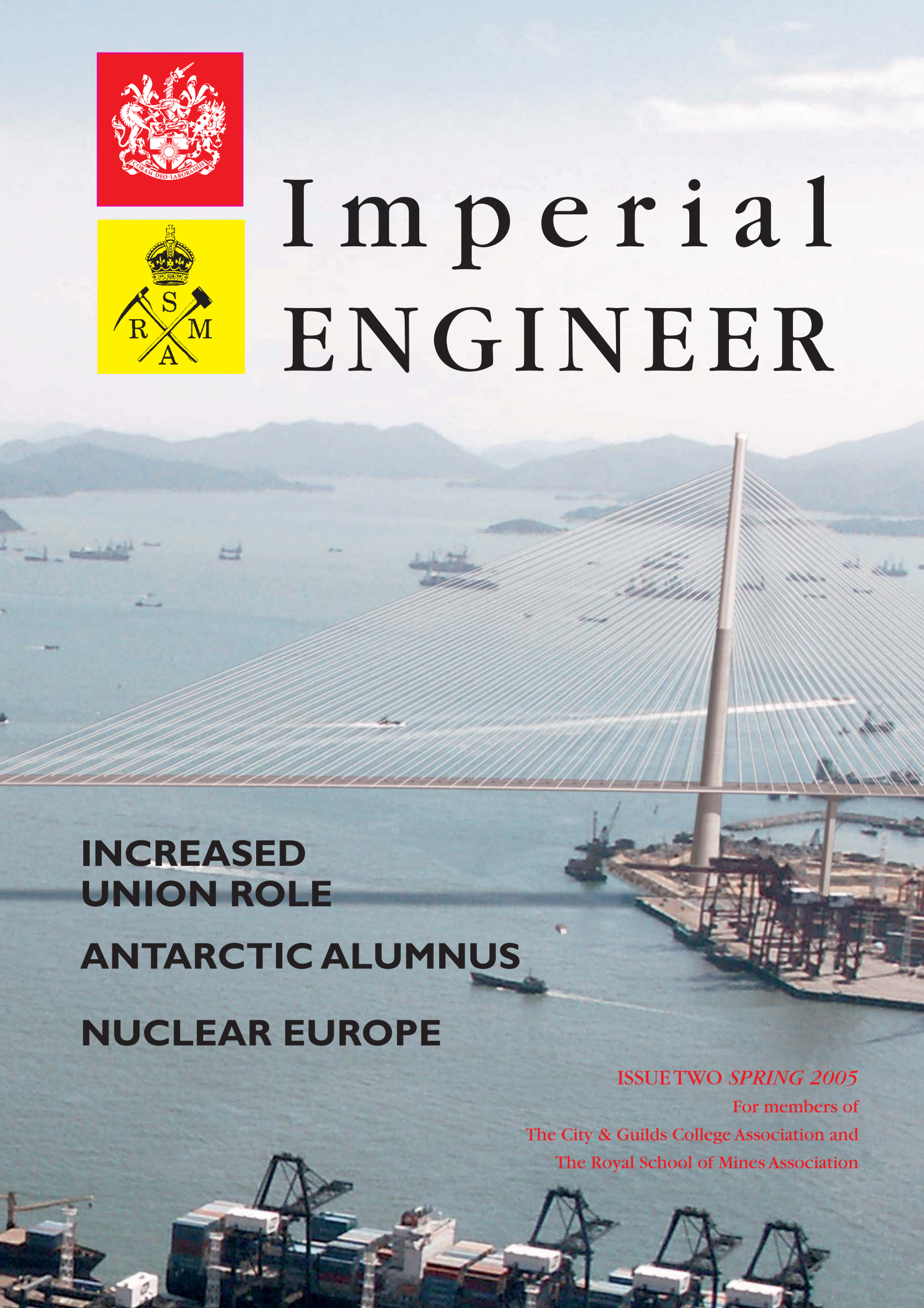
Imperial ENGINEER



INCREASED UNION ROLE

ANTARCTIC ALUMNUS

NUCLEAR EUROPE

ISSUE TWO *SPRING 2005*
For members of
The City & Guilds College Association and
The Royal School of Mines Association

ISSUE TWO *SPRING 2005*

In this issue...

ASSOCIATIONS' NEWS & REVIEWS

FACULTY NEWS

STUDENT NEWS

FEATURES

COVER PICTURE: The Stonecutters Bridge over Hong Kong Harbour. Story by Robin Sham on page 12

Imperial ENGINEER

EDITORIAL BOARD
Bill McAuley (Managing Editor)
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/aboutthefaculty/alumniengineeringchapter/

DEADLINE FOR THE NEXT ISSUE IS 15 July

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

PRESIDENTS REPORT

Giles Baynham

WELCOME to the second addition of *Imperial Engineer,* incorporating news, articles and events from both the RSMA and CGCA. The editorial team has worked hard to produce this second issue and has also taken on board the feedback from the inaugural edition. I'm looking forward to receiving my copy.

Since the last issue Dr Julia King has been appointed Principal of the Faculty of Engineering. I extend the RSMA's warm welcome and best wishes in her new role.

The Bottle Match weekend continues to draw significant interest from the alumni body. The RSMA committee would like to thank the RSM students for organising the events despite a serious lack of funding from ICU and FoESU.

On the issue of funding, we've made some progress on sponsorship for student events and will be able to announce details in the next *Imperial Engineer.* We have an offer from an alumnus who has been supportive over many years and are now looking to solicit funds from other parties.

Whilst we have had great success in dealing with the College and putting the RSMA on a solid footing with the Faculty of Engineering, the official disbanding of the RSMU some years ago has led to a reduction in student funding and their ability to hold traditional events, such as Foreign Students' Week, without increased funding from their own pockets – all at a time when costs of studying in London have been rising.

The RSMA Trust has been as busy as ever and the committee is currently considering bursaries and a scholarship as ways of increasing the assistance the alumni can make to students wishing to study in the RSM disciplines. Now we are settled in the new set-up with the Faculty, we can turn our attention back to helping the students. I know this is a theme my successor as president, Roger Clegg, is keen to expand on, especially as we've had success increasing student membership.

This will be the last report I make for *IE.* I would like to thank both the RSM committee and Chapter Manager Teresa Sergot for their support, and also Bernie Pryor and John Bramley for their continued efforts in keeping the RSMA and its values alive and well over the last few tumultuous years. It's been a privilege to serve the RSMA and I look forward to many years of mutual interaction with it and its members!

Barry Brooks

MY YEAR as president of CGCA has flashed past with much left to be done. I am pleased that this second edition of *Imperial Engineer* is proving to be a popular means for keeping in touch with Guildsmen and Guildswomen. It's also good that our collaboration with friends in RSMA is helping to produce something with even wider appeal.

I believe that, by appointing Bill McAuley as managing editor, to lead the joint CGCA/RSMA editorial board, we have a sound basis for making *Imperial Engineer* even more popular and valuable to members and other readers – such as employers who might be interested in seeing how they could gain from closer links to the Faculty and the associations.

I hope that *Imperial Engineer* will show the mutual benefit to be gained by enlarging companies' participation in such events as the Union's Internship Fair and our own Networking Reception. If we could capture some advertising, that, too, would benefit the associations by releasing funds to do more for members and students. But, to reach that stage, we need to deliver an attractive publication, so please continue to contribute good copy and excellent photographs, for us all to share in what you are doing around the world.

Our events programme has been very high class, with attractive venues and stimulating speakers who set us some challenges on what we, as engineers, should be doing for society. For example, we were most grateful to Lord Garden who hosted a tour of the Houses of Parliament followed by a dinner by the River Thames. He spoke about 'Where now for global security?' – a sobering review of the wide range of intractable issues which affect us all.

I just wish that more members had a chance to enjoy these London events, although it is good to see large numbers of students, particularly at dinners(!) – all part of their preparation for life after college. Reports can be seen elsewhere in this issue.

Our Annual Dinner gave us an opportunity to welcome Dr Julia King with whom we, the students' union and RSMA, are working closely in the Chapter, through which CGCA ideas and events are made available to a wider audience. So look out for more activities over the next year. Or, come to the AGM on 25 May and tell your Committee what you would like us to do!

C&G all-rounder wins award to take doctorate

LEILA SHEPHERD, winner of the 2004 John & Frances Jones Prize received her award from Barry Brooks (left) when she was guest at the dinner after October's committee meeting..

The award is available for a member, or a descendant of a member, of the CGCA (originally the Old Centralians) who goes on to undertake a post-graduate course in the college. It was originally instituted as a scholarship by a bequest from John Jones, the first Registrar of Imperial, who died in 1935.

Leila graduated in 2003 and is now well into a PhD course in the newly-formed Institute of Biomedical Engineering, researching into the development of ultra low-power transistor-based biosensors which may be used for the wireless monitoring of critical parameters for heart failure.

Leila's first degree was an MEng in electrical and electronic engineering, for which she spent her fourth year in Paris. She is particularly keen to stay in the cutting edge of innovation in engineering and hopes to be able to work on biomedical applications.

Leila has already amassed a wide range of experience in industry, including work for Peugeot-Citroën in Paris and Thales Avionics in the UK.

Away from her studies, Leila has been Joint President of the IC Electrical Engineering Society and has also served on the IEE London Section Younger Members Committee. She enjoys running, having achieved a place in the top 100 at the 2003 Paris marathon. She has represented Imperial in cross-country running. She is a brown belt at kung-fu and gained a Trinity College grade eight in drama with distinction.

Call for RSMA EGM

RSM has called an EGM at 6.15pm on Thursday 16 June, just before its AGM, to make a change to the RSMA Trust's constitution.

The current constitution calls for the RSM Dean to be one of its board members with the Hon Secretary and Hon Treasurer. However, Professor John Monhemius retired as Dean at the end of 2004 and it appears likely that no RSM dean will be appointed following the reorganisation of Imperial into a faculty-based structure.

Therefore the proposed change to the RSMA Trust constitution is to replace the board position of dean with that of 'A senior member of staff' within the Royal School of Mines'.

'We hope as many members as possible will be able to attend the EGM, AGM and the final year dinner which follows', says Hon Sec Paul Holmes.

For more information, see contact details on page two.

Electronic news

A WEEK after this issue of *Imperial Engineer* has been published it is expected to appear on the Chapter website – www.imperial.ac.uk/engineering/aboutthefaculty/alumniengineeringchapter/.

Walk on

DAVID Hattersley's popular 'walks with a past president' are continuing on Thursday 10 May with lunch followed by a tour of Lincoln's Inn.

On Saturday 23 July the walk will start from the Thames Barrier Visitor Centre and end at the Cutty Sark, Greenwich. Meet outside the café, at 2.30pm.

On Saturday 17 September and 5 November there will be two London walks.

Members interested in the walks should look at www.cgca.org.uk and register their interest to David Hattersley at davidhattersley@ aol.com.

Polish welcome for RSMA

A STRONG student contingent was among 40 members and guests treated to an enjoyable meal, wine and good conversation on 18 November at RSMA's Annual Dinner at the Polish Club.

It was particularly warming to welcome Charles Hutson who, after being seriously injured in March 2003, clearly showed that he is well down the road to recovery.

Association President Giles Baynham spoke to the assembled guests on the difficulties and challenges that not only the RSMA, but the student populous, are currently going through in the formation of the Engineering Faculty.

He spoke of the importance of embracing change but not at the expense of the RSM tradition and of the continued role of the RSMA in being able to assist in this.

Following the speeches, Giles formally presented John Bramley with a Dunhill pen and thanked him for all his support. John had recently retired as Honorary Secretary and had served the RSMA for the past decade. He had been instrumental in ensuring its very survival through ever-changing circumstances in college.

The evening was enjoyable. Those wishing to attend in 2005, should book for the dinner to be held on10 November, once again at the Polish Club.

Students and alumni mix it at the RSMA dinner. From left John Sharpley, Rob Thomas (back left), Ed Poulding, Peter Harding, Derek Norris, Nick Walker and Elena Clarici.

Bottle won for ninth time in row

'IT'S A GREAT pleasure to have the Bottle safely esconsed in the bar and after a hard-won victory with the RSM team coming from an early deficit to run out 17-15 against Camborne', writes RSMA President Giles Baynham.

Coming into the match with an unbeaten season so far, confidence was very high. The match was secured by winning 99% of line out balls thanks to accurate throwing from Luke Taylor, Rich Aung and Steve. Special mention also goes to Rob Robinson who, although at scrum half, seemed to think it was more productive to attempt drop kicks from the wing. To his credit, he made an 80 yard break which, if he'd scored, would have been the try of the match. Man of the match was John Spencer.

It was also a win for the squash team 'although no-one can remember when we last did that', reports Sports' Officer Tobias Dalton. The final score was 1–0, probably helped by the quality team t-shirts organised by Captain Tom Hawkins.

They were also helped by ex-CSM student, Nigel, who had turned up to play for his old college. As he wasn't needed, he played for RSM, where he's now taking an MSc. He scored 9–1, 9–4 against Camborne.

The football team, captained by John Eudall had a disappointing first half, but inspiration came with the second. Final result was 5–2; a win for the third year.

'Cheers to Camborne for not learning from their mistakes ... football is 90 minutes and not 45', writes John. 'We've put four past them in the second half for the last two years!'

No time to warm up, but despite matching Camborne in pace and skill, RSM's 'Golden Girls' (above) were finally beaten 4–1, writes hockey Captian Rachel Kershaw. Despite being intent on hitting back, the men's team came out for the second half 2–0 down. Men's Captain Peter Jackson writes: 'The change in mentality paid off when, shortly into the second half, Martin Stanley silenced Camborne fans mid-song, pulling RSM back into the match. Final score was still 3–1 however!

Decade Luncheon: those were the days my friend!

A PARTICULARLY good turn out from the 70s' decade contributed to the convivial and nostalgic atmosphere at this autumn's Reunion Luncheon.

There were the Guilds' videos, college regalia and mascots: Spanner and Bolt, and of course, Boanerges – albeit a touch static after problems on the Brighton Run.

Stilton and cauliflower soup, salmon with a herb crust and a chardonnay sauce, followed by chocolate truffle with raspberry coulis gave the impression that the standard of college catering had improved. Many comparisons were made with fare in former days!

As always we were grateful to the speakers from the Decades who entertained us with their stories of college life:

Bill McAuley and Peter Chase spoke of their respective decades in the 1960s and 1980s.

Robert Appleby from the 1950s gave us a slant from the RSM.

Bob Carter had contributed to *Felix* in his time. He spoke of the fun he had reviewing West End premieres on the strength of his reputation as a critic of some note to that celebrated journal.

Professor Peter Grootenhuis described how different student life was in war time and defended comments about how difficult the exams he set had been.

Finally, we heard from John Collins, President of the current student union about student life today.

After the more formal proceedings, members were once again free to mix and catch up on old times before making their way home, once again refreshed with a 'fix' of college life.

It's amazing how young you can feel when you are once again with friends of your youth.

David Law

FAR LEFT: Bob Carter.
LEFT: Peter Chase.
ABOVE: John Collins gives an update.

DIARY

Wednesday 25 May
CGCA AGM & President's Evening
Read Lecture Theatre/Senior Common Room, Sherfield 17:30

Thursday 16 June
RSMA EGM/AGM/Final Year Dinner
Ante Room and Main Dining Hall, Sherfield Building
18:15/18:30/19:30

Saturday/Sunday, 9 /10 July 2005
Imperial College Association Alumni Weekend
For details please see:
http://www.imperial.ac.uk/alumni/index.asp

Thursday 10 November
RSMA Annual Dinner
Polish Club, 55 Exhibition Road
19:00 for 19:30
More information on the website in due course

Saturday 26 November
Decade Reunion Luncheon
Senior Common Room, Sherfield
More information on the website in due course

Thursday 15 December
CGCA Christmas Lunchtime Seminar
170 Queen's Gate
More information on the website in due course All enquiries please to David Hattersley:
davidhattersley@aol.com (for walks with a past president)

For more information about any of these events, contact Teresa Sergot (t.sergot@imperial.ac.uk or phone 020 7594 1184)

Navy larks remembered

Colleen Richardson reports on a popular Christmas event.

DINERS were enthralled by Vice Admiral Sir Jeremy Blackham's *Boys' Own* tales of his days in the senior service when he was the guest speaker at CGCA's Christmas Lunchtime Seminar.

With the theme from the Navy to industry – a personal reflection, he spoke about his naval career from 1961 to 2002. During that time he commanded the minesweeper HMS Beachampton, a destroyer HMS Nottingham and the aircraft carrier HMS Ark Royal

'It was all fun – pure fun'

'My first 15 years were spent in the Far East, West Indies, South America and Gibraltar', began Sir Jeremy. 'It was all fun – pure fun. The Navy then was still the "old Navy" – a pre-war, worldwide "war Navy", spread around the globe. The fleet based in Singapore was much larger than the entire fleet today!

'There was first rate seamanship and things like ship handling diplomacy but we were not so good at modern warfare. Curiously during the cold war it didn't seem to matter.

'My memories of this time include patrols to guard Borneo villages, then rushing off to Brunei. There was the Empire games in Perth. Afterwards we came back via the Pacific with a week in Fiji. Taking command of the minesweeper when the captain was indisposed was a joy. Visiting Rio (three times) and Tristan da Cunha, Falkland Islands and West Africa was great.

'It was a visible demonstration of our power and presence. From the management side there was no financial responsibility, just loads of practical involvement.

'In the 1980s I was commanding ships and I noticed things were beginning to change in the Navy as well as in my own position. Life was more interesting as the Navy was getting smaller and we all had to work harder. The Navy also started being more professional at warfare.

'One of my greatest experiences was to be in command of a ship', Sir Jeremy continued. 'One almost assumes divinity. It is a bit lonely but a very open life – and this applies just as much to the captain as to any of the lower ranks and ratings.

'One's first trial is standing on the bridge and taking the ship away from the harbour wall. There's no one to tell you what to do and everybody on board is watching your progress!'

A single-propeller vessel is far more difficult to manage in this situation than a twin-propeller vessel. In some cases a new commanding officer would have only 10 minutes hand-over time, so he would have to learn the niceties of these tricky procedures the hard way, with all the crew watching to see how well he performed.

'One almost assumes divinity.'

'Commanding a ship is a unique experience – the captain is all-powerful and has great responsibility, he also has to operate very much on his own resources. The ship takes it all from the captain and in many ways the captain is the ship!

'The management involved is of an unusual nature as one is on duty for 24 hours a day, seven days a week. In the 1960s, once the ship was a few miles out, the captain was out of direct contact with base.

'Nowadays, of course, things are very different with satellite communications and navigation systems. Much of his task is concerned with supplies and manning.' Sir Jeremy recalled that he had to arrange the trucking of beer supplies from Germany, overland, to the Arabian Gulf, to avoid having a very thirsty and unhappy crew!

When Sir Jeremy retired from the Royal Navy in 2002, he joined EADS (European Aeronautic Defence and Space Company), as UK Country President and Senior Military Advisor.

Being a man of many parts he is, among other things, Editor of *The Naval Review*, Chairman of the Blackheath Conservatoire of Music and the Arts and a Companion of the Royal Aeronautical Society.

'...working for a large company is very educative.'

Because of his unique Naval career, Sir Jeremy gained insights that are invaluable as a basis for a second career in industry, where defence suppliers are seeking to meet the needs of several countries.

Sir Jeremy's life-style changed considerably when he moved to a desk job in the MOD. It was all about policies and planning and budgeting. He found the MOD a strange place of double-cultures, as about half the staff were civil servants and the rest were serving officers. This led at times to blockage rather than progress.

Sir Jeremy finished his talk by saying that his new career in the second biggest aerospace company in the world has turned out to be the most interesting of all his jobs but that it had a larger bureaucracy than the MOD! He admitted that, 'working for a large European company, that is still trying to come together, is a very educative experience'.

Principal focuses on high-profile research

IT IS only a few months since Dr Julia King arrived as Principal of the Faculty of Engineering and she is still in the process of developing her vision and strategy for the future.

However, the benefits of her broad experience in industry are already becoming apparent, particularly in the leadership of a knowledge based organisation.

She has been focusing on the Faculty's current most high profile interdisciplinary research areas: biomedical engineering; bio-processing; sustainable energy and nanotechnology.

'We look forward to the piece she's promised for the next Imperial Engineer', says Managing Editor Bill McAuley. 'Meanwhile, we wish her well as she settles into the job.'

Winning formula?

FINAL year mechanical engineering students David Stead and Oliver Postlethwaite, along with 21 other third and fourth year students, have produced a single-seater racing car which will be entered in July's annual formula student competition, organised by the Institution of Mechanical Engineers.

Some 50 engineering universities world-wide enter the event, held in the UK at Bruntingthorpe. It includes time and endurance trials as well as acceleration and braking tests. The cars are judged by top industry professionals and gives those involved a chance to meet and demonstrate their skills to possible future employers.

The design and building of the car is part of the students' final qualification, with each taking responsibility for part of the process. Currently just mechanical engineering students take part, but the team are keen to get others from the engineering faculty involved.

David and Oliver (who head the team) stress that the whole project is a great experience. 'It's highly competitive and it really brings out the best in your team', they say.

Cars can be entered as a design, a part-running static or a fully-running car.

In previous years the students have done very well entering cars at the concept stage, twice having taken first place. Last year they won the static car competition as well as the design competition featuring the running car being entered this year. The team achieved 22nd place last year with their first-ever rolling car but are hoping to better that this time.

Oliver said: 'This year we're only entering a running car and have gone for some added extras, including carbon fibre wheels and a turbo charger so we should stand a good chance. You don't get to know anything about any other entrants cars until the day though, so really at this stage we're working completely blind.'

New CGCA bursary for bioengineering

THE OLD Centralians' Trust recently announced that it has revised and updated its range of student awards.

In particular, it has inaugurated an additional student accommodation bursary, to be awarded to one student each year within the Bioengineering Department.

This brings the total number of CGCA accommodation bursaries available each year to 14, It also marks the first year in which bioengineering undergraduates will be studying in the fourth year of their course.

The £700 accommodation bursaries are intended to make it easier for students who are active in student or college affairs to spend a greater amount of their time on the campus. It will either enable him or her to live closer to college than they might otherwise afford or, alternatively by having additional funding for travel.

The first bioengineering accommodation bursary will be for the 2005-6 academic year. To enable the successful student to plan ahead, he or she will be notified during this term.

In welcoming this new bursary, Professor John Lever, Bioengineering Head said: I'm very grateful for this news. Since bioengineering is very much a newcomer on the Imperial scene, it's been recognised that the Old Centralians' Trust should give priority to the established courses.

Now we are coming of age since in 2005 we expect to graduate our first BEng students and in 2006 our first MEng students. We warmly welcome this award, and will emphasize to our graduates the value of becoming active members of their alumni association.'

Co-ordinating the levels of award will also clarify the application/nomination process for each category. In conjunction with this review, steps are being taken to improve publicity to increase awareness amongst both students and staff.

Full details of the range of OC Trust awards, with information on eligibility and the requirements for application and selection, may now be found on the web-site of the Engineering Chapter at www.imperial.ac.uk/engineering/aboutthefacultyalumniengineeringchapter. It is also intended that the updated information will be included shortly on the web-site of City & Guilds College Association (www.cgca.org.uk).

Science Museum in crisis

THERE ARE disturbing reports in the national press that South Ken's Science Museum is facing a funding crisis. Bill McAuley would be grateful for further information. 'After all', he says, 'the Faculty of Engineering has a major interest in it continuing to survive'. Ring the Chapter office on 020 7594 1184 if you can help.

Time to spare for students?

WHAT an excellent evening! For the second year running, we returned to the hospitality of the Polish Club for the Networking Reception, which appeared to be an enormous success. The rooms were buzzing with conversations everywhere as 50+ students and about 30 alumni enthusiastically exchanged information – with a little help from some liquid refreshment.

The major credit goes to Munir Hasan, CGCU's CGCA officer, and Tunde Olanrewaju for capturing the people to participate, and to Teresa Sergot for sorting out the admin to allow it to happen so smoothly.

A key request that emerged from several students was for the building of closer links between CGCA (and our alumni) and the departmental societies, allowing more such interchanges. This would encourage one-to-one discussions between alumni and students in specialist engineering sectors, and could led to mentoring, internships and other forms of support for today's students.

Ideally, we would have alumni points of contact for each department, using the departmental societies as the catalyst. For this to work, we need some alumni volunteers willing to give back a little time to their parent departments. If you are interested in doing something like this, please get in touch with Teresa. ***Barry Brooks***

NETWORKING (from left) RSM Clubs' and Societies' President John Sykes, CGCA committee member Mike Bartlett and third year geology student Joshua Wright.

TERESA Sergot mans the Chapter stand and prepares to greet an estimated 1,000 students who attended this year's CGCA internship fair. It was held in the spectacular new main college entrance foyer for the first time. Organised by students, the fair included stands from about a dozen companies all prepared to offer jobs for the summer vacations.

Global security theme for talk

TO START the New Year in some style a group of CGCA members, friends and partners gathered at the House of Lords as the guests of Lord Tim Garden. After a conducted tour of the Lords and Commons, with guides whose knowledge was based on working in the Palace of Westminster for most of their careers, there were drinks and dinner on the terrace (in a marquee!) with its river views.

Dinner was followed by a lively talk and discussion led by Lord Garden around the theme 'where now for global security?'.

What a pity that only 42 sat down for dinner in such glamorous surroundings and in such distinguished company, past and present.

If you don't wish to miss out on the next prestigious event make sure we know your up-to-date e-mail address and/or phone numbers, so we can keep you informed. ***Frank Brown***

CGCA helps breathing space for President

A SUMMER sabbatical for the president of the CGCU has become a reality thanks to the generosity of CGCA alumni.

The ambitious appeal to raise several £100,000 to finance a full-time sabbatical president, became necessary following the Union's recent growth in its activity level.

At Christmas 2003, the then President Shrenik Patel, wrote to 3,000 members of CGCA requesting financial support for the appeal. I am delighted to report that at the time of writing we've raised in excess of £10,000.

Although increasing, it falls a little short of the required amount to raise enough capital for our endowment fund to support a full-time student officer, it has enabled us, with more support from the Faculty and OC Trust, to finance two months' pay for next year's President.

From 1 August, CGCU's president will be able to live and work on campus full-time. It is envisaged that he or she will be able to use the time to prepare the union for the forthcoming academic year and pursue initiatives otherwise impossible to develop during busy term times.

The CGCU is optimistic that a year-long sabbatical will eventually be achieved, hopefully within the next five years.

John Collins

RSMA Trust courts support

AT THE same time as making a plea for more funds to help students, the RSMA Trust is reminding all students of help currently available.

Financial help for both undergraduate and postgraduate students is provided mainly by way of loans and grants. There is also an essay competition and, for undergraduates, two UROP bursaries worth up to £70 a week for up to 10 weeks.

Interest-free loans are available to students in cases of particular hardship. The Dean's discretionary grant fund is available for the alleviation of financial hardship. Grants of up to £200 are available and these are non-repayable. Those interested in the UROP bursaries, loans and grants should contact Professor John Monhemius.

The essay competition is run annually. Students are invited to submit essays which relate the environment to any earth science, engineering or materials subject taught at the RSM.

Any alumni who wish to contribute to the Trust should contact Hon Treasurer Paul Atherton on 07768 402132. Students interested in grants, bursaries or the essay competition should contact Teresa Sergot (see details, page two).

Engineering in the information age

The banqueting room of the 14th century Saddlers' Hall was at capacity on 3 March when members, guests and nearly 40 students gathered for CGCA's annual dinner. Colleen Richardson reports.

AFTER warmly welcoming everyone, President Barry Brooks said how grateful the CGCA was to the Master of the Worshipful Company of Saddlers, Mr Dyson-Laurie, for allowing members to enjoy the splendour of his hall.

Barry introduced Sir David Brown, Chairman of Motorola Ltd, a Fellow of the Royal Academy of Engineering and past-President of the Institution of Electrical Engineers amongst many other high-profile appointments.

Forward move

Sir David talked about how engineers' understanding of mobility has changed during the 103-years' life span of our mascot Bo and is changing still.

He went on to tell us that the car is a classic example of engineering vision inspiring profound societal change. Many of a car's silicon chips are for engine management but many more now support information, communication and entertainment systems. When, 75 years ago, Motorola began, engineers wondered if radios could be installed in cars. Then came mobile phones and texting. In the future, there might well be more communications between 'things' than people.

Engineering in the information age is fundamentally interdisciplinary, inclusive and global. 'Are engineers doing enough to engage society in a discussion of choices that information age engineering could deliver?' Sir David asked.

'We must harness it to respond to challenges of poverty, social cohesion and sustainable development as audaciously as we have responded to the challenge of mobility. How better than to begin now with this famous Association, involving itself with this here and now?'

After thanking Sir David, the President presented two awards. First the Holbein Memorial Award, to a 'sportsman' in the widest sense, went to Andy Towers. The second award – part of a Peter Moore Memorial – was a tankard to the year's official Boanerges' driver. This went to Dan Reader.

Barry introduced the

Association's guests, all of whom reflected the theme of collaborative working with CGCA and with interdisciplinarity – AVM Graham Skinner (Clerk to the Worshipful Company of Engineers), Tim Statham (Secretary to the City &Guild of London Institute), Lady Sue Garden who manages the FCGI awards and Keith Read, DG of the Institute of Marine Engineering, Science and Technology.

Example institute

He recalled how Keith had set an example to other professional insitututions by reorganising his institute into one that encompasses scientists and technologists as well. This sets an interdisciplinary example for other professional institutions.

From the College, the President welcomed Dr Digby James (President of RCSA), Professor Richard Kitney (Dean of FoE), Richard Martin and Dr Julia King (his boss and Principal of the Faculty of Engineering), and, particularly, the senior officers of the students' union.

LEFT: Sports' winner Andy Towers.
ABOVE: Bo driver Dan Reader hands the wheel to guest Sir David Brown

Replying to the toast to the guests, Dr Julia King said how privileged the Faculty was to have two such active alumni associations. She had witnessed this first hand at Chapter board meetings.

She quoted from a letter she'd had from Alexis Biller (COMP 1998). Alexis said that Imperial College students receive increased respect from both employees and their peers. This is in part due to their ability to apply their training to new areas. The courses are also structured to provide firm foundations, building knowledge across a wider span, not just on pillars of specialised knowledge.

Julia also mentioned an interesting letter she had received from Hugh Chare – a mining engineering student from the 70s.

Vision applauded

In his last paragraph he said: As you take the reins of the Faculty, one of your goals will be to graduate engineers, who are not only academic engineers, but who can be readily and usefully employed by the industries that you support and that support you. Having had the most difficult times in the past, of trying to recruit engineers who had an innate curiosity, and who would truly think outside their discipline of education, I applaud your vision of 'the interdisciplinary bit'.

In her view, this echoed Sir David's theme to educate 'interdisciplinary engineers' for today's challenges.

After thanking Dr King for her speech, which emphasised the links we are strengthening between Faculty and Association, and the chant of Boomalaka led by CGCU President John Collins, discussions continued round the bar.

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

CBE for professor

JOHN BURLAND, FoE's Professor of Soil Mechanics, has been made a CBE for services to biotechnical engineering.

John, who was a member of the commission to stabilise Pisa's leaning tower, has also taken part in BBC 2's four-part *Geronimo* series. It involved setting fun engineering challenges for teams ranging from expert engineers to children.

John was the expert chosen by the Royal Academy of Engineering to comment and judge the competition to build a sand-digging machine. The programme was fast and fun family entertainment with a clear engineering theme.

The school children won John's programme hands down, beating two teams of professional mechanical engineers!

Research could make 'bad hair day' history

CHEMICAL engineering PhD student Aikaterini Mavraki has devised a method for calculating conditions under which hair physically changes state which may one day save your locks. It captures the exact environmental conditions when hair goes from 'smooth and glassy' to 'rubbery'.

Typically due to changes in temperature and humidity in the outside air, scientists call the temperature at which this occurs the glass transition temperature (Tg). Calculating it accurately has been the focus of Aikaterini's EPSRC-funded doctoral research, sponsored by Unilever and supervised by Professor Daryl Williams.

For her efforts she won Best Paper Award and $3,000 at last summer's TRI Princeton First International Conference on Applied Hair Science.

Aikaterini uses the dynamic vapour sorption technique (DVS) to accurately monitor moisture content in solids, while the relative humidity is gradually increased from 0 to 95%.

Hair isn't the only material to undergo glass transition so Aikaterini's technique could be applied to other materials.

CIVIL and Environmental Engineering's Alison Ahearne (left) receives the CITB's CONSTRUCT award for best practice and innovation from Minister for Construction Nigel Griffiths. Imperial is the first university to receive this prestigious award for best practice and innovation.

The award recognises the success of the department's Constructionarium, invented by Professor Chris Wise. It provides hands-on experience for students, beyond work experience, by giving them real control of a large project.

This year, students built a 20-tonne oil rig, a six-metre communications tower, a footbridge and a version of Canary Wharf tube station in five days.

Professors join fellowship ring

THREE professors have brought Imperial's Royal Academy of Engineering fellows to 62. They are Tony Constantinides and Richard Syms of Electrical and Electronic Engineering and John Hutchinson of Civil and Environmental Engineering.

Trust's gold goes to Hugh

CONGRATULATIONS to Mechanical Engineering's Hugh Spikes, the first UK recipient of the IMechE Tribology Trust's gold medal in 19 years.

Mechanical Engineering Philippa Cann has been awarded the silver medal . This is the first time both medals have gone to the same group in the same year and the first time the Gold Medal has gone back to the department of a previous recipient.

Silicone model sniffs out solution

TWO YEARS ago researchers at Imperial started to build highly detailed 3D models of the nose. Their fusion of biological mechanics and aeronautical engineering, funded by a BBSRC grant, has since led to more accurate and useful experimental and computational models. They reveal the complicated geometry of the living nose and its airflows.

This information may soon be used to help ear, nose and throat surgeons plan operations, and help pharmaceutical companies determine the best way of administering drugs through the nose.

Because their modelling is so detailed, the work also has implications for animal testing as it goes far beyond what animal testing can tell us.

'Our main effort is working out where the airflow goes', says Aeronautics' Department's Dennis Doorly, and one of the two principal investigators.

Compiling together slices of CT scans, precisely defined airspaces were determined from which a set of instructions for building a 3D map were generated, using a technique called stereo lithography.

A prototyping printer then turned the model out in a soft plaster material. From this they cast the airspace model in optically transparent silicone.

The upside-down, transparent double-size nose cast is fitted with inlet and outflows to take water or a fluid matched for refractive index to the silicone. This replicates the flow physics because it slows down the speed of the particles 10-fold without losing realistic movement detail.

'It's probably one of the most complex areas of fluid mechanics in the whole of the body, more complex even than the heart', says the other principal investigator Bob Schroter. He is from the Department of Bioengineering, and has spent a lifetime researching biological systems from an engineer's perspective.

The experimental model is partnered by a huge computational fluid dynamics model that makes use of over 20 million elements, handled by computers from the London e-Science Centre, based at Imperial.

For Schroter the two approaches go hand-in-hand. 'The computational work is highly seductive', he says. 'But you have to go out and measure what happens in real geometry.'

The team recently CT scanned their first 'nose' and found only 1% difference between that and the original scans.

Union matches up to increased role

CGCU President John Collins reports

THE CITY and Guilds College Union is steadily adapting to its new status as an influential faculty Union for all engineering students at Imperial. With over 4,200 members across 10 departments, we now represent one in three Imperial College students. This makes us the largest faculty union in the college by a considerable margin.

Decentralisation

With greater decentralisation of academic affairs from the core of the College to the new faculties, the role of the Engineering Student Union in representing its members is more important than for decades.

In January, the CGCU widened the membership of its executive to reflect the recent structural changes that had emerged from the birth of the faculty system. These changes, whilst subtle and well-hidden, will ensure that the RSM identity and its two departments now have a fair say in the governance of the union.

Whilst a great deal of time is devoted to ensuring that academic representation is effective and active, there is still ample time available for co-ordinating traditional Guilds' activities, as well as a number of newer initiatives.

The 2004 Engineers and Physical Scientists Freshers' Ball was, even by modern standards, enormous. Its 530 guests were treated to a three-course meal, a vodka ice statue, a casino, a Scalextric competition, a live band, rides in Jez and Bo, two music venues (including one in a marquee) and a welcome speech from the new Faculty Principal, Dr Julia King.

Whilst three quarters of those present were from the Faculty of Engineering, a good mix of students from outside the faculty helped make the evening a memorable event for all who attended.

Our other traditional events have been equally successful. The Lord Mayor's Show (top right) was, in spite of some organisational difficulties, a huge success. Credit is due to the co-ordinator, Christopher McIver, who stepped in at the last minute to oversee the union's preparations. I'm pleased to report that Bo just about made it to Brighton this year, albeit arriving last and two hours after the official end of the race!

The Internship Fair, an event launched three years ago thanks to financial support from the CGCA, continues to grow. Around two dozen companies and an estimated 1,000 students attended this year's event held in the spectacular new main College entrance foyer for the first time. As I write Rag Week has just finished. I can report that the traditional 'slave auction' was, as usual, hugely embarrassing for all union officers who attended!

New clubs

Our clubs and societies are performing extremely well this year. We have recently welcomed a couple of new clubs into the fold, including one that encourages students to get involved in the construction of satellites for the European Space Agency. Meanwhile, our departmental societies are currently organising a series of events, supported by substantial government subsidy and aimed at encouraging female students to pursue a career in engineering and science.

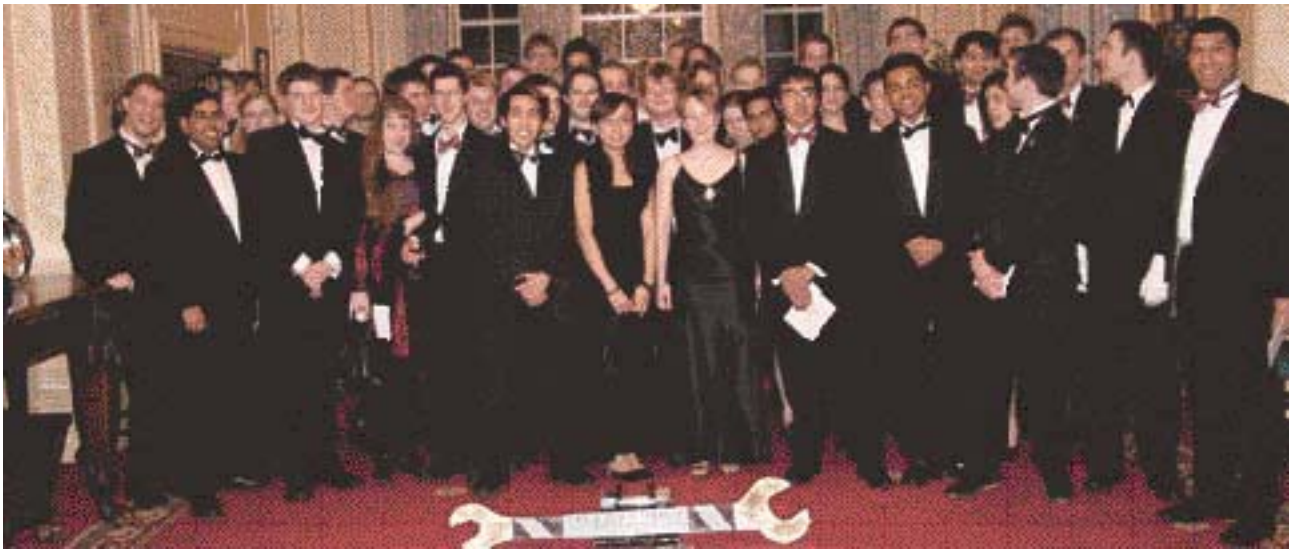
For the remainder of this spring term, we will be piloting an inter-departmental quiz challenge, wrapping up the football competition and organising our general elections.

I for one am looking forward to the day when I can relax for the first time in nine months. Running the largest faculty union at Imperial College is great fun, but it certainly tires you out!

The success of many of these events are thanks to the generous support of the Faculty and the CGCA. With the arrival of our new summer sabbatical, the performance of the union can only improve next year.

It is thanks to you that I am able to deliver a glowing report this year and thanks to you that next year's president will be able to do the same.

CGCA's annual dinner attracted a large group of students



NUCLEAR POWER – what is its future in Europe?

NUCLEAR power provides 32% of the 25 EU countries' electricity; more than any other fuel source. Coal provides 30%. It is secure, with an enviable safety record and does not put carbon dioxide into the atmosphere.

Recent analyses by the Royal Academy of Engineering in the UK and the Paul Scherrer Institut in Switzerland, show the cost of generating electricity from the second generation of nuclear stations is on a par with gas-fired generation – around 2.3p per kWh (UK). However, the gas price has risen sharply since the reports were written and coal is 2.6p.

Cheaper fuel

This makes nuclear a good deal cheaper than onshore wind which comes in at 3.7p, without back-up for windless days, and 5.4p with back-up, and very much cheaper than other renewable electricity sources such as solar, wave and tidal power. The notion that nuclear power is uneconomic is out of date.

As the UK takes over the presidency of the G8 countries, protection of the environment has risen to the top of the agenda. Prime Minister Blair has called for a reduction in carbon dioxide emissions of 60% by 2050, in order to stabilise the weather machine. This is an heroic challenge, as the EU is unlikely even to meet its modest Kyoto reduction target of 8% of greenhouse gases (of which carbon dioxide is the major component), by 2010.

So why are countries like Germany and the UK phasing out nuclear power, which is a vital component of their carbon dioxide-free power generation, and decommissioning their nuclear stations as they come to the end of their useful lives – typically between 30 and 50 years? They will all disappear over the next 30 years and, in many cases considerably less, leaving a huge gap in electricity supply.

In the UK, nuclear power provides 23% of electricity and in Germany 28%. In the EU overall, nuclear power reduces carbon dioxide emissions by 600m tonnes per annum, equivalent to 80% of the emissions from all transport in the EU.

What non-polluting power source will replace these decommissioned power stations? The political answer is renewable electricity, but this is becoming more and more unlikely as renewable targets are missed. It requires 2,400 large 2 MW wind turbines to replace one typical nuclear station. Because of the intermittent nature of wind (there is no wind at all for as much as one sixth of the time in northern EU countries), reliable back up from coal, gas or nuclear stations has to be provided and paid for. The only reliable, non-polluting power source is large scale hydro power, but we are running out of new sites in Europe.

The philosophy of replacing nuclear power with renewables is absurd. All it accomplishes is replacement of one non-polluting electricity source with another. This does nothing to reduce the carbon dioxide emissions from the increasing number of gas-fired stations, currently the preferred choice for meeting increasing demand for electricity and replacing old nuclear stations.

Attitudes are changing in some countries. Finland and France take a different view, as do some of the new entrants to the EU. Finland has ordered a new European pressurised water reactor (EPWR) which they see as the cheapest, non-polluting electricity source and one which has the added advantage of being under their control, unlike imported natural gas from Russia.

Picture courtesy Scottish and Southern Energy

Tilt for this or...

French ways

France has a steadily expanding nuclear programme which goes back 40 years. There are now 56 nuclear stations which provide 78% of French electricity. It is the only country in Europe where carbon dioxide emissions from electricity generation have steadily declined. Électricité de France (EDF) has ordered a new EPWR station for the Flamanville site and plans steady replacement of some 19 of its ageing nuclear stations.

France also sells cheap, nuclear electricity to a number of neighbouring EU countries, some of whom are happy to buy it despite having an anti-nuclear policy in their own country. In Italy, Prime Minister Berlusconi has indicated a possible move away from Italy's traditional anti-nuclear stance.

Comments and inputs from readers, including articles, on the theme of energy, are most welcome.
Contact Bill McAuley on 01276 23020

This article by Professor Ian Fells, first published in Euroreporter *in February, follows Peter Gaffney's* Are we running out of oil? *in the last issue. This will hopefully become an ongoing series on the theme of energy – how we produce it, how we consume it and how we can do better at both.*

In the Far East, China has announced its intention of building between one and two nuclear stations every year; South Korea is 40% nuclear, and Japan is moving ahead with its nuclear programme, as is Taiwan.

Up-to-date

The technology of nuclear power has moved a long way since 1956 when the first commercial nuclear power station was opened at Calder Hall in the UK.

Inherently-safe reactors are available from Siemens-Framatome, Westinghouse, General Electric, Canadian CANDU and others. These new designs produce only a 10th of the radioactive waste of current designs and both Finland and Sweden are happy with deep geological disposal of active waste.

There is a safe way of dealing with radioactive waste despite the shrill, often-repeated complaints by anti-nuclear groups that there is no solution.

In terms of risk management, the possibility of a nuclear accident pales into insignificance beside the risks posed by global warming. If carbon dioxide emissions from burning fossil fuels are allowed to increase unhindered it will lead to destabilisation of the weather machine, rising sea levels and increased frequency of extreme weather events.

A truly frightening prospect, admitted by most countries of the world with the exception of a few, unfortunately powerful countries, with vested interests in the oil industry. But recently, on 12 January 2005, in an interview in the *Wall Street Journal*, President George W Bush said: 'nuclear power certainly answers a lot of our issues...the upcoming energy bill will include incentives for nuclear power'.

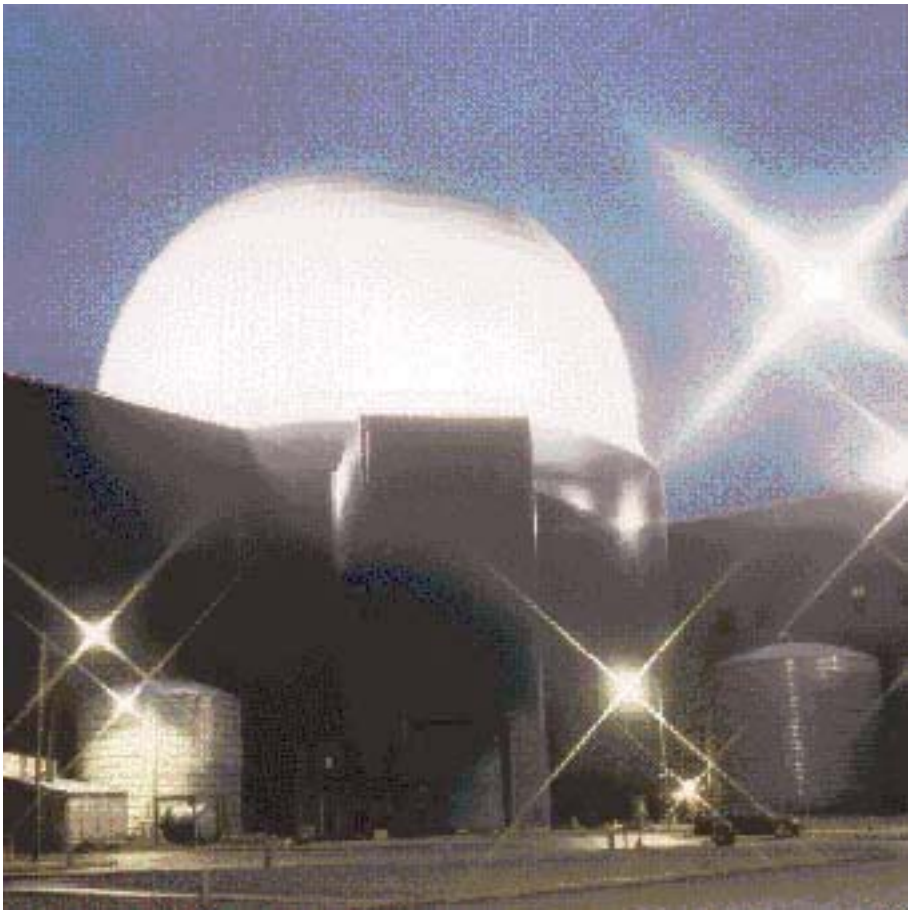
There is no simple solution to this problem. A big increase in the use of renewable energy, despite its high cost, is an important part of the solution, but to neglect nuclear power for whatever green, emotional, un-technological reasons is like going into battle with one arm tied behind one's back.

No alternative

Dr James Lovelock, the distinguished scientist and environmentalist, said, in an interview on 28 August 2004 with The Independent Newspaper that 'nuclear power is the only answer: there is no alternative'.

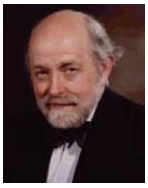
In December 2004, chief executives of over 20 electricity and nuclear service companies launched a joint declaration in Brussels calling for Europe to keep nuclear power 'at the heart' of its energy supply system. Only in this way can the twin challenges of global warming and energy security be faced, they insisted.

If we are to achieve the target of 60% reduction in carbon dioxide emissions by 2050, we will have to institute a huge global programme of carbon dioxide reduction technologies. The G8 countries will lead the way, but it will certainly not be achieved, with disastrous consequences, if we do not include nuclear power as part of the action plan.



Picture courtesy British Energy

...put your faith in this?



Professor Ian Fells CBE FRSE FREng is Chairman, New and Renewable Energy Centre, Blyth, Northumberland. He is widely-known as an expert in energy matters and as an advisor to the UK and foreign governments.

State-owned Brazilian company Petroleo Brasileiro to construct two pipelines through virgin rainforest. These e prize-winning essay looks at the problem and su

Planned pipeline could environmentally-frien

THE AMAZON is the largest rainforest in the world, covering an area of 6 million square km. It corresponds to a third of the world's tropical reserves.

It has been evaluated that 17,000 different species of plants can be found. More than 387 species of bird, 57 species of mammal, 28 of reptile, 3000 species of fish have also been found.

The region has 10 million inhabitants, most living in cities. There are different communities living along the rivers, who are called Riverines. The forest is also home of many different indigenous tribes.

This pipeline, if constructed, will cross 22 indigenous lands. There, it is estimated, 10 different ethnic tribes, counting 4,000 people, live. Five of them have little or no previous contact with 'white' civilisation.

Due to its difficult access, the area is poorly developed economically. In the main capital, industrial development is constrained by an increasing energy shortage.

The Urucu Project

The first economical oil and gas field in the Amazon was discovered in 1986. It is located next to the Urucu River, on the Solimões basin, 600 km south of the capital city Manaus, in the remote province of Coari.

With proven reserves of 160.7 million barrels of oil and more than 100 billion m^3 gas, the field holds 24% of Brazil's gas reserves. Production is expected to last around 20 years.

Currently, the oil produced is transported, by a 285km pipeline, to the Solimões terminal (16km from Coari city). From here oil and LPG are shipped in pressurised petroleum cargos through the Solimıes River to the refinery in Manaus. Nowadays, the 6.7 million m^3 of daily produced gas are re-injected as there is no means to transport it.

In order to transport this gas, two pipelines will be constructed to feed thermoelectric power plants.

The gas will not only solve the energy shortage problems in the area, it will also provide cheaper and cleaner energy. It will replace diesel-generated energy and will cost 60% less.

The first pipeline goes from Coari city to the capital of the Amazonas state, Manaus. It is 420km long and has a diameter of 45-51cm. It is predicted it will deliver 4 million m^3 of gas per day.

The second pipeline would go from Urucu to the capital of Rondonia state, Porto Velho. The pipe would be 550km long with a diameter of 36cm (14"). Both pipes will be installed in a minimum depth of 1meter. For inundated areas and the crossing of rivers and streams, the minimum depth will be 1.5m reaching 6m at some critical points. It is predicted that it will deliver between 2 and 3 million m^3 of gas per day.

Minimising the project's environmental impacts

IMPACT ON SOIL One of the main characteristics of the rainforests is that under very rich vegetation there is a very poor soil. Once the topsoil is removed the soil becomes subject to erosion.

An area of 20m will be cleared along the pipe for the passage of machines, material, and workers during the construction. After the pipe is installed the natural vegetation will not be re-grown. The area will be covered by grass allowing easy access to the pipe in case maintenance must be done. In order to minimise impacts, areas already disturbed should preferably be chosen. Regeneration of soils should be done when possible.

The use of heavy machinery will contribute to the compaction of the soil and should be avoided when possible. Working in the dry season is preferable.

Contaminants should be handled with care to avoid spillage on the soils.

IMPACT ON WATER The two main impacts observed on the water are the change in watercourses, including sometimes blockage of streams and changes in water quality.

Cleaning of materials, disposal of liquids or solid residues, increase in water traffic and accidental spillages will change the water quality. Nothing should be deliberately disposed of in the water.

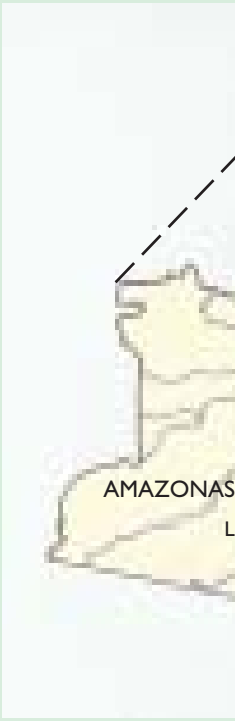
Erosion along the riverside and crossing the small rivers with heavy machinery can cause changes in watercourses. Compaction of soil will reduce the amount of water infiltration. This can cause the original water source of streams to dry out.

The placement of the pipe in riverbeds should be done during the dry season

IMPACT ON FLORA To reduce the impact on the flora, deforestation must be minimised.

The service path will link two major cities giving access to illegal loggers, miners, rubber extractors and farmers. In Brazil 70% of the logging is done illegally. The area should be monitored at all times.

IMPACT ON FAUNA The first step is to minimise the destruction of the natural habitat and monitor the increase in fishing and illegal hunting. During the construction period, light and noise disturbance should be reduced.



This map shows the Petrobas' proposed pipeli in red. The alternative pipeline suggest by Marcela Feilhaber is in green.

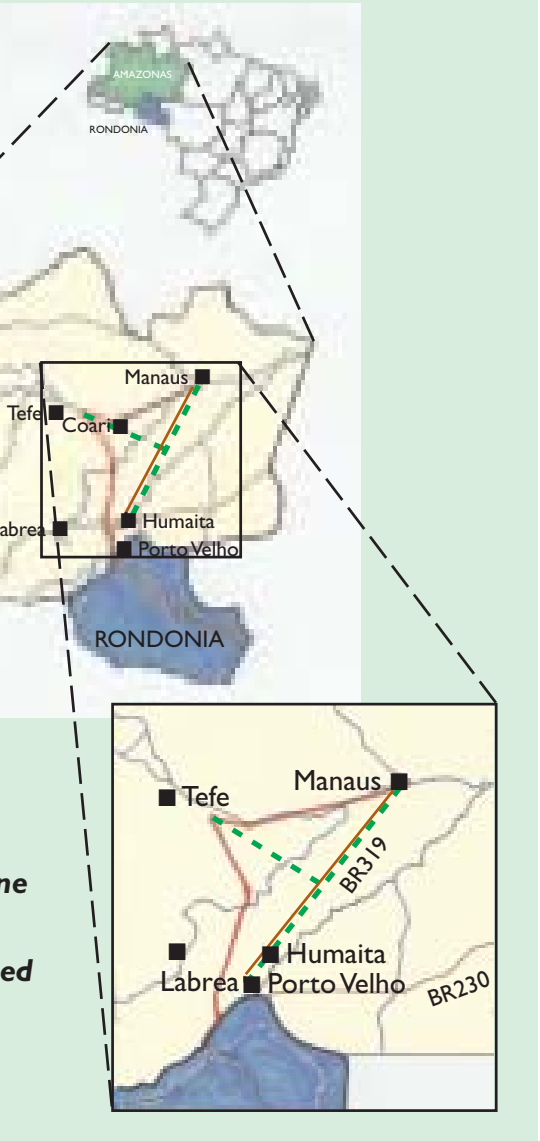
SOCIAL IMPACTS

Most of the impacts of the projectare well known by the companies. What must be treated very carefully are those on the local communities, which without a doubt are the most important.

The main impacts caused by the construction of the first pipeline on the Riverine community were:

o S.A (Petrobras) plans
extracts from Marcela Feilhaber's
uggests a solution –

d take more
ndly route



- Blockage of streams (used for drinking, fishing and utility water)
- The scarcity of some local products caused inflation of prices on the local market.
- A population influx of 7000 people looking for job opportunities. An increase in violence, STDs and prostitution was noticed.
- Increase in fluvial traffic created a safety issue for the locals that only circulate in small boats.

Contact with indigenous tribes is expected to create disastrous social and cultural impacts. It should be avoided all costs. A flu epidemic killed almost an entire tribe in the Peruvian rainforest during a Shell preliminary exploration in the 1980s.

The opening of the road will give access to indigenous land by illegal loggers and farmers. A sad example was the Juma tribe. In the 60s, the tribe was exterminated by illegal loggers. Today only five people remain.

Social impacts from major developments can and should be also positive. There will be an economy boost caused directly and indirectly by the project. The challenge is to balance positive and negative aspects of the development.

WASTE IMPACT

Waste generated must be reduced in the first place. The area should be treated as an offshore site: nothing should be disposed of locally.

Worker-generated waste can be transformed into fertilizers.

Recyclable waste must be compacted and sent for recycling. Non-recyclable waste should be incinerated in special furnaces (with reduced emissions).

ENVIRONMENTAL IMPACT

It is essential to make an extensive EIA that takes into account all the expected impacts and ways of minimising them. The EIA should also account for the social impacts. Secondary impacts of the project on the ecosystem are as important as direct impacts and need to be evaluated and monitored.

A transparency policy should be applied. Open audits should provide information to the local communities, the media, NGOs (environmentalist) and investors. This will avoid any sensationalism to be created around the project.

Another solution

When planning a major project the decision of the best alternative should take into consideration the cost, technical feasibility and environmental impacts.

The main problem concerning the construction of the pipeline is that it crosses intact areas of the forest, very close to indigenous land, archaeological sites and reserves.

In the EIA done by Petrobras it is always mentioned that it is better to use areas that have already been deforested. Highway Br-319 links Manaus and Porto Velho. The alternative route I have designed would go along this highway .

The length of the pipe would be around 1100km, which is just a little longer than the planned one. However, it will be crossing fewer rivers and this will make it technically easier to build.

The part that will have to be monitored to avoid illegal invasion and further deforestation is much smaller and therefore easier to control.

It is in the government plans to improve the highway. If Petrobas invested in construction works on the route, it would receive full support of the communities and the government.

It will also be possible to reach many more local markets along the route to deliver the gas.

In order to prove this alternative is recommended from an economical point of view, further analysis would have to be made. However, even if this is not the case, the alternative is definitely recommended from a social and environmental aspect. This will compensate any difference in final price.

Conclusion

Being a major development in the heart of the Amazon forest, the Urucu project became very controversial. Petrobras is in the spotlight and has been facing many obstacles in the acceptance of the project. Local groups, environmentalists and the national and international media are following closely each step taken by the company.

As we have shown, there are many environmental and social impacts associated with the development. But, if they are carefully considered, there are many ways of minimising and avoiding most impacts. Implementing the best environmental and social practice may have high cost and take more time but, in times like today, where society is really focusing on the environment, companies have no choice. The alternative route is an example of how these impacts can be reduced.

Marcela Feilhaber, winner of RSMA's 2004 essay competition, has gained her MSc in petroleum engineering. She is working in Rio for a French company making software for reservoir modelling and uncertainty analysis.

The Coari to Manaus pipeline is planned to go ahead.

In this article, based on a conference paper, Nigel Fitzpatrick takes a look at the potential for reduction in automotive energy demand by more extensive use of hybrid vehicles.
He also discusses the expanded application of electrochemically-produced metals, demonstrating that we can dramatically reduce overall energy consumption in the transport sector.

THE ARGONNE laboratory in Chicago has shown that the energy saved by using aluminum in a road vehicle more than compensates for the energy used to produce it[1].

Light metals are important in the transportation industry of the future and their production provides a base load for the power industry. They are traded internationally.

Throw a kilo of aluminium into a box. You are transferring 8kWh in a second. That is equivalent to 28MW. Ship the aluminum product from a Canadian smelter to China and you are effectively wiring one continent to another – but with a negligible power loss. You can use the metal when needed.

Hydrogen has been described as an energy currency. Aluminium and magnesium *etc* are 'energy currencies' that can be stored and shipped easily.

Hydrogen in transportation

Information on fuel pathways was obtained by Levelton *et al* [2] for light vehicles. The Levelton study took into account the full costs of fuel production, delivery, vehicle modifications etc. It can be seen that hydrogen produced from natural gas is the highest cost option here for reducing greenhouse gas emissions. Hydrogen produced by electrolysis is even more costly and not ranked in the study.

Hybrid electric vehicles

Historically electric vehicles lacked sufficient range and large batteries were needed. With the hybrid, only quite a small amount of energy, around 0.5 kWh, is required for levelling the load of an engine[3] and only 0.6kWh of the 1.8 kWh capacity of the Panasonic Ni-MH battery in the *Prius* is used. The system has been tested to 250,000km and Toyota feels that one battery set should last the life of the vehicle[4].

Most new hybrid power systems are heavier than the internal combustion engine and their arrival has encouraged automotive companies to lighten the structure of vehicles.

Azure Dynamics' technology is in the first licensed hybrid London taxi, launched in Trafalgar Square in June 2004.

Savings from reducing vehicle mass

Publicly available data provided to Natural Resources Canada (NRCan) by automotive manufacturers was combined with kerb weight data from consumer reports and adding 136kg (given by NRCan as the test weight for their data). It covered all of the light vehicles sold in Canada. A decrease from 2000kg to 1200kg (a 40% decrease) is shown to reduce fuel consumption on both the city and highway driving cycles by 40% with new vehicles. It is more normal to use a figure of 7% fuel saving for a 10 % weight reduction[5] .

Honda has coupled its hybrid *Insight* with a lighter vehicle structure. It uses aluminium extensively and it claim s a 40% weight reduction .The alloys used contain magnesium .There is also an increase in the use of magnesium castings in the automotive sector.

In the late 90s, the world demand for aluminium was growing at the rate of over 500,000 tonnes per year[6].The use of magnesium directly in the automotive industry was projected to expand by 5,000 tonnes per annum[7]. 55% of the world's magnesium is used by the aluminium industry which is growing at 3% per year leading to an annual increase of 10,000 tonnes of magnesium. Table 2 shows the avoided CO_2 if non-fossil power (*eg* hydro, nuclear) is used to produce these rather than using power generated from coal.

Conclusion

Table 1 shows that there may not be a future for hydrogen in vehicles and six years later we are finding that hydrogen vehicles are still as far away as they were

NIGEL FITZPATRICK (Met 65) is Chairman of Azure's advisory board, was founder CEO and a former Technical Director of Alcan International. Azure, a steadily-expanding company, provides hybrid electric and electric vehicle technology for commercial and military vehicles.

Azure is listed on the Toronto stock exchange as AZD and on London's AIM section as ADC. It has operations in Canada, the USA and UK

More information from www.azuredynamics.com/>

THOUGHTS ON NEW ENERGY

Fuel/vehicle combination	Rank	Cost $
Diesel	1	-34
Low Sulphur gasoline hybrid	2	6
Diesel hybrid	3	52
Low Sulphur Diesel hybrid	4	62
Natural Gas	5	65
Propane	6	68
E10 cellulose	7	84
E85 ditto	8	86
E10 corn	9	151
E85 ditto	10	155
Electric vehicle	11	161
Methanol from natural gas Fuel cell	12	300
Methanol from natural gas engine	13	303
Hydrogen (natural gas) Fuel cell	14	385

TABLE 1 – Light road vehicles' cost effectiveness relative to gasoline (valuing CO_2 reductions at $2010/tonne)

From Alternative and Future Fuels and Energy Sources for Road Vehicles *Levelton Engineering Ltd, December 1999.*

when this table was prepared. Light metals already save energy when used in transportation. Metal production is suitable for a base load where there is 'stranded clean energy' *eg* hydro in Northern Manitoba.

If the numbers in table 2 are used, then 10,000MW, less than 10% of Canada's installed capacity, could be parlayed into 130million tonnes of equivalent carbon dioxide reduction if the use of coal elsewhere is avoided. This is greater than total CO_2 emissions from Canadian vehicles in 1995.[10]

Hydrogen has an uncertain future in vehicles but the production of light metals with electricity for vehicle structures, with remote cleanly-produced electrical power has value for tackling climate change.

An afterthought

It might be deduced from the above that fuel cells, which many writers link only with hydrogen, should be abandoned. This is far from the case. Beside the potential value of hydrogen powered polymer fuel cells in compact and portable applications, there is hope for larger and more efficient hydrogen-independent solid oxide fuel cell systems.

In the 60s, at the Royal School of Mines, the late Brian Steele lectured on the ability of oxygen to move through hot oxides. Brian's thinking spurred the solid oxide fuel cell (SOFC) which operates at a temperature where catalysts 'self clean'. The SOFC does not require a new fuel infrastructure, has a good lifetime and yields high grade waste heat. If the hydrogen fuel cell is in decline for all except portable applications, the solid oxide fuel cell, which can accept a range of fuels such as ethanol, natural gas as well as hydrogen, is in the ascendant. Moving oxygen across an electrode has resulted in 'real fuel' fuel cells. The SOFC has some way to go before it is considered for vehicles but it makes 'solid' steps forwards and has, for example, been examined by Ford to generate power from paint fumes in a plant.[11]

Metal	Annual Growth tonnes/annum	Smelter electricity kWh/tonne	Coal v Hydro Extra tonnes CO_2 / metal tonnes	Extra annual tonnes CO_2
Aluminium	500,000	16,300	21.84[8]	10.92 million
Magnesium	15,000	13,700[9]	18.35	0.28 million

TABLE 2 – Annual increase in greenhouse gas emissions from two-tracked metals used in the automotive sector if renewable energy is not used

FOOTNOTES

1 *F Stodolsky, A Vyas, R Cuenca and L Gaines* Life-Cycle Energy Savings Potential from Aluminium Intensive Vehicles *SAE 951837 Total Life Cycle conference, Vienna, 16-19 Oct.*

2 Alternative and Future Fuels and Energy Sources for Road Vehicles, *Levelton Engineering Ltd, December 1999*

3 *WJ Halliop, J Stannard, N Fitzpatrick, Low Cost Supercapacitors Third International Seminar on Double Layer and Similar Energy Storage Devices (December 1993).*

4 *Conversation with David Hermance, 1999 Windsor Workshop.*

5 *It is normal to use a lower ratio for vehicles that are 'in use' such that a 40% weight saving gives a 28% energy saving according to Michael Thomas of Alcan (communicating on 30 September 1999). The above results though are what one would likely see on the stickers that would accompany vehicles on sale in Canada!*

6 Opportunities and Challenges in the Aluminium Industry *– keynote address by Jacques Bougie, President and CEO Alcan Aluminium Ltd, to the Third Annual World Aluminium Conference London, 15 June 1998.*

7 *Report of the Electrolytic Industries for the Year 1997, Mark SVreeke, Dennie T Mah and C Mare Doyle. Source: The Electrochemical Society, Inc. vol 145, 10 pages: 3668 – 3696.*

8 *Letter S Pomper of Alcan to N Fitzpatrick 24 April 1996 (Pomper assumed coal with a 72% carbon content burned with 33.4% efficiency).*

9 *Fax S R Leavitt of Altimag, consultants to N Fitzpatrick 13 Sept 1999.*

10 *A Jacques, F Neitzert, P Boileau, 1997,* Trends in Canada's Greenhouse Gas Emissions *(1990-1995), Environment Canada report EN49-5/5-8E, ISBN0066225643-4, April*

11 *17 JULY, 2003, FCT builds/installs fume-to-fuel system at Ford.*

Frank Bickerton

This year marks the publication of the first biography of Francis Howard Bickerton (1889-1954), a City & Guilds alumnus who served as mechanical engineer on one of the most successful of all 'heroic age' Antarctic expeditions – Sir Douglas Mawson's Australasian Antarctic Expedition (AAE) of 1911-1914. Author Stephen Haddelsey writes for *Imperial Engineer*

BORN in Oxford and educated at Marlborough College, Frank Bickerton studied at City & Guilds for four years and may have been numbered among the very first students to attend the newly-developed aeronautical lectures delivered at the College in 1910. He was recruited for the AAE in June 1911 and Mawson gave him responsibility for two groundbreaking experiments: with propeller-driven traction and with wireless telegraphy.

Commenting on Bickerton's engineering qualifications, Lieutenant Belgrave Ninnis, another Englishman on the AAE and one of its two fatalities, stated that he was 'a first rate engineer, and a scientific one at that'. In the Antarctic his skills would receive their first and most severe test.

Fundraising

Mawson's intention was to attempt the first powered flight in Antarctica and, with this goal in mind, he purchased a Vicker's REP monoplane for a total cost of £955.4s.8d. Not only would the machine prove invaluable in route surveying but the novelty of aeroplanes – particularly in Australia – would also make it a highly effective fundraising tool.

Unfortunately, the monoplane crashed and was severely damaged during a test-flight in Adelaide in October and Bickerton was tasked with converting it for use as an 'air-tractor sledge' to be used for the ground-haulage of heavy supplies and equipment across the ice.

The expedition landed at Cape Denison in King George V Land on 8 January 1912 and, working in a specially-constructed hangar and workshop, Bickerton spent the winter months preparing the machine for the planned sledging expeditions into the interior.

His modifications included the fitting of a screen to protect the occupants from the elements, adjustments to the carburettor and fuel tank to prevent the petrol freezing and the fitting of skis to facilitate travel across ice fields scarred by deep crevasses.

The AAE's second pioneering experiment was with wireless telegraphy, the use of which had never before been attempted in Antarctic conditions. Two sets of Telefunken equipment were purchased, the first being set up at a wireless relay station on Macquarie Island, approximately half way between the expedition's winter quarters at Cape Denison and its headquarters in Hobart, Tasmania.

Despite problems caused by the severe climatic conditions, including ferocious winds, magnetic disturbances and St Elmo's Fire, the wireless proved highly successful. Not only did it allow an Antarctic station to communicate with the outside world for the first time in history, but the transmission of time signals enabled sledging parties equipped with receivers to determine their longitude.

Bickerton's role in establishing, maintaining and operating the wireless station was absolutely crucial to the success of this groundbreaking innovation. The work required great physical bravery and endurance as well as technical expertise and, during the erection of the wireless masts, Bickerton spent many hours suspended high above Commonwealth Bay, buffeted by winds of over 100 mph and constantly subjected to the risk of frostbite.

It had been hoped that exploratory sledging journeys might be made as soon as the expedition's base huts had

– an Antarctic alumnus

been erected, but the weather conditions at Cape Denison proved too severe for sledging at any time other than the Antarctic's spring and summer months.

In fact, the AAE had unwittingly discovered what Bickerton accurately described as 'the windiest spot in the world'. The prevailing gales – which maintained a yearlong average of 50 mph and peaked at well in excess of 200 mph – made 'simple occupations difficult and difficult ones colossal'. Even walking was all-but impossible and some members of the expedition spent practically every second out-of-doors either crawling on their hands and knees or slithering from place to place on their bellies.

Mapping marathon

Four main sledging expeditions were undertaken between November 1912 and February 1913 and they were responsible for the exploration and mapping of over 2,000 miles of virgin territory.

Piloting the air-tractor, Bickerton led the three-man western sledging party and, despite suffering from dysentery and being trapped in their tents by blizzards which lasted for many days, he and his companions not only charted 160 miles of unexplored coastline but also discovered the first Antarctic meteorite. This discovery, made on 5 December 1912, was the crucial first step towards establishing Antarctica as the Earth's richest meteorite field.

For his work on the expedition, Bickerton was awarded the prestigious Polar Medal and Cape Bickerton – the most westerly point seen on his sledging expedition – was named in his honour. A portion of the 'Adelie Land Meteorite' now resides in the Natural History Museum in London.

Bickerton's connection with aeronautical engineering and the Antarctic did not end with the AAE. While he was still in King George V Land, he was contacted via the new wireless equipment by Sir Ernest Shackleton and recruited for the ill-fated but undoubtedly heroic *Endurance* Expedition of 1914-17.

His recent experiences had made Bickerton the world's leading expert in the use of propeller-driven traction in sub-zero temperatures and Shackleton asked him to work on the 'wingless aeroplanes' that he wished to take to the Weddell Sea. It was to test these machines that the two men travelled to Norway in May 1914, undertaking trials on the frozen lake near Finse.

With the advent of war, Bickerton decided that his duty was to fight and the *Endurance* sailed without him.

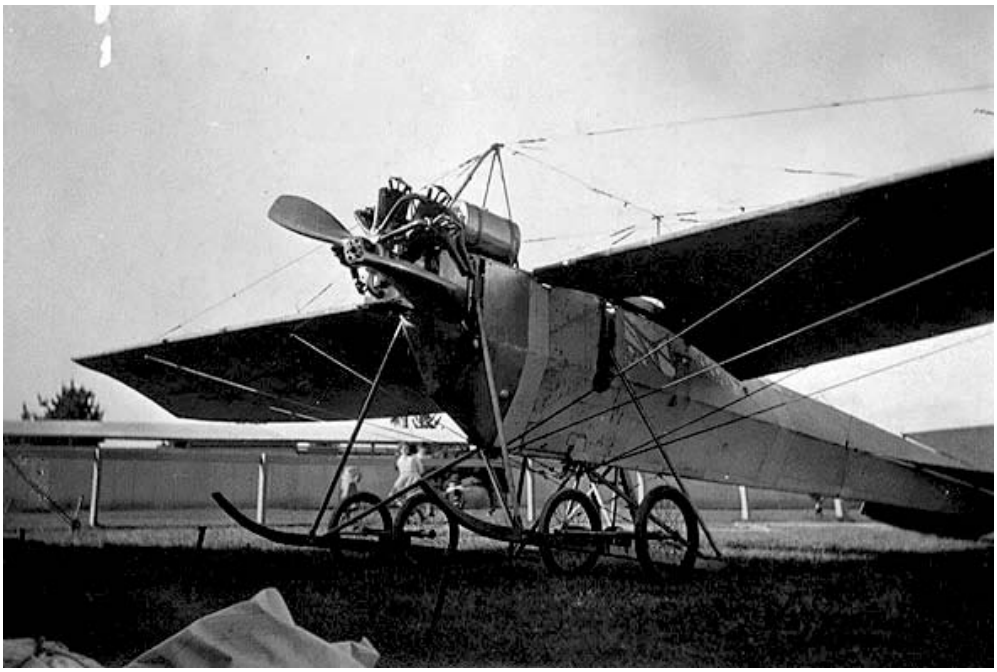
World War I

Having spent a year in the trenches, he volunteered for the Royal Flying Corps and served first as an observer and then as a fighter pilot with one of the RFC's elite squadrons during the third Battle of Ypres.

During this period, he not only invented a double-barrelled Lewis gun, but also became one of the first men to demonstrate that the much-admired but inherently unstable Sopwith Camel could be flown as a night fighter.

Having been severely wounded on three separate occasions, Bickerton ended his war as a test pilot at the Martlesham Heath Aeroplane Experimental Station in Suffolk, working on the development of direction finders and course markers.

Bickerton went on to a host of other adventures. He dug for pirate treasure on RL Stevenson's *Treasure Island*; he founded an ex-pat 'colony' in Newfoundland with a veteran of Scott's fatal *Terra Nova* expedition; he travelled the length of Africa by train, plane and automobile; founded one of the USA's most prestigious golf courses, and worked as a script writer and editor during the heyday of the British film industry. Finally, he served with distinction with the RAF as a wing commander in WWII. He died, aged 65, on 21 August 1954.



ABOVE LEFT: Bickerton in RFC uniform.
ABOVE: The Vicker's REP monoplane which Bickerton fitted with skis.

Stephen Haddelsey's biography of Frank Bickerton, *Born Adventurer*, will be published by Sutton Publishing in September 2005.

Imperial alumni set to bridge gap in Hong Kong

MANY of us pursue dreams and ambitions in our careers, wading through triumph and despair', says Robin Sham. 'But if all the triumph and despair are shared by a close-knit team, and that team consists of many an Imperial engineer, one has found the meaning of success'. That's the case on Maunsell's Stonecutters Bridge contract.

The Stonecutters Bridge in Hong Kong is a high-level cable-stayed bridge, with two towers located in the back-up areas of Container Terminals 8 and 9, with a main span of 1018metres across the Rambler Channel and of a total length, including the back spans of some 1.6km.

Maunsell Consultants Asia Limited was appointed in 2004 by the Maeda-Hitachi-Yokogawa-Hsin Chong Joint Venture (JV) as its consultant for the construction phase of the 1018m main span Stonecutters Bridge. It had successfully assisted the JV in the tender preparation and secured the contract for the construction of the 1.6km-long cable-stayed bridge, against fierce competition from four international contracting groups which are some of the very best in this industry.

The Maunsell team consists of numerous talents, notably Imperial alumni from different eras. Project Director is Robin Sham (PhD DIC 89), Project Engineer is John Cadei (ACGI 73) and one of the team leaders is Guy Russell (ACGI 94).

Robin Sham reflects: 'Maunsell's involvement dates back to the tender preparation stage. It assisted the JV in producing some of the most robust and impressive winning proposals by any standard. Its appointment as the JV's consultant for the construction phase is well-deserved. We are very grateful for the selfless contributions from the team, particularly the Imperial engineers who demonstrated courage and judgment.

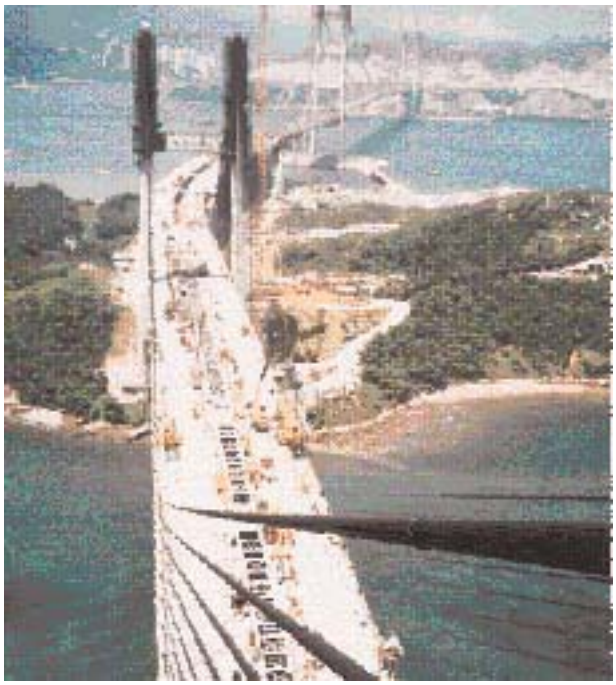
'In those days back in South Kensington, we felt we were specially chosen, and lucky to be there. We were then spurred on by a glimpse of the horizons beyond, being tacitly confident of what the sum of the parts can achieve.'

The construction phase of Stonecutters Bridge has already commenced and Maunsell provides support to the JV. This is notably in design, construction engineering, bridge aerodynamics, wind tunnel testing, falsework and cofferdam design, marine traffic management, marine jetty design, temporary traffic management, geotechnical engineering, amongst many other strands of work.

'True to Imperial College tradition, the team aspires to conquer one great height after another', says Robin.

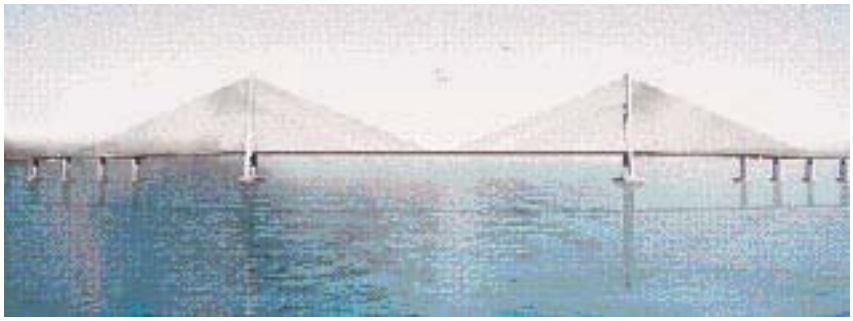
The Maunsell team has also been appointed recently to provide comprehensive services to the China Harbour Engineering Co's Second Navigational Engineering Bureau in the construction phase of the 1088m-main span Sutong Bridge. This sea crossing in Shanghai, China is now set to be the world's longest cable-stayed bridge.

The services include contractor's alternative design; development of construction methodology; construction engineering/erection analysis/geometry control; deck lifting methods and procedures; surveying and monitoring techniques and systems; stay cable installation simulations; advice on construction method statements and specifications; bridge aerodynamics and wind tunnel testing; vibration mitigation measures/devices; falsework and plant/equipment design; advice on innovation and high-technology and research and development. As was the case of Stonecutters Bridge, the appointment also follows from Maunsell's support to the contractor in winning the construction bid.



'To work on one of the longest bridges in the world is already a dream come true, but to work on two of the world's longest bridges... Once may be serendipity, but twice is consistency. We will cherish the days when the world was young and everything was possible', says Robin.

BELOW: A computer generated view of Sutong Bridge.
TOP RIGHT: Construction on one of Robin Sham's other long-span bridges, Kap Shui Mun, also in Hong Kong.



Robin Sham (CIVL 82) has 27 years' unique experience in building long-span bridges

A mining geologist's revenge!

YOUR RESERVES OR MINE
BY JIM PLATT (MGEO 57)
Published by Creighton Books
ISBN 90 807808 2 0

PROVING that literacy can be compatible with an RSM education, Jim has written a highly entertaining memoir of his colourful career (almost literally) at the coalface.

His book comprises a series of accounts of his assignments whilst working for the Flying Circus of 'The Company'. The history starts with the acquisition of the Company by a very large Dutch Oil Company, 'Uncle Joe' and carries on through its subsequent purchase by an (also unnamed) South African mining house.

Upon joining The Company, Jim was assigned to the Flying Circus. The Flying Circus is, or was, a team of assorted specialists from the Company's three major divisions assigned to perform technical reviews of both existing operations and prospective acquisitions. The three divisions were Exploration, Mining and Processing, known respectively as MTE, MTM and MTP. Each had their specialist contributors. They would frequently practise seagull management (fly in, defecate all over the place and fly out again). According to Jim, they rarely achieved unanimous recommendations, largely due to the internecine rivalries inherent in large organisations. He is also of the opinion that the Circus was a tool used by management to ratify decisions already taken – said decisions being frequently to avoid corporate or personal risks of any kind.

His entertaining narratives take us from Africa to Quebec and from the Indies to the Andes with stops in the Caribbean and elsewhere. Throughout, his characterisations of the people he meets sparkle with wit and incision. His descriptions of longer term assignments also highlight the highs and the lows of a peripatetic life.

Those of us whose career has involved working with, or for, large corporate organisations develop a healthy scepticism regarding 'professional managers'. In his description of these 'types', Jim's cynicism manifests itself in a series of anecdotes which are replete with searing and hilarious invective. Consultants, lawyers, accountants and finance professionals will not find this comfortable reading. He highlights the continuing dichotomy in most large industrial organisations between the technologists and the variously described exploiters and hangers-on – something that will continue to exist as long as human nature stays the same.

Despite a tendency to drop into cliché from time to time, his book remains entertaining throughout and will certainly resonate with those of us whose lives have taken a similar path. A very good read! ***Bill McAuley***

BOOKS

Educational fun

BOING BOING
BY LARRY HENCH
Published by Can of Worms Press
ISBN 190 487200X

BOING Boing and the Lion's Claws, the third in the series about a bionic cat by Professor Larry Hench, hit the bookstall in time for Christmas. The Professor of Ceramic Materials and Co-director of the Centre for Tissue Engineering and Regenerative Medicine, created the robotic cat for a boy allergic to cat fur.

'I'm particularly proud of this book as it has shown technology evolve into a form that is not just fun, but highly educational', he said.

An exciting memoir of three decades

FRAYED LIFELINES: A SIEGE SURVIVOR'S STORY
BY FRANK LEIGHTON (CIVL 49)
Published by Trafford Publishing
ISBN 1-55395-841-1

THIS ACCOUNT of the first 30 years of his life, from 1919, is dedicated by Frank Leighton to:

'The unsung heroes of the Merchant Navy who helped keep Malta's lifeline unbroken in the face of fearsome odds 1940 –1942'.

Well written and full of detail, the book reflects the life not only of Frank Leighton, but also the way society was conducted between World War I and World War II. It will certainly strike a sympathetic chord of interest in any City & Guilds alumni around then.

A gentle man who liked his own company, Leighton was also happy to join in the social life in the various communities where he had to live. They were variously his family and school, the RAF and finally Imperial College.

Just before enlisting in the RAF at 20, he was able to complete his first year of engineering externally at Norwich Technical College. He wished to join the fledgling Air-Sea-Rescue service as he decided that he wanted to save lives rather than take them. It turned out, however, that they were only recruiting for wireless operator trainees. Young Frank signed on hoping to be transferred to the rescue service later.

Sadly, it was found that he was tone deaf and he was reclassified as Aircraftsman Second Class: General Duties. These were the dogsbodies of the RAF, but still determined, Leighton applied to remuster to a trade. Motor Boat Crew training followed and months later he was part of a large convoy sailing to Malta, where he stayed over two years.

By December 1941, Hitler had ordered half of Admiral Dönitz's U-boat fleet to the Mediterranean to destroy Britain's naval forces and prevent supply convoys from reaching Malta. Thus began the siege of Malta. The end came after the air battle of 9-10 May 1942.

Leighton tells it all with splendid detail and quite a few allusions concerning the history of Malta thrown in.

Leighton describes his time at Imperial College with affection and, as ever, with careful detail. He mentions that he won the Institution Medal competition, held every year by the Institution of Civil Engineers and also his pride in being a member of the Links Club. One year, Frank was Hon Sec of IC Student's Union. His great friend, Don Huddart, was President.

Leighton's second romance finished disastrously towards his last year at Imperial so, in 1949, he decided to emigrate to the USA to make his fortune. ***Colleen Richardson***

BOOKS

MACKEREL THE TRAVELLING CAT – IN THE LAKE DISTRICT
BY KATHERINE AND MAURICE GEORGE

Published by Greendog
ISBN 0 9538143 2 7 and
ISBN 0 9538143 3 5
Available Medici Galleries, South Ken

THIS delightful book with its charming black and white sketches of cats, people and views is the literary venture of two C&G alumni, Maurice George and his wife, Katherine (née Dent). They were both mechanical engineers from 1952-56.

After several decades in the nuclear field, they took early retirement and practised as industrial safety consultants. Now, in a third career, they are writing about the adventures of their tabby cat as he travels, on a lead, with them round the country. Illustrations are by freelance artist Jennifer Toombs.

Mackerel, the tabby cat figures on every page, either stepping out over the sloping ridges leading down to Rydal Water or feeling tired and curling up in a rucksack and being carried. His long lead made it possible for him to be safe and free at the same time.

He probably knew the Lake District better than most walkers and loved the The Swan at Grasmere.

Colleen Richardson

Volunteer archivist

IN VIEW of the current resurgence in metals prices, I would have thought that offsetting costs (of producing *Imperial Engineer*) with a few appropriate industry advertisements might be worth investigating?

I would personally be pleased to act as a postbox for any old photos relating to RSM people/events and organising them into simple displays/articles.

Digitised formats or high quality photocopies only required with brief supporting text. I would not like to guarantee return of possibly precious originals. The idea would be to create essentially graphic articles with minimal text, which might spark further interest and correspondence. ***Bill Bradford (MinTech 57)***

See page 26 appeal!

Chaps and Links have role

CONGRATULATIONS on your first issue. Such a venture was long overdue. I hope it'll continue to be successful.

Ref your question on page 26 and your call on page 27, I firmly believe that Chaps and Links have a role to play but it will largely depend on the type of person invited to join and the maintenance of the pre-qualification standatrds.

In my book, *Life of Mine* I record a Friday in April1955, when I walked into Goldfields' head office in Johannesburg to ask for a job. I met Freddy Sussman who was also wearing his tie. He took me into the holy of holies to meet the Chief Consulting Engineer, Bulla Smart. Not wearing his tie, he was obliged to close his office and take us both for a drink at a nearby hotel. On returning to his office, he gave me a job at their Vlakfontein Mine.

Roger Barnes (MinEng 50)

LETTERS

Plea for easy-to-read type

THE ONE thing that I do not like about *Imperial Engineer* is the shade of colour of the ink used for text. Grey is not an easy shade to read on a white ground. The contrast is poor.

Please could the editorial board bear in mind that some of us of a 'certain age' may not have eye sight as good as it was when at college, but still would wish to be able to read all the contents of the magazine without the need to resort to a magnifying glass. ***John A Hobson (MECH58)***

ALTHOUGH the print in the last issue was not grey, it was a 'bit thin'. So this time we're using slightly bolder versions of the two classic typefaces Garamond and Gill. The type is a little small, but this is necessary to accommodate all the news and features. Production Editor, Lynn Penfold.

Balance just right

... I WOULD like to send my best congratulations to all involved in the compilation and publication of this excellent magazine. It is, and will be, much-valued by all its recipients. I think that the then, now and in the future balance of news involving people, events, traditions and items of general interest has been caught just right.
What I was particularly delighted with was the attention given to people and personalities. Such a magazine that allows the members to keep in touch with the combined spirits of RSM and Guilds is of such a great benefit to us all. *Imperial Engineer* joining two famous institutions will be welcomed by all who read it. ***Jim Platt***

Ah yes, I remember him well!

CONGRATULATIONS to everyone involved. It makes great reading and contains a well balanced and informative variety of topics.

I was particularly interested in the article by John Davis – *The Russian Visitation*.This must be by the same fellow I was at school with in South Wales from 1940-1945 and at Imperial College from 1945-1948 (I was in Metallurgy at the RSM). I have had no contact or news of him since we graduated!

Could you let me have his present email address and location. He has presumably retired and may have moved from Orpington. I sincerely hope you have this information or it can be readily accessed? I was lecturer in the Mineral Processing Department of the RSM from 1957-1965. We left the UK for the USA in 1965 and moved, from Greenwich Connecticut, to Tucson Arizona in 2001.

I have one suggestion – The two associations should perhaps be merged into one – might a suitable name be the Imperial Mining and Engineering Association?

Derek J Ottley (Mat 48)

Adventurer who found way back

RICHARD Rubinstein, MC, (MECH 48) died on 23 February aged 83. He was remembered in *The Times*' obituary as 'an adventure-hungry Special Operations soldier who organised guerrilla resistance in France and Burma'.

Dick was disappointed not to be accepted for commando training or as an artillery air-observation pilot when he ceased leading an Anti-Aircraft Command searchlight detachment. So he volunteered for unspecified 'tasks of particular danger'. This led him to the SOE

Dick parachuted into Brittany on the night of 6 August 1944, as leader of one of 93 'Jedburgh' three-man teams. Despite encountering ground fire as their Stirling ran into the dropping zone they, and a 15-strong SAS group, all landed safely.

Further sorties followed and Dick was mentioned in dispatches for service in France and awarded the *Croix de Guerre*.

Having volunteered for service with SOE Force 136 against the Japanese in the Far East,.his first operation in Burma took place in January 1945. The operation produced intelligence on Japanese dispositions and supply lines.

RICHARD RUBINSTEIN

For operation 'Chimp' Dick's party was parachuted into a jungle clearing in April 1945 around 100 miles east of the Irrawaddy. There he quickly raised a force of 200 guerrillas who operated against the Japanese under their own leaders but on his guidance,

When the XIVth Army swept in, he moved his SOE team southwards to Toungoo to join 'Reindeer', operating against trains ferrying Japanese reinforcements northwards.

Operations with 'Reindeer', which used guerrillas to help to mop up Japanese troops who had escaped into the hills, marked the end of his Far East adventures. Dick was awarded the MC for his gallantry and leadership in Burma,

He returned home and read mechanical engineering at Imperial, taking up a place he had been allocated in 1939. He graduated with a first and began work with ICI on Merseyside but, when De Havillands offered him a post in its sales engineering division, he returned south.

After an enjoyable and successful career with De Havillands and Hawker Siddeley Dynamics, he retired in 1986 and found his way back to his wartime friends through the Special Forces Club, of which he was chairman from 1989 to 1991.

PAUL ALTMAN

Generous supporter

PAUL ALTMAN, who died on 8 February, entered C & G in 1936, as a then German citizen, to study electrical engineering.

In 1939, before the final year results were out, he was collected from his lodgings and interned as an enemy alien. He was 'exported' to Australia and interned for the rest of WWII. It was not until after his release in 1945 that he was able to find out whether he'd passed or failed in '39!

He returned to England and worked for Metropolitan-Vickers, later returning to Melbourne, as Chief Electrical Engineer of Australian Paper Manufacturers. On his retirement, he accepted a part-time consultancy with Merz and McLellan.

Paul was a generous supporter of the National Gallery of Victoria.

JOHN WILKINS

AS EXECUTIVE Director of Consulting Engineers of British Columbia, John Wilkins (MINENG 69) was responsible for increasing the profile of this association of 100 best known BC consulting engineers.

Before that he had followed a degree with study at RSM. An early career in geology and work for a number of innovative companies followed..

Kidney failure forced John into early retirement in 1998 but dialysis did allow him to enjoy some of his favourite outdoor pursuits like hiking and camping. However, a quintuple heart by-pass and various infections dogged his final years and he died last 5 September.

Innovator who launched Triple–E

IN ADDITION to an engineering degree and PhD for research studies in chemical engineering technology, specifically in the field of simultaneous heat mass transfer, innovation was in Martin Stacey's soul.

He also had a unique ability to identify markets for compounds and chemical additives during the boom time of the 60s and 70s.

As Manager of BOC Ltd New Venture Group, he discovered a rejected trial product and through his comprehension of its value pioneered it as TRIPLE-E. UK and European companies bought it by the barrel load, eager to improve their heavy use of petroleum fuels.

MARTIN D'AMBOISE STACEY

From 1973–1980 Martin built up the brand and its sales channels as Managing Director.

In 1981, the Alexander Proudfoot Organisation recognised Martin's entrepreneurial spirit and engaged him at the heart of its European operations Metra Proudfoot International

Martin relished his time at Imperial, where his nickname was Frenchie, and was extremely popular for his enthusiasm and eccentric personality.

Aside from his studies, he was also Treasurer, involved in the Imperial Charity Carnival Committee, Hon Sec of Imperial College Student's Union, Student Orator and Imperial's delegate to London University's Students' Union

Martin had two sons, Carl and Oliver, by his marriage to Jacqueline and later married Marita, in 1988. He also embraced Marita's own son Jason as his own.

Sadly, for the family, and especially Martin who was so active, a harsh diagnosis in his early 60s left him facing an immense personal and terminal challenge, this time as cancer.

'After a long period of decline in health and much suffering, his humour still made us laugh and he never complained no matter how painful the symptoms became' writes his son Oliver. Martin passed away peacefully in the arms of his wife last 9 July. He was 65.

'We all hold Martin fondly in our hearts and memory. He inspired us through his thoughts and all his lively conversation. He was rightly a proud man – of his achievements and others around him. Moreover, he was immensely proud and protective of his family, always rooting for us to see the best that life has to offer. We still miss him greatly.'

CHRIS HALL

CHRIS HALL (MINENG 49) was always a dedicated teacher, mentor, hunting companion and supporter to his students until his sudden death. After the Fleet Air Arm as a bomber pilot, he took a PhD at RSM, specialising in thermodynamics. Chris also taught at RSM as well as working in mining.

STAN SEROTA

A great support

'STAN Serota(CIVL 38) was always a good friend and source of both way-out and very sound engineering', Terrel Wyatt, a former Chairman of the Costain Group, writes about his ex-colleague. Stan died on 20 October, aged 88.

Stan graduated as a civil engineer in 1938 and, after the war, established a soil mechanics department at Richard Costain.

Over the next 30 years, the department, later known as Foundation Engineering, built an international reputation for soil investigation and innovative solutions to difficult foundation problems.

Stan's wife became a baroness and the Tate's Sir Nicholas Serota is his son, but Stan was always Stan!

A keen rower and passionate airman

SYDNEY 'KIM' ASH

SYDNEY Kincaid Ash, who died last 12 September, studied mechanical engineering at City and Guilds from 1952-56.

As his son Paul says: 'My father loved his time at Imperial and five decades had not dimmed the joy and wonder of studying there'.

On arriving at Imperial, he joined the Boat Club where he was a keen and active member, rowing at number six for the first VIII. He was Captain of Boats 1954-55, winning the Desborough Medal the same year.

Kim was also vice-president of the City and Guilds Union 1954-55 and a member of both the Links and Chaps clubs.

Upon attaining his degree, Kim returned to his native South Africa where he joined the family firm, Ash Brothers (Pty) Ltd. which his father had started in 1919 on arriving from England, using his war gratuity as capital. Here he spent the rest of his working life, taking them from the world of heavy engineering (locomotives had been a principal part of the business) to highly sophisticated metering and control, and industrial weighing equipment.

He finally retired as chairman in 1998, and moved from Johannesburg to Hermanus – the 'whale capital of the world' – in the southern Cape.

He remained an active boatsman and was often to be seen in his sculling boat on the Klein River lagoon. He kept in touch with I.C.B.C. and various of his fellow oarsmen, some of whom he joined at the opening of the new boathouse by Kate Hoey MP, in May 2000

Apart from rowing, his other passion was flying. He earned his pilot's licence in 1971 and subsequently joined 104 Squadron, South African Air Force, a volunteer squadron of pilots flying their own aircraft.

He was appointed Officer Commanding 104 Sqn. in 1986, a position he held for six years In 1995, Kim was appointed Honorary Colonel of 104 Sqn, and was still active at the time of his death.

Driving force in gas transport

ERIC MILKINS

PROFESSOR Eric Milkins (Mech Eng 66-69) died in Melbourne in January.

In 1972, he was awarded the Rodda Medal of the Society of Automotive Engineers of Australasia. This award has only been made six times in 70 years of the Society's history.

Eric founded and directed the Transport Energy Research and Development Group in the Mechanical Engineering Department of Melbourne University. He took early retirement in 1989 to rejoin industry.

He became a Research Associate, making a significant contribution to collaborative research. As Melbourne University's Principal Investigator Eric was in charge of the engine development for the $2 million ERDC project with Ford and Allgas Energy to develop natural gas fuelled taxis. ***David Bishop***

Motherhood before career

BARBARA STRACHAN

'SHE'S already sadly missed', Ken Strachan wrote when informing *IE* of his mother Barbara Strachan's death on 24 November ' quietly and quickly at home in Tenbury Wells'.

Barbara (née Wright) was one of two lady engineers in her years at Guilds – 1941–43.

Her work on jet engines at Metropolitan Vickers was her part in helping us to win World War II. She was keen to continue her career but having married Noël Strachan, a wartime secretary of ICU, she moved to North Wales in 1948, where convention obliged her to choose motherhood over career.

She retained a lively sense of humour and interest in engineering until the end.

HERMAN RAMSTAD

A gentle giant

BORN in Orkanger, Norway in 1930, Herman Ramstad arrived in England in 1952 to read metalurgy at the RSM He obtaining his masters in 1955 and a doctorate in 1959. Herman died in January 2004.

An accomplished oarsman, he rowed at Henley in the College first VIII in 1953 and 1954 and doubled up in the first IV in 1954. He was a member of the Chaps Club and held positions in the Mines' union. In the crew he had the nickname 'the gentle giant' but when provoked he could, to use a Norwegian expression, 'chew chains'.

Herman was very fond of the outdoors and loved the mountains where he felt most at ease and could enjoy his passion for shooting. He was also a first class skier.

On leaving Imperial, Herman went to live in the USA to work for Pittsburgh steel-maker Jones and Laughlin. 1964 saw his return to Norway to manage an iron ore mine close to the Arctic Circle which was a big change for him and his family.

In 1970, he moved to Oslo and worked for Strommen Staal (as CEO) and later was CEO of Aker Engineering for seven years, He later had a number of Directorships in the Aker Group, one of Norway's leading blue chip companies. He was nicknamed the 'Pace Maker' during the period when Aker Engineering was the most profitable part of the Group.

About five years ago he broke his neck in a diving accident at his island cottage off the south coast of Norway and spent the last four years of his life as a paraplegic, a situation he bore with great fortitude and good humour. ***Peter Swift (AERO 56)***

MECH ENG 73-76

30 years on but it seemed like yesterday

A UNIQUE gathering took place at the Insitution of Mechanical Engineers recently when 33 graduates and their partners met for the first time in nearly 30 years. They all graduated at the same time from the mechanical engineering course in 1976.

Isobel Pollock, who is one of the vice presidents of the IMechE, used a variety of methods to find her fellow mechanical engineering graduates. Most graduates were found in the UK, whilst others were tracked down in Canada, USA, Asia, Australia, Cyprus, France and Belgium.

'I was amazed at the positive response I received. Everyone was so supportive. Those who were able to attend enjoyed meeting everyone after such a long time and recalling our memories of Imperial.

'I was very pleased that Professor Sir Hugh and Lady Ford were able to be present and delighted when he spoke of his time as our head of department.'

Sir Hugh and Lady Ford joined a happy party.

The party adjourned to a local Italian restaurant after the reception in the Institution's library and some even continued through to the wee small hours.

Isobel has been challenged to organise another reunion in five to 10 years time! Lyn Turner 0044 (0)1484 545213 Email: lyn.turner@clara.co.uk

CGCA MELBOURNE

Recorder inventor honoured

IT'S been a quiet year in Melbourne as far as the local branch of CGCA is concerned, reports David Bishop.

Even the annual dinner was cancelled due to the organiser being in hospital.

However, one member, Dr David Warren (Chem Eng 1949-52) has made it into the news. He was honoured on an Australian postage stamp, for his invention of the black box recorder which is so useful, particularly after air disasters.

David also reports that their newsletter kept members up to date with the interesting changes at Imperial and within the alumni organisations

Contact David Bishop on 0061 3 9596 1532 or db@numerousbenefits.com

Cockney warmth thaws NY

NEWS from a very busy John Gardiner (CVIVL 70) includes information from Sandy Eames(ELEC 70) about an ICENAE weekend which included climbing in the Adirondacks.

'More recently a few of us, including Simon Maddison (ELEC 70), and Andrew Mongar (MSc MECH 70) met in NY to celebrate Sandy's 25th year in the US. It snowed as we started volunteer work on tall ships (Sandy's major interest), but we thawed out at the party afterwards.' During the evening the four Londoners tried to teach their American friends to speak Cockney!

The picture shows the 1885 iron-hulled *Wavertree* in the South Street Seaport Museum, New York where Sandy volunteers his time and helps renovate and sail vintage schooners. *Wavertree* was dismasted off Cape Horn and abandoned in the Falklands before being brought to New York for restoration. Contact Sandy on SandyEames@aol.com. and John on johngardiner@cs.com.

WE NEED YOUR NEWS

Let us know your news and stories. Or have you an idea for a feature you think will be of general interest? Editorial assistance is available!

Contact is Teresa Sergot (address on page two).

DEADLINE FOR NEXT ISSUE IS FRIDAY 15 JULY

PICTURED at dinner after meeting in the George, Fleet Street, are five of the 14 Triodes who met this January. They are, from left, Peter Cheung, Richard Lewis, Peter Marlow, Philip Harris and Martyn Hart. For details and names of the 17 Triodes, electrical engineers who qualified in 1973, contact arch-Triode Martyn Hart on 0044 (0)1474 569055 or martyn.hart@blueyonder.co.uk.

The next meeting will be on Friday 6 January 2006.

CGCA S'TH AFRICA

Thursday date continues

THE SOUTH AFRICAN branch of CGCA still meets after work every third Thursday. You can confirm venue by phoning any of the committee members – Richard Gundersen 082-654-6476, Charles Lewis 082-557-5074 or Colin Batchelor 084-642-1881

The joint dinner with RSMA is on 25 June.

Jean's latest first

HAVING been elected Vice President of The Institution of Civil Engineers, Jean Venables (CIVL 69) will become its first female president for 2006-2007.

FOLLOWING the very successful 25th anniversary reunion of 1995, there will be a 35th (yes, it really is that long ago) Reunion in 2005, on Saturday 14 May.

We have arranged to meet at noon in the Union for a buffet lunch at 1pm in the Union dining hall and some drinks, with plenty of time to talk and catch up. There will then be a short tour around the department, so that we can see how little it has changed (!) in all these years.

We are hoping to have at least one member of staff from our time along as a guest, as well as Peter Cheung, the current Deputy Head of Department.

We have made some contact with other engineers of the same era, and are throwing the event open to them also

For those with the time and energy to carry on, there will be a loop back to the Queen's Arms to round off the afternoon, followed by a trip down memory lane either to a curry house in South Ken or for a chinese meal off Leicester Square.

A small and dedicated band has made great effort and sacrifice, meeting regularly in the union bar in order to plan this event, often accompanied by other family members. The planning meeting in the spring attracted some 30 people!

We expect attendees from far and wide, and do hope that you will be able to join us for what promises to be a great occasion.

We very much look forward to meeting you again. Partners and offspring are, of course, also very welcome.

Cost of lunch and wine is £16 per head. We will need to confirm numbers in advance, and would appreciate payment in advance also. Please get in touch with: Simon Maddison (simon.maddison@btinternet.com), Jim Lee (mahjong@clara.co.uk), Bob Mack (bob@essex.ac.uk), Dave Hoare (janeand dave@connectfree.co.uk) or Suzanne Flynn (sgf@cygnets.co.uk.

Cheques for lunch to me please to be received by Friday 6 May. ***Simon Maddison***

ELECTRICAL ENGINEERS 1970

Planning bears fruit

Well-known speaker booked for MinSouth

THE ANNUAL dinner of MinSouth (The London and Southern Counties Minerals Industries Institute, a regional group of the IMMM) will be held on Tuesday 17 May, in the upstairs function room of The Counting House, London.

In recent years, this has proved to be a popular venue for our monthly general meetings with the added attraction of London Pride served at the adjacent cash bar to assist with networking.

Jim Platt, (MGeo 60) will be this year's after dinner speaker. In his recently published book, *Your Reserves or Mine (see review p21)*, Jim recounts, in his own inimitable style, life working for a certain international mining house based in The Hague (see Imperial College Alumni E-Bulletin, November 2004).

Alumni recent or not so recent, especially those who have spent time during their careers working with Billiton or Shell, are invited to contact MinSouth's Honorary Secretary Alan Baxter on (alan.bax @ntlworld.com) for tickets for what promises to be an entertaining evening.

Dinner speaker Jim Platt

Clive Hallett (META 81), Phone 0044 (0)1233 658254 or email: clive.hallett@scottwilson.com.

OSN's John visits London

JOHN Gardiner (CIVL 69), redoutable contributor to Old Student News, will be visiting the UK from his Oregon alpaca farm in June.

He will be speaking at a CGCA general committee meeting and dinner and would like to catch up with as many old friends and colleagues as possible. Contact Teresa for further information about his trip.

CAN YOU HELP?

***We are intending to carry advertising in* 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.
So we are asking YOU, our readers, to be our salesmen and women and approach your own organisations to generate some interest.
The editors will be happy to follow up your lead if needed.

Please forward all ideas and contact details to Teresa at the Chapter office.

Retired RSMA Secretary writes...

AS HAS been my former habit when visiting Australia, I asked Ron Butler (MET52) whether he knew of any RSM alumni in the Adelaide area. He gave me two contacts: Mike Davey (Min.Tech 55-59) who lives in the centre of Adelaide, and Ian Youles (MinGeo 57-60) who lives at Middleton on the coast east of Adelaide.

In the event, time didn't permit me making contact with Ian, but Mike Davey and his wife, Lois, did very kindly invite me for a drink and a chat in his fifth floor flat in the city centre.

Mike has been retired from Adelaide Brighton Cement for some years now but keeps his hand in with some consultancy work. He's working on a project to produce paper pulp from wheat straw. However, his principal retirement enjoyment is study, and he's now well on the way to getting a degree in history and classics. Mike 's e-mail address is jmdavey@chariot.net.au.

Mike and I overlapped at RSM and it was good to meet again after 45 years. Although our careers were on other sides of the world (Mike went out to Mount Isa after graduating), we discovered that we had had many mutual acquaintances along the way - mainly to do with titanium mineral sands in Western Australia.

I recommend the practice of seeking out fellow alumni to any travelling reader of *Imperial Engineer*. ***John Bramley***

1954 mech engineers reunited

AS THE 50th anniversary of our starting at City and Guilds College was due later in 2004 it seemed appropiate to think about a reunion. So I got in touch with as many people as I could, either through the CGCA or by personal contact. A notice was also put out on the Imperial College alumni website.

I was lucky in that Justin Warwick was back at Imperial reading for a masters degree in the history of technology so he was the on-the-spot adviser.

As a result we arranged to have the reunion lunch in 170 Queen's Gate dining room. We had an excellent lunch and Diana Kelly looked after us superbly.

I would like to take this opportunity to thank all the other Imperial staff who helped with the arrangements.

We thought we might have a similar function in five years time and I would be very pleased to hear from any other members of the 1954 intake. I can be contacted at:
132 Allestree Lane, Allestree, Derby DE22 2JY 01332 559700
email: richard@annewood.fsnet.co.uk ***Richard Wood***

1954 Mech/Eng Reunion From left to right: David Walder, John Taylor (Chem Tech 1953), Geoff Smithers, Barry Jacobs, Keith Ryder (1954 Aero), David Barclay, John Webb, Richard Wood, Chris Gray, Graham Tilly, Terry Steer, Justin Warwick

Get digging with Nigel?

DURING December next there's to be a full archaeological survey at Dufile. Nigel Fitzpatrick is currently one of a team planning this and is interested in hearing from people who might wish to be involved.

You can contact Nigel on n_p_fitzpatrick@yahoo.ca. if you would like to be involved.

In 1965, Nigel was the Secretary of the Imperial College expedition which surveyed Emin Pasha's fort at Dufile which is on the Uganda-Sudan border. Nigel was also excavating at Dufile in December 2004.

RSMA S'TH AFRICA

Another win

RSMA'S winning streak of recent years continued on 10 April in the annual Bottle Challenge cricket match against CSMA. It was held at the Country Club Jo'burg, one of the most idyllic cricket settings in South Africa. It has two very mature trees *actually* in the field of play. It was debatable whether the majority of the players or the two trees were in fact older!

RSMA set about CSMA's attack and reached a total of 144 runs in 21 overs. An undefeated Chris Rule and Alistair Forbes, had 27 each and Mark Button, with 26, slayed the tiring CSMA bowlers around the park.

RSMA bowlers restricted the runs in CSMA's reply and knocked over stumps to leave them with 66 in 21 overs. Best of the bowlers were Mark Cresswell and Chris Rule, but all gave the impression that this was a weekly exercise rather than the annual two overs a man.

Both teams (and the numerous spectators) retired to the, necessarily, well-lubricated post mortem discussions and an excellent 'braai' under more oak trees. ***Chris Rule***

CGCA SYDNEY

New blood and new ideas needed

JIM KEHOE (Mech58-62), Bob Turtle (Chem Eng 49-52) and Bill Macmillan (Chem Eng 58-62) enjoyed the company of former Director of Alumni relations, Peter Mee and his wife Anita at an informal barbecue at Bill and wife Heather's Sydney home on February 10.

The Mees were stunningly tanned and fit after their holiday in Australia.

Sadly, interest in alumni affairs has waned in Sydney. We need new blood and new ideas and to make contact again with those who have changed their email addresses. Please get in touch with either Jim (jpkehoe@attglobal.net) or Bill (macmillanw@bigpond.com) to let us know you are still interested in maintaining links with IC and fellow IC alumni."

We'd also be delighted to hear from anyone at Imperial, now or in the past., travelling to Sydney. We're desperate for more news of the College.

Bill Macmillan