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Dow@Cam is intended to give an informative, light-hearted view of College related events and people.

Front cover:

PD James

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The Master's Voice

It is hard to believe that as I write this, my tenth 'Master's Voice', I have reached the halfway point of my tenure as Master of Downing College. This year we have also been celebrating a far more significant anniversary: a quarter of a century since the graduation of the first Downing women. We marked the occasion with a summer garden party, a delightful event at which we were thrilled to see so many of that first and subsequent years, together with their families – including the first two couples to make Downing marriages!

It is no exaggeration to say that the admission of women was the major change in the structure of the College since its foundation over 200 years ago. When I was elected a Fellow at Downing in 1976, it was my first ever experience of working in a single-sex environment, and I have to admit that I found it extremely unusual. I soon learned that a "Co-Residence Committee" had been established (which had among others Andy Hamilton and Mark Stoneham as undergraduate members) and that vigorous discussions had recently taken place within the Governing Body which had ended in a vote in favour of keeping the College's original Statute 1 which stated, rather unambiguously: "No woman shall be Master or Fellow or Member of the College". So that for a short time was that. However, the debate resumed as more and more men's colleges began to admit women – and indeed Girton began to admit men – and the momentum to reconsider our position grew. Then in 1977, the Governing Body resolved to delete those fateful words from the Statute, leaving the way clear in 1978 for the first admissions offer to be made to a woman. As it so happened, that offer was made by me to prospective medical student Paula Nock, who came up in 1980 with twenty-one other women. The first female Fellow, Dr Jane Weston, was elected around the same time.

As will be clear from the words of some of the women and men at the garden party, those first few years of mixed intake

required a certain amount of adjustment in all sorts of areas; details concerning the evolution of bathroom arrangements have obviously lingered long in the collective memory! Twenty-five years on, with women now making up nearly half the intake each year, it is clear that the College is a rather different place but one that has benefited enormously from the contribution of women members and is now thriving as a co-residential community.

In addition to its high academic achievements, what is and what has been special about Downing, in my view, is its sociability, its social inclusiveness and cohesiveness. The challenge we face today is of course not one of gender but of broadening access more generally, and in this issue we include an update on our work on this important initiative. Our article on Downing graduate Sir Keith Ajegbo and his work on diversity and citizenship in our schools highlights the fact that social inclusiveness at university level is a matter that also has to be addressed throughout the whole of the education system.

Elsewhere in this issue, we focus on two Downing scientists, Engineering Fellow, Bill O'Neill and former Research Fellow, Lucy MacGregor, both of whom work on scientific endeavours with potential to make significant contributions to our industrial and economic society. We are also delighted to include an interview with Honorary Fellow, PD James (Baroness James of Holland Park), to whom we are extremely grateful for her generosity in helping to set up and to fund the Treherne Prize, the annual College award for creative writing.

Finally, at the end of the College year we say farewell to Barry Moore, who has been a Fellow in Economics at Downing and a dear friend for thirty years. We welcome three new Fellows: Kendra Packham, Research Fellow in English, Guy Brown, Fellow in Biochemistry, and Ken McNamara, Fellow in Earth Sciences.



Mixed perspectives

On Saturday 5 July, alumni from 1980–84 assembled for the 25th Anniversary of the graduation of women Garden Party. While old friendships were renewed and children played happily on the lawns, both women and men shared their memories of life in a newly mixed College.



"There were all sorts of funny things like the Fellows worrying about whether the electrics would stand up to hairdryers."

Lydia Jones 1980



"The women had quite an effect. I think it became very quickly a much more civilised place."

Hugh Mercer 1982



"Of course the people who had opposed the admittance of women in their first and second years were the first to go out with the newly arrived girls!"

Gavin Williams 1980



"When we arrived, all the loos had those boxes of greaseproof paper, so we had a petition. And we got soft toilet paper, initially just in the loos on the women's corridors, but then they all had it. It was our greatest achievement and everyone should be eternally grateful."

Joanna Lorenz 1980



"There were separate laundries! I mean, why on earth would we worry about seeing men's underwear?"

Fiona Kenshole 1980



"Having come from a comprehensive school, I felt I could deal with most things. But I wasn't quite prepared for how hearty it was."

Lydia Jones 1980

"One nice thing about being a girl here was that there were so few of us that you didn't have to be fantastically sporty to play in a team. So that brought me into doing things that otherwise it would have been much harder to get into."

Rebecca Kelly 1982

The puzzle beneath the prize

By Sandra Stafford

Consider the clues: a creative writing award that mysteriously changes its name, a deceased academic, and an Honorary Fellowship. One person holds the key. Sandra Stafford went to see the renowned crime writer PD James, to help piece the story together.



The ‘mystery’ was how Lady James had become involved with Downing’s John Treherne Prize for Creative Writing. As one would expect of someone who has made her name in crime fiction writing, she was able to produce plenty of evidence in the form of correspondence between her and the College, dating from her election as an Honorary Fellow in 2000.

In gratitude for her election as Honorary Fellow, Lady James funded a creative writing prize which bore her own name. Three years later, the untimely death of Fellow John Treherne was the catalyst for the name change, even though the prize is still generously financed by Lady James.

“I first met John at an international seminar (held at Downing) for writers and academics from all over the world who were interested in English literature,” explains Lady James. “He was hugely supportive and all the overseas academics who came very much welcomed his contribution. What’s more, he wrote very well, and had he lived there’s no doubt he would have continued. I had great respect for him as an academic and as a human being. He was a remarkable man; I’m delighted that he should be commemorated by this prize and delighted, too, to continue to fund it.”

Although PD James is not on the panel of judges, she takes an



extremely keen interest in the writers and contributions selected for the prize. “All the entries [for the 2007 competition] were very impressive,” she says, as she leafs through the manuscripts. “Anna Marsland’s short story, in particular, is extremely accomplished,” she adds. “Obviously, a good short story is very different from a good novel. In a novel you have scope particularly to expand your characterisation, to set the scene at greater length and to hold together the different aspects – plot, characterisation, theme – in unity, because you have the space to do it. A short story is rather like an arrow: it drives straight to the point. Anna’s entry is exactly what a short story should be. It’s clever. It’s highly individual. And it doesn’t owe anything to anybody else.”

Encouragement

Since her first novel was published in 1962, Lady James has won many awards herself and has been chair of the Booker judging panel. So what, in her opinion, is the purpose of literary prizes? “Well, I think their chief importance is that they do create public interest in creative writing, and they give publicity to good writing. They encourage new and, often, young writers. Aside from the money, it’s important to have won a prize. Even to have on your CV that you won the John Treherne Prize for Creative Writing says something.” Whilst acknowledging that literary prizes, especially the very public ones, do have their detractors, her verdict is that they are a valuable way for a community to say that it values its new literature. A literary prize “gives more pleasure than pain,” she says, having weighed the matter carefully, “which in the world as it is at the moment is a good thing in itself.”

Ambition

Despite an early ambition to write, the opportunity didn’t fully materialise until Lady James was in her late 30s. Her debut novel, *Cover Her Face* (introducing the character Adam Dalglish), was accepted by the first publisher she sent it to. Eighteen novels and two non-fiction books later, a high percentage of her work has also found its way to the small screen.



Lady James with Lawrence Collins and Quentin Blake on her election to an Honorary Fellowship in 2000.

But finding her literary feet was something she did very much on her own. “Of course, my family were supportive of me writing,” she says, “but I didn’t have any help. I didn’t go to any classes. I didn’t have a correspondence course. And I have never let *anybody* read my books before they are finished, so there was no one helping me with their progress. But we’re all different. That’s just how *I* work.”

There was tutoring, however, in the form of reading other novelists, notably from Jane Austen – “she taught me a great deal about irony”, Graham Greene – “he deals with a religious dimension in life that is important to me in a novel” and Evelyn Waugh – “one of the great stylists of his generation; he taught me so much about dialogue.”

Success

Now in her late 80s, Lady James has an enviable reputation as a popular and successful writer worldwide. Pausing to consider the advice she can pass on to aspiring novelists, she says: “I tell them that first of all they must increase their word power because that’s the raw material on which we build our craft. Second, they must *write* rather than keep saying that one day they will. It doesn’t matter *what* you write – but write. For instance, if you see something while you are out on a walk and you find the right words to describe it, then put them down on paper. Always have a notebook with you. Don’t lose those words. Third, read other people widely – not to copy them but to see how it is done. One learns from this. The last thing I would say is to go through the world with all your senses open to

The John Treherne Prize for Creative Writing

Each academic year, PD James funds the John Treherne Prize for Creative Writing with prizes of £500, £250 and £100 respectively for 1st, 2nd and 3rd prize. Entries in the form of poetry, autobiography or fiction with a maximum of 3,000 words are invited from undergraduate members of Downing College. In 2007, the winners were Amy Russell (1st) for her selection of poems, Anna Marsland (2nd) and Tom Ash (3rd), both of whom wrote short stories.

Books by John Treherne

John Treherne was a Fellow of Downing College for many years. In addition to his work there, he also wrote a number of books, including the following.

Non-fiction

Dangerous Precincts
The Galapagos Affair
The Strange History of
Bonnie and Clyde

Fiction

The Canning Enigma
Mangrove Chronicle
The Trap
The Walk to Acorn Bridge

experience and realise that everything that happens to a writer is very important; nothing is ever lost.”

Lady James acknowledges, too, the role of a good editor in a successful title. “I had a very good and perceptive editor,” she says. “She would make suggestions and we’d argue them out.” She recalls with much amusement how, in one of her novels, she had included a detailed and heavily researched description of a stained glass window, with which she was rather pleased. Her editor, however,

didn’t think it fitted, so reluctantly Lady James allowed it to be axed. A couple of books later, the same editor enquired, “Where have I met this stained glass window before?” “I’d gone to a lot of trouble to write this description of the window. So back it came!” She laughs. “And this time it stayed.”

It would be an understatement to say that Lady James is fascinated with words; it goes beyond that. Words and the written form are all-consuming, part of her core. Her eyes

light up when she talks about authors, books, poetry, words, genre, and the profession of writing. What’s more, she is a warm and giving person – generous with her time and thoughts. “That said,” she emphasises, “I can only talk about how I do it.” Then, with formidable energy, she turns her attention to work again – and one gets the impression that her work is never far from her mind.

The Private Patient, a new novel by PD James, was published by Faber and Faber on 4 September 2008.

The writer and the prize

One of the awards in the 2007 John Treherne Prize for Creative Writing went to Anna Marsland for her short story, ‘*Speranza di Morte*’. Anna, who was in the second year of her English degree when she won, tells the story behind the story.



“I’ve always enjoyed writing and done bits and pieces in my spare time. Mostly that’s been theatre stuff, and a bit of poetry. But when I saw the little notice about the Treherne Prize, I was quite tempted by the idea of writing a short story. And it was something to take my mind off exams!”

The competition rules give guidance on word count but free rein on subject matter. “That was actually quite difficult at first,” says Anna. “But I’ve always been interested in Italy, and as part of my course I chose to do Italian literature. I really like Dante, so I picked a line of his about

apathy. I also wanted to write something that was northern, so I set it in a northern pub. So ‘*Speranza di Morte*’ [‘The hope of death’] is about an ordinary family man living an unexciting life. He dies in the pub and ends up, supposedly, in a level of hell, but it’s exactly the same as where he’s been living.”

The Italian–northern connection is in fact forged from Anna’s own experience – her home is in Lancashire (the setting for the ‘northern pub’) and she has Italian relatives with whom she has spent time in Italy. “It’s just an interesting juxtaposition,” she says.

Anna’s prize money has already been put to good use, helping to fund her place on a course at the National Youth Theatre. With her passion for theatre, Anna is in her element at Cambridge and has already directed four plays here, including *All the Ordinary Angels* at the ADC. “It’s quite a new play by Nick Leather,” she explains, “It’s set in Manchester but it’s very light-hearted rather than stereotypically northern – like *Kes* or *Shameless*. And it’s about Italians in Manchester who run an ice cream business!”

Access ability



As the remnants of the May Week festivities are cleared away and the last undergraduate is signed out for the summer, the College draws breath and prepares to welcome some forty sixth-form students from the South West of England for two intensive days of talks, tours and forays into the town. It is eight years since the first South West Residential Open Day; time, perhaps, to look back at what eight years of access initiative has achieved.

The Schools Liaison Project was launched in 2000 with the aim of increasing access opportunities for bright students from schools with little or no tradition of making applications to Oxbridge. In those days, Cambridge applications from the South West trailed at the bottom of the area table, together with Scotland and Northern Ireland. The first full-time Access Officer was appointed in 2002 to visit schools in Dorset, Devon and Cornwall, talking to both pupils and teachers about applying to Cambridge.

Downing undergraduate Dan Chapman, reading Natural Sciences, remembers the visit to his school by Access Officer Katie Childs: "She came up to visit our school and gave us a talk about Cambridge and said normal people can go there too! I hadn't really thought about Cambridge before that – hadn't even considered it." The Residential Open Day clinched it for Dan. He applied, was offered a place, threw himself into College life and has this year been elected JCR President.

Jim Cannon also remembers how Katie's visit to his comprehensive school in Launceston in Cornwall persuaded him to change his view of Cambridge as an expensive place full of private school kids, and encouraged him to apply. "Once you're here, it doesn't actually matter what school you come from at all," he says. "I don't think I'd have met such a broad range of people had I gone to another university either. It's just a really special place and it's something that's worth being part of." Jim has now graduated with a degree in Natural Sciences, and this summer has taken up the post of School and College Liaison Officer.

Jim is looking forward to embracing the challenge and is under no illusions about the nature of the task ahead. "You get a lot of myths about Oxford and Cambridge," he says, "and teachers can be worse than pupils for having misconceptions. At one access event I did, a teacher said to me, 'How are you finding it? Because you're from a state school and there's only 20 per cent of people here from state schools.' I told her that it's nothing like that at all – it's over half, if truth be told. And she couldn't believe it!"

But it does appear that once a school has sent a student to Oxbridge, there is a 'knock-on effect'. "Once they see someone from their school who's done it and had a great time, it becomes more real and it becomes feasible," says Jim.

Admissions Tutor Paul Millett agrees, and says that all the evidence shows the scheme is bearing fruit: "The results to date have been impressive. Last year Downing alone received some twenty-three applications from targeted schools, seven of whom received offers of places. Since we aim to raise the profile of Cambridge in general, not just Downing, it is also worth noting that other Colleges report an increase in applications from the South West. This is encouraging in that, once applications have been made to the College, all candidates are treated on an equal footing, without any fear or favour. In light of recurring assertions to the contrary in the national press, that cannot be repeated too often."

So as Jim packs his bags and takes to the road, the Access South West success story continues.



Jim Cannon

Development Office

Hall transformation takes effect

Slowly but surely the Hall is being transformed. The walls have been repainted, a new sash window has been installed at the west end, and the Downing shield has been moved to its new location above the window. A temporary wooden floor has been put in place whilst students and guests continue to use it. Sections of wall are screened off behind which the detailed intricate redecoration work is taking place.



The new oak dining furniture has also arrived. Designed and built by Roger Lloyd Partnerships the chairs and tables come complete with brass discs engraved with the names of the members who have kindly helped to fund the restoration through their generous donations.

119 chairs have been renamed as well as many tables.

In excess of 100 limestone floor tiles have also been named and we expect those to be engraved and put in place at the end of the project which is scheduled to be December 2008.

Of the £1.17m donated, £953,158 has now been received by the College and the rest of the donations are expected in instalments over the next few years. This has been a tremendous project involving 734 alumni and it is very pleasing for the whole College community to see this long-awaited restoration becoming reality.



Howard Theatre

Construction of the Howard Theatre is proceeding extremely well and at the time of writing is seven weeks ahead of schedule with much of the external structure completed. The topping out ceremony is scheduled for 16th March 2009 with the trustees of the Howard Foundation including Dr Alan Howard (1948), Jonathan Howard (1974) and Sir Anthony Grant expected to attend as special guests.

Endowment Campaign planning

Plans for Downing's £20m endowment campaign continue to develop with the help of alumni.

It is vital for the College to strengthen its endowment to make sure that it remains strong into the future and able to adapt to changes and opportunities as they arise.

Mays Wild Fund for the Natural Sciences

The Fund currently stands at £497,514, just short of its target of £500,000. Dr Rachel O'Reilly, the Mays Wild Fellow Research Fellow in Chemistry, who came to Downing in 2005 has been offered a position at Warwick University and will shortly be leaving us. She has been a great first Mays Wild Fellow and will be missed by everyone at Downing.

The Annual Fund

Many of you will have received a copy of Downing's new Annual Fund leaflet over the summer. This initiative is intended to seek alumni support for the essential services that the College provides to its students, teachers and researchers such as study grants, student support funds, gym equipment and funding for sports teams. In short, all of the things that make the College a community. Income from the College's endowment funds would normally be used to provide these services and, by giving, alumni are helping to relieve pressure on the endowment and are thus helping our long-term objective of

strengthening it. To date members have given over £41K to the 2008-09 Annual Fund with alumni from the 1958 year being the most generous givers and the 1994 year providing the highest number of donors.

Thank you to all who have donated.





John Fletcher Hawkins (1952)



It is with great sadness that we report the death of John Fletcher Hawkins (1952), Chairman of the Mays Wild Committee for the Natural Sciences and a former member of the College's Campaign Board. He was also a Year Representative

and a generous benefactor not least to the Mays Wild Fund for the Natural Sciences, an appeal for £500,000, which he led and which was on the brink of reaching its target when he passed away.

John died in June 2008 at the age of 76 after a long illness. During his life he had an illustrious career in industry including at Alcan Aluminium where he worked on heat resistant alloys for Concorde. He was also associated with the Royal Aerospace Establishment (RAE) at Farnborough jointly receiving the Queen's Award for Technology with them for the development of aluminium lithium alloys for Eurofighter and Airbus.

A full obituary appeared in the 2008 edition of the Downing College Association Newsletter.

Staff News

We are delighted to report that Helen Limbrick, Development Officer, married Gareth Machin on 23rd August 2008. Her new name will be Helen Machin.



Photo by Ryan Jarvis Photography

We are delighted to announce that Sara Brinkley, Events Co-ordinator, who took maternity leave in August, gave birth to a little girl on 4 October 2008. Phoebe Elizabeth weighed 6lb 9oz. Warm congratulations to Sara and her husband, James.

Serena Fidgett will fill Sara's role until she returns. Serena has had extensive events organisation experience in the private corporate sector and recently moved to Cambridge from London.



Our best wishes go to Helen and Sara and we warmly welcome Serena to the Development Office team.

Downing sculler Annie Vernon wins medal at Beijing Olympics

Annie Vernon who read History at Downing from 2001–04, continued her glittering rowing career by gaining Silver in the quad sculls at the Beijing Olympics. Annie came to Downing from Wadebridge School in Cornwall, one of three counties with which Downing has a special relationship for widening participation.

Annie took a 2.1 in History whilst taking part in rowing at the highest University level. She was in the 2003 Women's Boat Race crew competing against Oxford.

Downing's earliest Olympic participant was Rex Salisbury Woods (matriculated in 1911) who represented his country in the shot-

put in both the 1924 Paris Olympics and the 1928 Amsterdam Olympics. He stayed closely associated with University sport throughout his life whilst practising as a G.P. in Cambridge.



Service game

As a keen tennis player and former junior Wimbledon competitor, Sir Keith Ajegbo's retirement dream included sauntering down to the All-England Club to enjoy large helpings of the Wimbledon fortnight action. As things turned out, his diary was full of commitments in other parts of the country and he had to content himself with one afternoon at the men's final.



Shortly before retiring from school headship in 2006, Sir Keith was asked to lead the writing of a report on diversity and citizenship in the curriculum by the Secretary of State for Education. The report was published in January 2007, but Sir Keith has found himself still very much in demand, advising government on diversity and citizenship, and training school leaders across the country.

The long game

His considerable experience in this field is drawn from his pioneering work in an inner London comprehensive – a school that was transformed under his twenty-year leadership. A failing establishment in a socio-economically deprived area, with thirty or forty different languages spoken and no pupil managing even five GCSEs – this was no task for the faint-hearted. Today, however, Deptford Green

is a thriving, oversubscribed school where children's progress is measured as being in the top 5 per cent in the country. But it was a long game. Sir Keith wonders whether it would be allowed to play out in today's system: "Nowadays in education you're under much more pressure because there's a very quick turnaround, with heads leaving if they don't get fairly instant results. But this was a slow process. I think we had the opportunity, in a slightly more gentle age, to work with people to support them. We were a bit easier perhaps, not quite so target-driven. And that enabled us to build quite a gentle ethos in quite a tough place."

Reflecting on the process that led to this remarkable achievement, Sir Keith talks about the importance of creating an environment where children can learn –

and central to that, he believes, is the quality of the relationships. "The thing we concentrated on," he says, "was respectful relationships between adults and between adults and children. You do everything in your power to create those relationships. To do that, you also have to have very clear parameters. So we said, for example, it's perfectly possible for you to disagree with a teacher, but if you disagree then you have to say so politely." Rules were, of course, unswervingly enforced.

Power play

Much of the first few years was spent dealing with the massive changes to the education system wrought through the introduction of Ofsted, league tables and the National Curriculum. Then in 1998, David Blunkett launched a new initiative in citizenship education. Sir Keith



remembers reading the report and thinking that it might have something to offer their students. "If you live in SE14 you're not going to achieve the glittering heights, so you feel what's the point? So our hypothesis was, if you gave them more of a voice in what was going on, you might empower them and they might feel more motivated to do things and change things." Feeling that this should be something more than a token school council, the staff set about finding innovative ways to develop the student voice. They invited an adviser from Save the Children to come and work in the school, and together they developed students' involvement with the local community, getting them engaged in various activities from presenting ideas to local politicians and councillors to petitioning for better lighting in a local alleyway. As a result, Deptford Green became one of the first schools to offer citizenship as its specialism. "It was intensive work," says Sir Keith, "but the kids felt they were taken seriously."

Another fruitful external link was the one-to-one mentoring scheme set up with the investment bank, UBS, whereby employees talked to pupils about their progress and possible careers. The scheme is still going strong, and research by the University of Warwick showed that in successful pairings, it increased the child's desire to stay in education and made a difference to their exam results.

As he talks about the school's success, Sir Keith is keen to acknowledge the part played by his senior leadership team, many of whom were with him for more than ten years. But it is clear that his

personal contribution has been substantial and that a special combination of background, experience and perspective has helped to make the difference.

Advantage Ajegbo

Born on a south-east London council estate, the young Keith began life in rather different circumstances from those typically enjoyed by life's great achievers. His Nigerian father left when he was six months old, leaving him to the care of his white family and with little contact with black people. He was fortunate, however, to have the opportunity at eleven to go to Eltham College where he excelled at tennis. Encouraged by a supportive teacher, he won a place at Cambridge. He enjoyed his time at the university, although found himself once again in a racial minority.

After graduating with an English degree he went into teaching, initially, he says "with no particular sense of mission". His first teaching post was at a grammar school, and this he feels was significant because it gave him a clear view of what children are capable of. "I think one of the problems for people who come into schools in challenging inner city areas, is that they don't know what children can achieve. So expectations can be dampened," he observes.

So Sir Keith has seen life from both sides of various divides, and has done a lot of reflection on how this very mixed mixed-race experience has affected his work in education. He believes it has conferred a certain advantage: "I think I see the world from the perspective of someone who has multiple identities – so I do have lots of

sympathy with the journey that kids have to make. And I think how unsympathetic people can be sometimes."

Now he has the opportunity to share that perspective with a wider audience, but he says that for the first few terms he really missed the "labour of love" that this school had become: "It's all of those kids who you have a relationship with – which is quite formal on the one hand because they know you're the head, but beneath that formality it was always quite fun. So most days were really quite pleasant and most days you had some amusing interactions. Often it's silly things – like the boy in the late queue. I asked him, 'Why didn't you get to school on time?' and he said, 'I had to do my hair.' Well he did have a rather baroque hairstyle. Talk about breaking stereotypes!"

Sir Keith now devotes much of his time to initiatives that came out of the citizenship and diversity report such as the Schools Linking Network, which aims to encourage and facilitate schools across the country to come together online to work on curriculum projects. The project is very much in line with his conviction that citizenship can only become meaningful by starting where children are, and building relationships with those around them. "There are no 'answers' as such," he says. "Different bits of the country are very different places. But in terms of the curriculum, it's about trying to build those links between the local and the national identity. Kids can't go from being confused about their identity to being global citizens; there's probably got to be quite a complicated journey – and it's got to start with where they are."

Biography in brief



Sir Keith Ajegbo came to Downing in 1966. As well as reading English, he was captain of the University tennis team. After a PGCE at Nottingham, he taught at a grammar school in Middlesex for three years and then at several inner London comprehensive schools before taking up the headship at Deptford Green.

In April 2006 he was asked to lead the writing of a report on Diversity and Citizenship in the curriculum by the Secretary of State for Education. This was published in January 2007. Now retired from teaching, his current work includes advising the government on Citizenship and diversity, training future headteachers on the Future Leaders Programme and chairing the steering group for the new humanities diploma.

Sir Keith was awarded an OBE in 1996 and a knighthood in 2007. He is married and has a daughter and a son.

Local hero

As the virtues of local production and supply become increasingly apparent, the 'locally grown' label is popping up in restaurants and supermarkets all over the country. But we don't have to stop at fruit and veg, according to Downing Fellow Bill O'Neill.

Picture the scene: a day in the not-too-distant future. It is the day, you have decided, for a new i-Pod (or 2020 equivalent). You go online, you select the model that best suits your needs and pocket, then you download the specification to your home laser 'printer'. In a short time, you pick your freshly printed i-pod from the machine, perfectly formed and ready to use. The 'Santa Claus machine', as Bill fondly refers to his pet idea, is a bit of domestic kit that can take information and use it to grow all manner of manufactured goods. 'Growing', he explains, means simply that the product is built up, layer by layer: "You start off with a computer description of the object, then you have something like an 'electronic bacon slicer' that will slice that object into very thin layers. The instructions for those layers are then sent to the laser, which can fuse metal powder or transform liquids into solid plastic, layer by layer. The technology enables us to grow very complex three-dimensional objects, very simply."

Futuristic and far-fetched? Possibly, but then the techniques are already being used in some areas of high-value manufacturing, such as biomedical devices, and it's the same technology that already enables some sports shops to grow a sports-shoe insole which is perfectly matched to the geometry of your foot.

Application, application, application

Although he enjoys 'bench physics', Bill has always got his scientific kicks from exploring possible applications. He remembers becoming excited about the potential of lasers while watching a TV programme at the age of 12. This early interest led to a degree in Applied

Physics followed by research into high-power laser technologies, focusing on the potential for industrial purposes. One of the advantages of laser technology is that it interfaces well with computers, and that offers the possibility of using CAD to instruct lasers to build 3D objects. By the mid-1990s, Bill and his team at Liverpool University had developed techniques that allowed them to grow metallic objects; the challenge now lies in creating a system that can grow multi-material objects – specifically from metal, plastic and semiconductors. If you have these three constituents, you can build almost anything. To get to grips with what is now essentially a materials-science problem, Bill's 20-strong Cambridge research team collaborates with five universities and 30 companies.

These developments are not simply a matter of convenience. The Santa Claus machine may sound like the ultimate home-shopping experience, but behind it lies a concept that could have a profound and – Bill believes – beneficial effect on world economics.

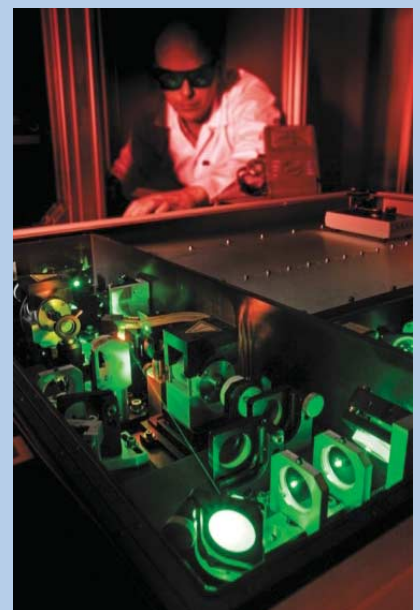
Revolution – the hole story

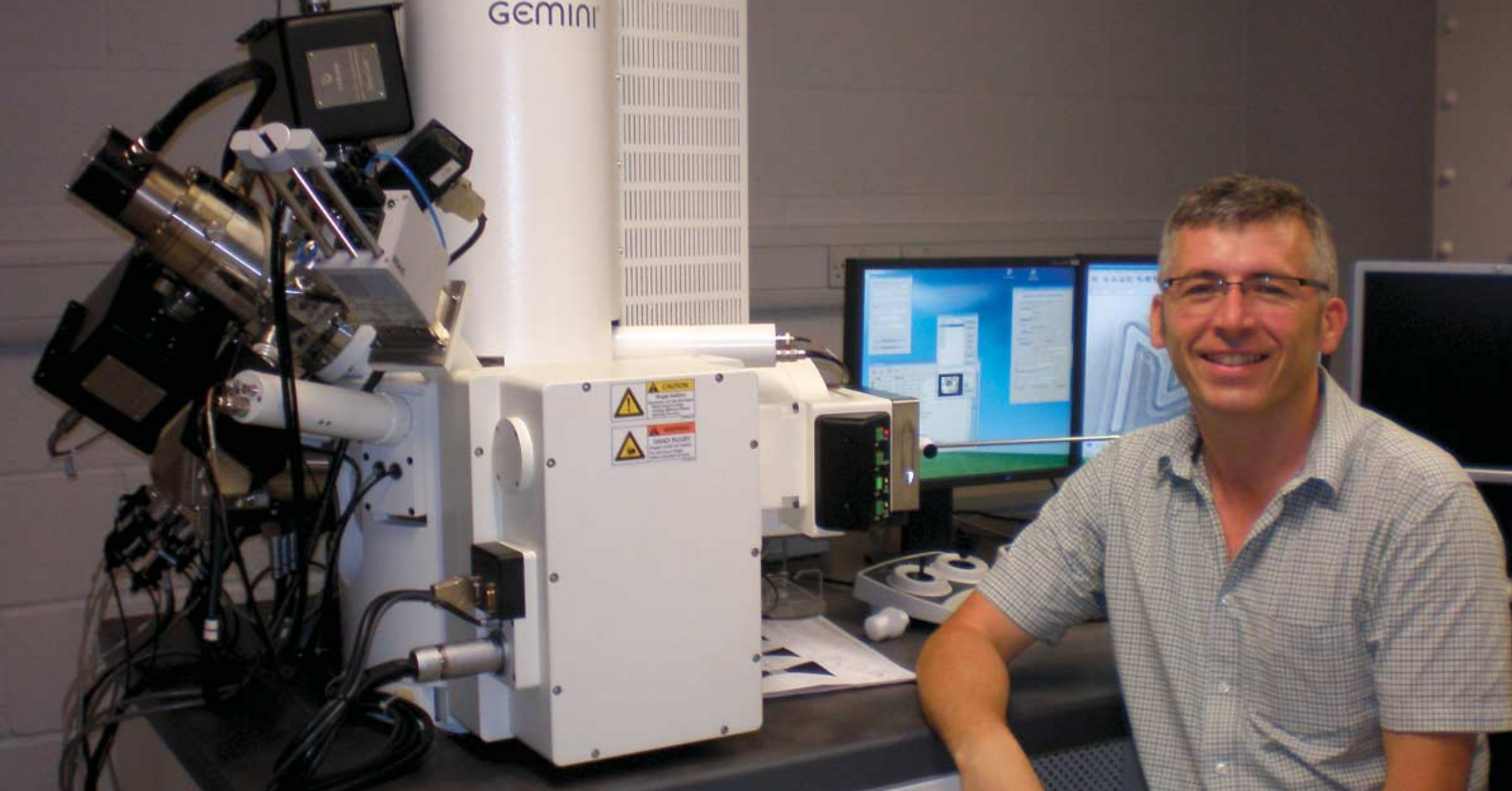
"Essentially," says Bill, "the digital economy is based on looking back at the seventeenth century and at the very local manufacturing base of the UK. You had your local suppliers – the weavers, the artisans, the blacksmiths – probably sourcing components from not very far away. So the idea is that in the future, designers would offer their design services rather than the product provision. You would buy the information remotely then use your local machine to construct the object when you wanted it, without having

large factories in China making millions and sending them by ship around the world."

The 'local' machine in this scenario would likely be a five-million-dollar factory somewhere in the same country as the purchaser. But compared with the five-billion-dollar factory somewhere in the Far East, it is both local and cheap.

"We're trying to get away from the Victorian concepts of engineering, wonderful though they are" says Bill. "If you want to drill a hole, for example, you have to buy a machine that holds a drill bit, you have to buy a drill bit of the right size, you put it into the machine and you remove a piece of material to produce the hole. With our technology you actually grow the material around the hole, without any tools or extra features. So actually it's a very high-cost structure for a very low-value feature – a hole."





And round again

But hang on. Isn't this easy, flexible production system simply going to pander to the 'throwaway society' and exacerbate problems of waste and over consumption? "Ah!" says Bill, "There is that danger. And in order for this technology to be accepted in the twenty-first century – which is all about sustainability and controlling of resources – we have to provide a way in which we can take the original components and reduce them to their original state. So we have to build something accurately enough to be a functioning object, but we also have to be able to initiate some kind of process where we can ask the material to decompose. Then, hopefully, we can put it back in so it comes out as a new object when we want the i-Pod mark 2, or whatever. Now that's a really big challenge. But we like to have big ones!"

To explore the applications of these new techniques, Bill and his team have forged links across all sorts of sectors – from working on fabric design with the Royal College of Art to creating low-volume, titanium-based components with the aerospace industry. He also expects to see the first applications in the biomedical sector moving into commercial production before the end of next year.

Bill observes that creating these relationships has almost certainly been assisted by his move to Cambridge in

2003: "It's just easier to get company attention if you've got this brand behind you." Moving from Liverpool was no mean feat. Bill brought with him, in addition to half a research team, "some pretty heavy systems" for which the engineering department didn't really have space within its existing provision. Space was procured, however, on the Trinity Science Park, with the result that Bill now has to divide his time between three offices, one there, one at the Engineering faculty and one at Downing. "I'm probably a bit like a quantum oscillator," he says, "never quite at any one of the locations but somewhere in the middle – and I spend a lot of time on my bike."

He says that the oscillator effect is more than compensated for by the opportunities for collaboration, not only with external agencies but with Cambridge scientists in other fields. In one such collaboration with colleagues in chemistry and materials science, he is currently exploring the incorporation of bio-materials in this new technology. This, he says, "might just be the key to producing systems that can transform or reconfigure themselves at the end of their lives."

Cambridge has also given Bill the chance to fulfil another ambition: to give manufacturing a better image. He describes how teaching undergraduates in the manufacturing division gives him the perfect opportunity: "I don't really like

talking about machine tools – I find those very boring! I try to give them an insight into what engineering could lead to. I want to demonstrate to the world that manufacturing is actually far more interesting than people believe. It's a really exciting opportunity to create new means of production and it can help every industrial collaborator in every sector."

Biography in brief

Bill O'Neill gained a BSc in Applied Physics at Essex University in 1985 followed by a MSc in Laser Physics in 1986. Following a PhD at Imperial College, London, he spent 15 years developing one of the world's largest laser research groups at Liverpool University.

In 2003 he came to Cambridge and established the Centre of Industrial Photonics, and in 2006 was elected a Fellow at Downing.

Bill says that in his 'spare time' he runs a business that develops control and monitoring systems for industrial laser users and can often be seen jetting off to the beach to kite surf. This may be because Cambridge, excellent as it is for many things, is not such a good place for indulging his enthusiasm for watersports.

A geo-logical move

Downing graduate and former Downing Fellow, Lucy MacGregor was entirely happy in her work as an academic. But as the commercial potential of her research in marine geophysics became apparent, she found herself moving into uncharted waters.

When Lucy MacGregor first started submitting her idea to conferences, she got a less-than-enthusiastic reception. “It was a new theory and no one really knew what to make of it,” she says. “So we were always given the last slot on the last day of the conference, in a session of wacky things that no one was particularly interested in, and we would always be in the basement lecture room with the flickering light.”

She admits, however, that it was the sheer wackiness of the idea which drew her to the work in the first place. She was casting round for a PhD focus, and her supervisor suggested that they might try dangling a piece of wire off a ship, passing a current through it and

then measuring the resistance to the current in the sea bed. They would then use the resulting data to build up a picture of magma chambers in volcanoes on the sea floor. Did Lucy have any inkling then about where it might lead? “Not at all,” she says. “It just seemed like such a way-out idea that we had to try it. I did it because it was fun.”

Because the procedure was largely untried, it was as much about developing equipment as ideas. Lucy says that the first thing she did as a PhD student was to go to a field in Wales and build a transmitter which was then loaded onto a research ship off Barry Island. She remembers the very hands-on process: “It involved a

lot of sticky tape and it broke down regularly. I don’t know how many times we had the thing apart on the cruise. It’s interesting working at sea. When things are going right, it can be very boring, but then boring is good. When things go horribly wrong, it takes a certain mindset to say, right, well let’s just get on and fix it. And you just have to fix it with whatever’s around. So an awful lot of interesting design goes on!”

Sea change

For all the homespun equipment, the technique worked well and the team recorded a slow-spreading ridge magma chamber on the mid-Atlantic ridge – the first one ever found. From there, Lucy went on to explore other

Biography in brief

Following a first degree in Natural Sciences (1993), Dr Lucy MacGregor stayed on at Downing for her PhD in Marine Geophysics. She then spent a brief period at the Scripps Institute of Oceanography before returning to Downing as a Research Fellow. In 2000 she became an NERC Research Fellow at Southampton University’s Oceanography Centre. In 2002, she founded OHM with Prof. Martin Sinha, and the company moved its Head Office to Aberdeen in 2004.

While at Downing, Lucy sang in the Chapel choir and in a quartet specialising in early choral music. Although no longer within cycling distance of each other, ‘Erasmus’ still get together to sing and give concerts whenever possible.



ridges in more exotic locations such as the waters near Fiji and the Azores. As she says, the advantage of working on that kind of volcanic system is that “you get to go to some very nice tropical islands!”

Lucy emphasises that the technique, known as Controlled Source Electro-Magnetic imaging (or CSEM), is a complement to more established methods using seismic data. These are helpful because they tell you about the structure of the earth – the shape of the strata, where the faults lie, and so on – but they can’t tell you about any fluids that may lurk within. With CSEM on the other hand, you can detect fluids, which might be magma and hot water – as in the case of the volcanic ridges – or hydrocarbons – in other words, oil and gas.

By the late 1990s, the team at Southampton University with whom Lucy was now working had been approached by two major oil companies about the possibility of using the technology for hydrocarbon detection, and they had to work out how to respond to the commercial opportunity. “What became very clear very quickly,” says Lucy, “is that if you’re going to operate commercially, then an academic environment is not what to do it in. So eventually we formed a company, Offshore Hydrocarbon Mapping, and ran it out of the university. All three of us hung out in one little office in the corner of the Oceanography Centre.”

Seismic shift

That was 2002. Just six years later, OHM is a fully industrialised operation with two data-acquisition ships, headquarters in Aberdeen as well as offices in Houston, Oslo, Kuala Lumpur and Dubai, and a technology that’s well on the way to being adopted by the conspicuously conservative oil industry as a “standard bit of the geophysical toolkit”. In 2004 OHM was floated on the AiM market of the London Stock Exchange, and in 2007 it acquired Rock Solid Images, a company specialising in seismic analysis. Lucy explains why this was a significant step: “It gives us the seismic expertise and the logging

expertise, so that what we can offer is an integrated interpretation approach. We take all the information that’s available and come up with a geophysical model of the earth that’s consistent with all the parts, which we hope gives a better result. And this has huge implications in oil exploration. It’s still the case that two out of three wells are commercial failures – which is a lot of very expensive holes in the ground. We can’t make it perfect with this approach, but what we hope we can do by integrating the different data types is improve the likelihood of success, or de-risk the drilling exploration process.”

Optimising oil production

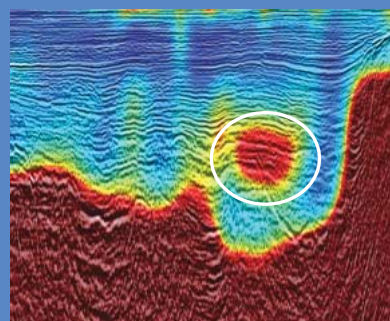
As OHM’s Chief Scientific Officer, Lucy takes charge of the research group, whose aim is now to develop intelligent interpretation capabilities to allow them to work in ever-more complex geological environments – “because the earth is a pretty complex place”. She also sees potential in moving the technology from working purely in exploration to assisting the production phase of the oilfield life cycle in order to get the most out of the existing fields rather than finding new ones. As she says, “that’s going to become more important in the future as it becomes harder and harder to find new oil.”



Lucy also enjoys being involved on the commercial side and spends quite a lot of time “flitting between offices and between clients” – which in this business means flitting between continents. She still gets to attend conferences, but is thankfully no longer consigned to twilight sessions in the basement. “These days we’re on at the start, with a full audience and standing room only. It’s been extremely satisfying to see this funny little technology being used and making an impact. When I started, I was regularly told by people to stop wasting my career on this stupid idea, so it’s nice to be able to go from that situation to this – where it’s the hot thing!”

Improving the image

In a CSEM survey, a series of electro-magnetic receivers are positioned on the sea floor in an area of perhaps 100km². A high-powered electro-magnetic source – in this case, an electric dipole – is towed over the receivers, emitting a low-frequency signal. As the signal passes through the layers of the sea floor, it meets different levels of resistance. These changes are recorded by the receivers and subsequent analysis of the data builds up a picture of the constituents of the earth from a depth of a few tens of metres to several kilometres.



Circled area shows a high resistivity zone coincident with a seismic structural trap – giving an indication that hydrocarbons may be present.

London Alumni Reception



Tuesday 4 November 2008

The Royal Automobile Club
89 Pall Mall
London, SW1Y 5HS

Around 200 alumni attend this very popular drinks reception. The event is an ideal opportunity to meet up with fellow Downing alumni working in London.

This year's Reception to which you are most welcome will be held on *Tuesday 4 November 6.30–9.00pm*. Please contact the Development Office on 01223 334850 or email development@dow.cam.ac.uk by *Friday 17 October* if you would like to attend.

Alternatively you can book online at www.downingcambridge.com

EVENTS CALENDAR 2008–2009

Tuesday 4 November 2008 6.30–9.30pm

London Alumni Reception
RAC Club, 89 Pall Mall, SW1Y 5HS

Wednesday 10 December 2008

Singapore Alumni Reception

December 2008 TBC

Downing City Group Reception

28 January 2009

Year Reps Meeting and Dinner

31 January 2009

Griffins' Annual Dinner

Spring 2009

Paris Reception

Saturday 14 February 2009

Hall Donors Event

Saturday 28 March 2009

Annual Reunion Dinner

Saturday 16 May 2009

2002 MA Reunion Dinner

May 2009 TBC

Cambridge Reception

Saturday 13 June 2009

Donors' Garden Party

Saturday 13 June 2009

1956 Reunion Dinner

Saturday 20 June 2009

1961 Reunion lunch

Thursday 25 June 2009

Reception for 2008 Graduands

Saturday 25 July 2009

1749 Society Reception

Saturday 26 September 2009

Alumni Day and Association Dinner

**Please note that the information above
may be subject to change.**

For further details on any of the events listed, or to find out what else is happening throughout the year, please visit the Development Office website www.downingcambridge.com or contact Serena Fidgett in the Development Office on 01223 334850 or email sf395@cam.ac.uk



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