Director of Geothermal International, the largest ground source specialist in the UK, Geothermal International has designed and installed a few hundred systems throughout the British Isles.

It specialises in design and installation of full geothermal solutions for all types of buildings. karldrage@yahoo.co.uk or kd@geoheat.co.uk

CGCA MELBOURNE

ICinVIC entertains

DIRECTOR of EnVision 2010 Dr Ruth Graham was entertained at a special dinner this year during her fact-finding visit to Australia. She wanted input from Australian engineering academics and people employing graduates, as part of her project to devise a new paradigm for training engineers at Imperial

The next ICinVIC dinner will be at the end of October.

Capital job

MIKE BARTLETT (Civils 85) has joined BAA Capital Projects as Portfolio Risk Manager. He was previously with Bovis for 18 years.

Mike is on 07921 108391 or Mike_bartlett@baa.com.

Biographer hunts for Rougier

DO YOU remember George Ronald Rougier who gained his ARSM in 1923?

Imperial Engineer has been contacted by Dr Jennifer Kloester who is writing a biography of his wife, the famous romantic novellist Georgette Heyer, and would like to know more of his background.

Records show that he took up law and became a QC in 1959. Before that he started with the Niger Co and went on to Anglo-Georgian Manganese Co, Caucasus, Tanganyika Goldfields, and the Kratovo Venture Selection Trust Ltd.

If you can add any more, please email Dr Kloester on jkloester@gmail.com.

IMPERIAL COLLEGE ALUMNI ASSOCIATION SINGAPORE

Singapore mentoring to start

IN CONJUNCTION with IC Singapore Society, ICAAS is starting a mentoring scheme for current students.

They will have a formal meet-up session and then be encouraged to keep in touch face-to-face (if possible) or via email and other means.

Alumni are asked to find an application form to be a mentor on www.icaas.org/membership/MentoringSignupForm.doc.

To read ICAAS's newsletter, email ICAAS President Hing Yan Lee on hinyan@ngp.org.sg

Dragon Boat loss

AS USUAL an ICAAS team competed in the Inter-Business Houses & Clubs (open) category in the Singapore Dragon Boat Festival this summer Unfortunately, they were missing several key members as the race was brought forward and they did not make it beyond the heats.

AFTER general elections in Singapore the ICAAS newsletter has published how many of its alumni are involved in politics and is looking for more.

They include Teo Chee Hean (Computing 77), Ong Kian Min (Physics 82), Imperial Fellow Lee Kuan Yew, newcomer Baey Yam Keng (Biotechnology) and Lee Yock Suan who has now retired from politics. He completed his chemical engineering BSc in 1969.

Alumni in politics

Latest medal for Limsoon

PROFESSOR Wong Limsoon (Computing 88), immediate past President of ICAAS received the 2006 Singapore Youth Award Medal of Commendation. The medal was awarded for contributing to inspiring the young to high achievement. He won the Singapore Youth Award for Science and Technology in 1999.

Michael wins US$ 47 million contract

ITINERANT Guildsman Michael Barron (Mech Eng 60 and 62) has just landed his largest order ever for uninterrupted power supply equipment. It is worth US$ 47 million. Michael is currently President and CEO of Piller Inc, a subsidiary of UK company Langley Holdings whose HQ is in Retford.

Obviusly an all-rounder, Michael is an ex-Editor of *Felix* (twice); ex-thespian (he acted in Clifford Odette's The Big Knife and directed Jean Girardeau's " Tiger at the Gate); Captain of Basketball (twice), and played rugby for Guilds and Imperial College. Contact him on michael.barron@piller.com

CHEMICAL ENGINEERING 1960

Putting the world to rights

THE HOSPITABLE New Cavendish Club was the venue in February for six select alumni who graduated in 1960.

Tony Davis writes:'The ravages of flu, colds, delayed business meetings in Algeria (yes, some of us are still working for a living) and emergency baby sitting reduced us to Malcolm Cross, Barry Daniels, Brian Stevens, Mike Heath, Dave Wilbrahim and myself.

'Conversation over the bar lunch was, as usual, spirited and included Malcolm's account of his experiences living near to the Buncefield Depot.

'We put the world to rights for another year and have scheduled the next meeting for Wednesday February 14 2007. Same venue and time but reminders will be sent, longevity permitting!'

ardavis@btinternet.com

CGCA SYDNEY

Aussies to celebrate?

'THE CELEBRATION of Imperial's centenary in July 2007 will give us a reason to get together for the first time in years', writes Bill Macmillan. 'Especially if we can get someone from Imperial to bring us up-to-date with what's happening at South Ken. 'I would be interested to hear from alumni in the Sydney region of their suggestions for a function such as format and location. macmillanw@bigpond.com

Montana magic

BILL BRADFORD (MTec 54) has submitted a great piece describing his pilgrimage to the non-ferrous Mecca of western Montana.

The recent surge in commodity prices has spurred an interest in reopening workings whose production peaked early in the last century. In the 90s, noughts and teens, the cities of Butte, Anaconda and Helena were major copper, manganese, phosphate and zinc producers and other minerals. Helena went on to become the state capital but all three are now fairly sleepy backwaters in a state that, despite being almost twice the size of the UK, boasts a population of less than a million!

Bill provides an overview of the region's history as a mineral producer. He gives us a sketch of the towns' histories as well as brief description of them as they are today.

He also ventures some predictions as to whether their previous glory can be regained and if the current metals' boom is sustainable.

His full article can be found on the Chapter website – www.imperial.ac.uk/engineeing/about/alumni.imperialengineer

WE NEED YOUR NEWS

Let us know your news and stories. Or have you an idea for a feature? Editorial assistance is available! Contact is Teresa Sergot (address on page two).

COPY DEADLINE FOR NEXT ISSUE IS FEBRUARY 1 2007

Any pieces not published in this issue will be published next time

Should public roads be built by private sector?

GABRIEL ROTH (CIVILS 48) has edited Street Smart – Competition, Entrepreneurship and the Future of Roads. It is about how the private sector can provide public roads.

Although published in the US, the book takes a worldwide view. Four of the chapter authors (Button, Heggie, Roden and Roth) are British, two are Swedish and there is one each from Australia, Germany, New Zealand, the Philippines and Singapore.

One of the reviews said: 'Street Smart contains a wealth of useful theory, case studies and practical advice about a very important piece of future road policy.

roths@earthlink.net.

BOOKS

Ancestor remembered

DURING the 80s while living in Guernsey Richard Whidborne (Civils 50) wrote about possible tidal barrages and 'mills' using the strong currents around the Channel Islands to manufacture electricity.

Now he has he published a book called *Crosses & Comforts - being The Life and Times of Captain Sir Richard Whitbourne (1561-1635) of Exmouth in the County of Devon.*

Richard writes: 'My namesake and forbear was the son of a lowly yeoman and spent his working life fishing off Newfoundland. He wrote a book, published in 1621 by authority of James 1, about Newfoundland and how it could be better colonised'.

richard.whidborne1@ntlworld.com

Robin leads Maunsell team to prevent suicides

DMJM Harris/Maunsell AECOM has been appointed by the Golden Gate Bridge Transportation District to conduct environmental studies and preliminary design for a suicide deterrent system on the Golden Gate bridge, San Francisco.

It was won with substantial contributions from Maunsell Consultants Asia Ltd (MCAL) and demonstrates its personnel's strength as it continues its onslaught into the worldwide long span and special bridge market.

Project Director for MCAL is Robin Sham (CIVIL 82) who in spring 2005 was Project Director for the Stonecutter Bridge in Hong Kong.

Says Robin: 'MCAL's input will include studies of bridge aerodynamics, reviewing wind tunnel tests, suspension bridge analysis and assessment and other engineering aspects of potentiual changes in the overall static and aerodynamic bridge behaviours resulting from retrofitting with suicide deterrent systems.

Competition extended

KNOWING how busy most women usually are, the Editorial Board is allowing all female readers more time to write a humorous definition of man. It can be in prose or poetry but in no more than 100 words. The winners can name their charities to receive £100 and £50 respectively, kindly donated by Jack Sandy (Min 50).

Final closing date is definitely February 1.

A very special man

LEAVING Blackburn Grammar School for an apprenticeship at Leyland, Keith Miller won a scholarship to Imperial.

Here he played tennis and football at a high level, became union president, got married and gained a first when this was a considerable accolade. In 1957 he initiated the Imperial expedition to Karakoram.

Keith Miller (Mech Eng 52) was a mechanical engineer of world standing and a remarkable explorer and mountaineer.

He became a Fellow of Trinity College, Cambridge, a Fellow of the Royal Academy of Engineering, a Founder's Gold Medallist of the Royal Geographical Society and a Foreign Member of the Russian Academy of Science, a Fellow of the Royal Academy of Engineering and a Fellow of the Institution of Mechanical Engineers as well as winning countless other awards.

At a ceremony at Sheffield University last year, when he was made an honorary doctor of engineering, the oration summed him up: 'Before you stands an adventurous man, one who has climbed mountains and fallen down crevasses, been attacked by elephants and sharks, been accused of being an American and a Russian spy, and who has been a lifelong supporter of Blackburn Rovers. Yet he is also a scholar of distinction whose work has saved many lives and made many careers.'

KEITH MILLER

By 1980, he had led 13 expeditions to the Arctic, introducing scores of undergraduates to the area and launching many successful careers. Then he was invited to lead 73 scientists from around the world in the Royal Geographical Society's 150th anniversary expedition to the Karakoram.

Keith Miller began his academic career as a part-time evening class lecturer at Rugby College of Technology, progressing to Amadu Bello University in Nigeria before becoming a lecturer at Queen Mary's, London. Here he combined his duties with a PhD in metal fatigue – the topic which would occupy the rest of his life, assembling teams to investigate many aspects of the problem. After lecturing in engineering at Trinity, Cambridge in 1970, in 1977 he took the chair in mechanical engineering at Sheffield University, where he remained until retirement in 1997. It became one of the leading centres of mechanical engineering in Britain.

OBITUARIES

Renowned as an expert in metal fatigue, Keith Miller is credited with saving many lives. He filled public lecture halls to overflowing and he inspired many students.

He was completing his magnum opus on fatigue when he died on May 26, aged 74, after being told two years ago that he had a rare blood cancer.

Leading consultant in smelting

DR DEREK Anthony Temple read metallurgy at RSM from 1942 to 1945. He died following a stroke on September 18.

After a year with Airspeed Ltd, he became a post-graduate at Trinity Hall Cambridge, gaining his PhD in 1949. He joined the Imperial Smelting Company at Avonmouth in 1950, becoming Chief Metallurgist in 1957. Subsequently, he was a consultant specialising in lead/zinc smelting. He was President of the Institution of Mining and Metallurgy in 1979-80.

DEREK TEMPLE

Respected by his peers and students alike

THA HLA

THA 'TOMMY' HLA was born in provincial colonial Burma in 1913 and gained a degree in chemistry in Rangoon University prior to WWII, where geology was not an option. When the opportunity arose, he came to England in 1939 to do a degree in geology divided between Kings and University Colleges (of London University), in London and Aberystwyth, such being the turmoil of the times. He continued on to complete a PhD in geology at the RSM, and met and married an English girl, Jeanette.

Upon Tha Hla's return to Burma, he rose rapidly through the ranks to become Professor of Geology by 1949, then Rector of Rangoon University in 1961.

In 1963 he took up an advisory post with UNESCO in Paris, then went back to teaching, his first love, at Thonburi Technical Institute in Bangkok (UNDP) and later at Kandy in Sri Lanka under the Colombo Plan.

Tha Hla was widely respected by his peers and students alike, the latter coming to appreciate the benefits of his strict teaching style better after their sojourn at university! He was in ill-health for the last several years of his life due to cancer and blindness, and died on September 16 2005 in Rangoon at the age of 92.

Despite little notice being given, his funeral was attended by hundreds, including many of his former students from 40 plus years before, who came to honour their old mentor.

Tha Hla is sadly missed by his wide extended family who live in the UK, Thailand, USA, Australia and, of course. Burma.

Provided by his daughter Wendy (Met 1974).

Training put to work in Argentina

Argentina's 2000-2001 economic crisis has led to around half the population living below the poverty line. In particular, it has had a disproportionate effect on the middle classes, many of whom are among the 200,000 Jews remaining in the country. Gil Rabbie writes about the work he did in Buenos Aires thanks to winning the Old Centralian's Trust Rosen Award.

IN 2004, I was fortunate to be selected for World Jewish Relief's (WJR) Time for Life Argentine programme. I was looking for a challenge which would benefit myself and others and this gave a stimulating opportunity to apply the Spanish I had been studying for some two years in a real life setting.

Joint venture

As the main overseas aid arm of the UK Jewish community, WJR gives basic welfare support in the form of food, medication, fuel and aid. Its recent merger with World Jewish Aid has added a non-sectarian dimension to the work it does, helping individuals and communities alike to survive and thrive.

Due to its largely middle class make-up, Argentina's Jewish community has been disproportionately affected by around 400% currency devaluation over the last five years, inflation of around 41% and unemployment near 30%. Thousands have lost jobs and savings. The elderly are particularly vulnerable with state pensions so low.

The Jewish community in Argentina today numbers some 200,000, mostly in Greater Buenos Aires although over the last 10 years some 100,000 more have emigrated, mainly to Israel The community which started in the early 20th century has always led a vibrant life with strong communal organisations in place to support the people.

On the face of it, in many areas the Buenos Aires of today appears almost untainted but the gap between rich and poor is large and widening. Shanty town neighbourhoods are commonplace and begging is widespread.

Our project involved a number of different social work, education and physical support activities over a full-time schedule that kept us very busy indeed. Our local contacts on the ground were from WJR's partner organisation, the American Joint Distribution Committee. It has been heavily involved in co-ordinating a response to the social and economic problems since the crisis began.

One of our key activities was teaching English in a local job centre, helping students gain essential English skills to make them more attractive to potential employers. Not having taught English systematically nor worked with adult students, the challenge was to find the appropriate level for each.

Private tuition

We began a series of additional one-to-one classes for those who felt they would benefit from some extra help. It was very warmly received.

I also gave private tuition to a girl from a poverty stricken family. She'd managed to enter the public university system to study medicine, but was struggling with her mathematics and chemistry, particularly as she lived in a small two-bedroom flat with her parents and five siblings. With my engineering background I was able to provide private tuition which helped her pass her first year exams.

Our social work activities were focused primarily on young children and the elderly. With the latter, we worked closely with local community 'social action centres' to organise activities and outings for members as well as special community dinners.

I also made home visits to an elderly gentleman, who had numerous health, economic and family problems. Offering him unconditional companionship in the form of a friendly chat each week, helped him to focus on the positive things in his life.

We also worked in the so-called 'Baby Help Centre' (pictured), an initiative established to assist parents of very young children experiencing financial issues. The centre provides a play-group facility, professional advisory services, monthly provisions - assistance packages and critically, the support of other parents like themselves.

Other physical support involved assisting in the local 'Roperos' or secondhand clothes distribution services. At the central pharmacy, we helped the pensioner volunteers sort pharmaceutical donations.

Finally, one of our most challenging and rewarding activities was aimed at children from one of Buenos Aires' largest shanty towns. Born into some of the worst levels of poverty imaginable, these are children who, given the country's current political and economic situation, will probably also find it very difficult to ever escape it.

Many of them neither work nor attend school, but by teaching some basic computing skills we hoped to inspire them to more – perhaps an education or a job. Over eight weeks we saw an interesting and unexpected transformation in many within the group – from boisterous and unruly to receptive and appreciative.

Basic need

We realised that basic values of discipline, civility and respect were not something they had been taught nor did they require in their present lives, but they were fully aware of the need to learn in order to create change in their lives.

The project period ended, but had I given as much as I had gained? Charity work is such that there's always so much more to be done than any one person can offer.

I focused on the individuals whose lives I may have touched. The smiles, where in the past they would have been sad. The thanks and appreciation where in the past they may have felt angry and alone. That was the legacy left behind in Argentina.

The success of WJR and the Time for Life programme is a testament to the commitment of its volunteers and generosity of its donors.

GIL RABBIE is now a process engineer at Procter & Gamble UK, having completed his Chem Eng degreer in 2004. To learn more about WJR and Time for Life, contact gil.rabbie@gmail.com

Mongolian adventure

PJ Ho writes about his foray into tourism after gaining an honours degree in mechanical engineering in 2000

MXP ADVENTURE aims to provide the best guided tours around Mongolia with its carefully planned travel itineraries. It is a young start-up, yet it is dynamic and resourceful. Founded by two young men who come from very different cultural backgrounds, MXP adventure began its first operation in July 2004.

The founders, Muno and PJ (as I'm known), met coincidentally during an expedition organised by UK-based charity Raleigh International which took place in summer 1999.

Xanadu 2000

The three-month long expedition allowed our strong friendship and trust to build up. This friendship brought us further and we co-organise another expedition, Xanadu 2000, which was funded by Imperial College.

Xanadu 2000 took place in July and we rode horses for more than half a month in the mid-western and northern parts of Mongolia in search of water pumps to repair wells that were built by the Soviet army before the collapse of the Soviet Union.

The entire expedition lasted one and a half months, taking us to five provinces in Mongolia. During Xanadu 2000, the idea of bringing tourism to Mongolia was first mooted. However, in the years after the expedition, we were busy with our studies and starting a career. It was only in early 2004 that the idea of operating a tourism office was revisited.

Our passion for traveling and our great interests in meeting travelers led us to start MXP Adventure. Leveraging on our extensive traveling experiences gained from the two expeditions, we have identified excellent spots around Mongolia that are less traveled by tourists.

Horses play a great part in any Mongolian holiday .

With this in mind our itineraries are planned in detail. And we take customers' feedback, complaints and constructive criticism seriously in upgrading and improving our tour programmes.

PJ HO gained an honours degree in mechanical engineering in 2000. For PJ's tours in Mongolia see www.mxpadventure.com or pj@mxpadventure.com.

Doing good is good for your health

John Rotgans (Civil Eng 55), who retrained as a doctor, has travelled widely. This little tale is typical of many he sends to colleagues

HAPPY people seem to have better health than sad ones, for some strange mind-body reason. So buying a tricycle in Mandalay was good for my health.

The Buddhist merit system seems even more popular here than in Thailand which is 97% Buddhist.

The belief is that all the rotten things you do, even those ugly thoughts you believed were secret, are all recorded somehow and accumulate as bad karma. If you die with a big debt of bad karma your next life will be full of tests and learning situations. Things can be really miserable and every Buddhist knows this. They are always looking for ways to build up good karma to cancel the bad.

Tutu and his own trishaw

So, a wealthy man or a rich war lord, who probably did many a dirty deed to accumulate his wealth, will spend a bunch of money building a holy pagoda on a hill. His motives are selfish? Partly. But giving is good for the soul. When I gave Tutu his own trishaw I felt good. I'd improved his life.

He has spent the last 10 years peddling a rented tricycle around Mandalay. He is raising three boys and his wife spends most of his money. So far he has saved $26 and it would take another 30 years to get $100 for his own trishaw.

Few foreigners travel by trishaw. Taxis are cheap and quick, but you don't see the details: the washing on the third-floor balcony; the street vendor frying her snacks, the kids playing kickball.

The roads could be a lot better. The bumpy ride is just as therapeutic as a Swedish massage. Every bone is well and truly separated from every other bone and all joints are well loosened. So, I got to know Tutu quite well on our leisurely journeys and he seemed to be a good man, so I told him I would buy him a bike.

Maybe one of my motives was to reduce my cash before I left. Going out with more than $2,000 US is a crime and foreigners have been thrown in jail for currency offences.

Tutu got all excited. Perhaps he had told this tale of woe many times and had finally got lucky, but I don't think so. I didn't see any other foreigners on trishaws. One fancy hotel didn't even want him coming through the main gate. It's not a classy way to travel.

He started calling me father, asked me to come and meet his family and said he couldn't sleep all night. He kissed my hand with red lips and teeth from betel nut.

Over a cup of tea the deal was done. The seller produced the all-important licence and a promise agreement and they both signed it. I gave Tutu the money and we rode away on his new possession. He stood on the pedals and the trishaw flew. And I felt better. Doing good is good for your mental health. I may try it more often.

In his recent research, Graham Harris questions the conventional view of the authorship of the famous 18th century satire

ALMOST everyone has heard of, if not read, the famous classic *Gulliver's Travels*, the authorship of which is attributed to Jonathan Swift.

The first edition of this satirical masterpiece appeared in two volumes in October 1726, with the title *Travels into Several Remote Nations of the World by Lemuel Gulliver, first a Surgeon and then a Captain of Several Ships*. It was the fashion of the age to write under a *nom-de-plume*, and Jonathan Swift was no exception.

However, attributing Swift with the sole authorship of *Gulliver's Travels* appears to be based on shaky ground. This warrants a reconsideration of Swift's role in its authorship. There now appears to have been an actual 'Gulliver', one who, if he did not actually pen *Gulliver's Travels* himself, most assuredly aided its composition.

Not conclusive

One of the main arguments for Swift's authorship is based on the fact there exists a first edition of Gulliver's Travels, the pages of which carry extensive deletions, notations and additions to the text, executed in Swift's own hand. This certainly suggests Swift played a major part in the revision of the text, but it cannot be accepted as conclusive evidence that he, and he alone, wrote it.

An equally enigmatic publication appeared two years earlier to *Gulliver's Travels*. In May 1724 Charles Rivington published, in conjunction with two associates, a book titled *A General History of the Robberies and Murders of the Most Notorious Pyrates* by Captain Charles Johnson. The book was an instant best-seller, for within a few months it had sold out. A second edition was published that same year and others followed in quick succession. The book is still reprinted on a regular basis, its popularity remaining undiminished over the years.

But who was Captain Charles Johnson whose identity has baffled the literary world for almost three centuries?

The argument that 'Captain Charles Johnson' was a cunning pseudonym masking dual authorship, was first advanced in *Treasure and Intrigue: The Legacy of Captain Kidd**. Space prevents that argument being reproduced here, but in essence it was

concluded that the *General History* was written by Captain Charles Atkins and Stella Johnson.

Stella was the woman who won the heart of Jonathan Swift at a very tender age, but whether they married, or whether that marriage was ever consummated, has intrigued the literary world ever since. Captain Charles Atkins, on the other hand, had a very chequered career and, since his travels in the east occupy the same time frame as Gulliver, there is a strong hint that his adventures inspired the writing of *Gulliver's Travels*, and that he is 'Lemuel Gulliver'. From this it should not be assumed he encountered little people no bigger than his thumb, giants who could hold him in the palm of their hand, flying islands or horses that talked.

Reader of *Gulliver's Travels* will note the text begins with biographical information relating to Gulliver, information which is totally irrelevant to the satirical thrust of the tale. It has been claimed this was introduced by Swift to impart a sense of reality to the story.

This is absurd in a tale about pygmies, giants and horses that talk! Reality is an ingredient noticeable by its absence in *Gulliver's Travels* which more appropriately, perhaps, might have begun with the phrase "Once upon a time."

What this suggests, therefore, is that the biographical information regarding

TOP LEFT: Lemuel Gulliver. ABOVE: Esther Johnson, known as Stella.

Gulliver could be substantially correct, and valid reasons may have existed as to why he should have wished to mask, but not entirely obliterate, his true identity.

Captain Charles Atkins was born into one of the most distinguished families of 17th century England, his uncle being sixth Duke of Norfolk and Earl Marshal of England. After commencing a naval career with great promise he

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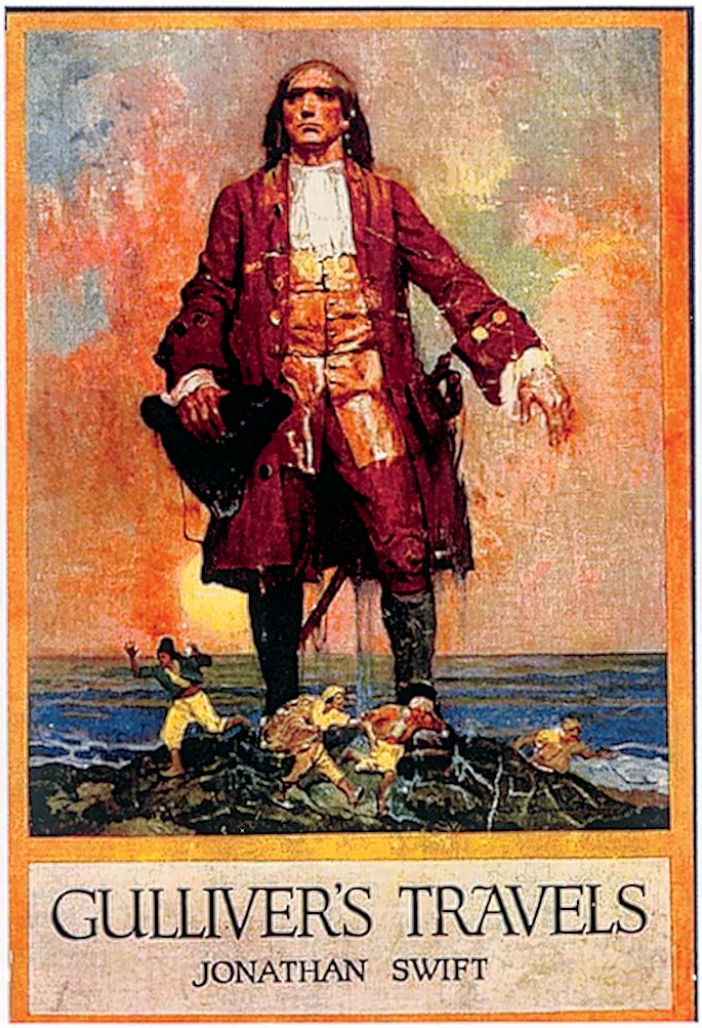
GRAHAM HARRIS (Civils 61 and 63) specialised in practical soil mechanics on large projects in the mining industry in Canada, Africa, Australia and the Middle East. Since retirement in 1993, he has been involved in various research studies relating to piracy and technical aspects of Oak Island, Nova Scotia, the renowned site of 'the world's greatest treasure hunt'. **Imperial College Engineer** ***(Spring 2002) carried his article 'Recovering the Oak Island treasure'.***

Other publications include **The Destruction of Sodom and Gomorrah*: a geotechnical perspective (co-authored) which was used by the BBC as the basis of a documentary in their series* Ancient Apocalypses; *Treasure and Intrigue the Legacy of Captain Kidd; Oak Island and its Lost Treasure *(co-authored) and* The Golden Reef of Sir William Phips. grahammharrispei@hotmail.com**

IN SEARCH OF GULLIVER



***LEFT: One of the many and often lurid covers to* Gulliver's Travels.**
ABOVE Jonathan Swift by Charles Jervas. (National Portrait Gallery, London.)

was to tarnish the family name, be cut off by his father and be banished from the land. His selfish actions in the Mediterranean provoked war with the Algerines in 1676 leading to dismissal from the navy.

Depraved

He opted to become a surgeon, qualifying in 1683, but during his apprenticeship was involved in the murder of Sir Edmund Berry Godfrey in 1678, a murder that officially remains 'unsolved'. He consorted with villians of all classes, had a penchant for 'women and wine' and was described as 'depraved'. There is no doubt he was a rascal and reprobate with few, if any, scruples.

The evidence suggests Jonathan Swift and Stella Johnson, whose parentages have never been truly determined, were his natural son and daughter. The fact they were to meet, fall in love, and wished to marry, must be the most ironic twist of fate in the history of marriage.

Charles Atkins's career as a surgeon was spent either at sea or in the employ of the East India Company and for a spell he became a pirate under Henry Avery, whose infamies in the Indian Ocean reached their peak in 1695-96. In the employ of the Company, he was shunted from one factory to another as a consequence of his numerous delinquences which ranged from collusion with local traders to the detriment of the Company's interests, to immoral and lewd behaviour, keeping whores, debauchery and assault.

From one factory he was packed off under armed guard with a recommendation he be 'sent back to England to rid the country of so dangerous a person'. Despite this disastrous career he survived for 15 years in places ranging from the Persian Gulf to Sumatra before returning to England.

Though the evidence gathered thus far cannot be considered conclusive, it suggests Captain Charles Atkins was Lemuel Gulliver and, if not the author of *Gulliver's Travels* certainly aided Swift in its composition, being also the co-author (with Stella Johnson) of that famous classic *The General History of the Robberies and Murders of the Most Notorious Pyrates*.

Facts fit

The triangular relationship that existed between these three individuals is deserving of better acknowledgement by the literary community. Sherlock Holmes said: 'If the facts don't fit the thesis, alter the thesis'. Thus far the facts fit!

A more detailed argument by Graham Harris can be found at www.imperial.ac.uk/engineering/about/alumni/imperial engineer.