DOW@CAM

THE DOWNING COLLEGE MAGAZINE / VOLUME 25 / WINTER 2013–2014

From the Master 2014

On being admitted to Downing on 1 October, I became my own sixth Head of House, after three in Oxford and two in Cambridge. I have often wondered what being a Master is like, but only recently have I aspired to find out. I do not yet have a succinct answer, but the position is totally occupying and very fulfilling. The Downing community has accorded Rosine and me a very warm welcome for which we are deeply grateful.

Barry Everitt has passed on the Mastership of a College in full swing. Forty-two new students were admitted this week to the rank of scholar, in celebration of their academic achievements. Of our many fine sporting achievements, the victory in rugby cuppers and the drama on the river in the last two days of the May Bumps will remain long in our collective memory.

Many of you watched the fine performance of our University Challenge team, and will join me in congratulating them on their first-round victory. As I have been saying around College, there is no fundamental contradiction between excellence in sporting and cultural activities, and academic distinction. This theme was picked up by Jeremy Paxman in his introductory "Let's see if the Downing team is as good at general knowledge as it is at frisbee". Fortune was less favourable in the second round, but the defeat was noble.

Barely have the new students of 2013 arrived in College, than we begin the assessment of the 2014 round of 730 applicants in competition for about 130 places. We will make offers based on performance in interviews, examinations, and admissions tests. The admissions process is a complex affair with a multiplicity of interlocking constraints not all of which are under our control. That said, we aim always to admit those who will benefit most from education in Cambridge.

The College is undergoing four linked renovation programmes which, when complete, will see our students accommodated better than ever since our foundation. The houses at 40/42 Lensfield Road were restored over the summer, on schedule and within budget. D Staircase is currently under wraps, and that will be followed in the New Year by major improvements to the services of the Howard Building. The fourth project is First Court and Parker's House, which, as alumni may be aware, will be converted to provide on-site accommodation for 77 graduate students.

When these extraordinary works are completed, almost all our resident students will be housed within the historic site of the College. Admittedly, it was already thus when the Boat Club was founded in 1863, with all 25 or so undergraduates reported as living on the Domus. The first three projects have been made possible through the magnificent support of our friends and alumni, and fundraising for First Court and Parker's House is getting under way.

I am looking forward to meeting more of you on my forthcoming travels around the UK and further afield. The Downing community is strong across the generations, and I am eager to experience that at first hand.

Professor Geoffrey Grimmett,
Professor of Mathematical Statistics

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Professor Nick Coleman in the Roof Laboratory, Department of Pathology

Image showing the painstaking process to conserve the Sylvester Harding miniatures

From the Archives

Jenny Ulph became College Archivist in March 2013 on the retirement of Dr Kate Thompson. Previously the Records Manager, with a background in archives, she was already familiar with much of the College's history but has spent the past few months exploring the Archive's original records, plans, photographs and artefacts. Here she gives an update on developments with the Sylvester Harding miniatures and an overview of her work.

The Archive generally receives over 70 enquiries a year, covering all manner of subjects from the tutorial records of deceased relatives to the development of the College buildings. This year, enquiries have significantly increased, with research covering a fascinating variety of topics. Records from the Archive have proved invaluable in supporting planning applications for building projects around the College including: dating the former stable block, which will form an exciting part of the redevelopment of Parker's House, and showing that what we now know as D staircase was, until 1964, a curtain wall with an open courtyard behind.

The 'inauguration' of the College Bath House

This cartoon was found in the Lent 1927 issue of The Griffin. An anonymous writer recounted his new routine: 'At eight I run across to the bathroom… I leap into the water and swim round and round. I leap out again refreshed, glowing, full of life'. The editorial for the next issue claimed that 'the inauguration of the new baths… may be said to virtually initiate a new epoch for Downing… No longer… need we henceforth confess… though in all other matters our college has few equals and no superiors – we can only just use the plural when speaking of our baths… Now… one may rise like a Lord, stroll in one's negligé to staircase O like a Duke, disrobe like a King, and – pausing deliberately for the advent of the psychological moment – take the great aquatic plunge like an Emperor.' The installation in 1913–14 of baths in I and K staircases (the present O and Q) is covered in "Downing and the Two World Wars", but the Griffin cartoon and editorial suggest that the bath house contained something grander. 'O' staircase, prior to the Baker buildings in the North Range, was presumably the current U or V, but contemporary plans for this period are lacking. The Archivist would be very interested to hear from any alumni who remember this 'Bath House' – and its location!

Update on the Sylvester Harding miniatures

Last time, Kate Thompson provided an overview of the album of Sylvester Harding miniatures. She was trying to raise funds to pay for conservation work, and so it is exciting to report that the album has been sent to the Cambridge Colleges Conservation Consortium at Corpus Christi, funded by pooling the College's library and archive conservation budgets (thanks to the College Librarian, Karen Lubarr). The conservators have painstakingly removed the miniatures from the old acidic album, revealing the original printed paper borders for the first time. They will be cleaned and remounted in archival window mounts to allow each to be seen in full, while ensuring they are safely secured and protected from future damage. The album was photographed before being sent for conservation and the Archivist has produced a display, in the display cases at the rear of the Library Octagon. It is intended they will be photographed again following the conservation work, and that the collection may be made available online.

Plea for photographs

The Archivist has recently produced a display on the archive and its collections, in the Library Octagon, showing how the College and its members have changed over time. Photographs are an invaluable resource, and any old photographs showing either College scenes or sports teams would be a welcome addition.

The Closed Doors of Cambridge

Richard Stibbs

"The Closed Doors of Cambridge" was the title of an article written by a Schoolmaster Fellow Commoner after a six week visit to Downing in the mid-eighties and which was subsequently published in the national press.

In the article he compared the physical doors of the Colleges and the hurdles to the acquisition of knowledge. In both cases he found that the obstacles were illusory. The massive College doors always contained a small wicket door. A gentle push on the wicket door opened to a welcoming court or to an enchanting garden. A phone call to a College or Departmental librarian would result in a warm invitation to visit and to share in the intellectual riches.

So it has been for me. The doors of Cambridge started opening in the autumn of 1963 when I visited for the entrance interviews followed by the scholarship exam. A nervous scholarship boy from a city grammar school whose family had never aspired to a university education, I found that my fellow applicants were from similar backgrounds and I started then to make my lifelong friends. The subsequent fifty years have seen the widening of both fellowship and of my intellectual horizons.

But it is not all Panglossian. Consider the physical gates. In the sixties, gates were all locked at curfew time and I can still point out the various unofficial ways into Colleges via lampposts and walls. Not for nothing was the apocryphal joke told about many Colleges:

An undergraduate climbs over College wall and jumps down. Straightening up, he finds himself face to face with the Dean. "Oh God" he exclaims. "No", replies the Dean, "Merely His earthly representative."

The gate hours went together with the stringent rules about visitors and overnight guests. As one might imagine these rules went down very badly with the sixties generation, but were necessary as most students were below the age of majority. The lowering of the age of majority to 18 in 1970 and pressure from the student body meant the rules were swept away, and in particular College gates were left open all round the College perimeter. By the early eighties, you could criss-cross Cambridge in all directions confident of entrance and exit through the Colleges. Sadly, although understandably, that has had to change from student pressure following every incident of theft or assault. We are now back to medieval security, with the modern accoutrements of CCTV, security lights, card locks and controlled entrance and exit via Porters' Lodges.

Let me turn to the most positive change both socially and intellectually, which has been the acceptance of women as having equal status in Cambridge. Socially the choice for my generation was the Newnham, Girton and New Hall students, the Addenbrookes' nurses, the Bell School of Language exotic foreigners and the Homerton teacher trainees. Women have civilised the student body and have added an intellectual spur.

As many Alumni will know, **RICHARD STIBBS**, President, Fellows' Steward and Praelector, and a Fellow for 31 years, sadly died on Saturday 31 August 2013 shortly before his retirement. He wrote this article over the summer especially for DOW@CAM, and we publish it here not only because it is a characteristically well-expressed and insightful (and funny) comment of College life, but because it shows why Richard was held in such esteem as a friend and colleague by many Fellows, staff and students, past and present.

They have also shown the Downing men how to be Head of the River.

The admission of around 50% women has all been to the good, but another aspect of admissions has deteriorated. That is the social mix. The high point was through the sixties and seventies when the Direct Grant Schools were feeding Oxbridge with the meritocratic scholarship candidates from across the social classes (although not enough from the working class). The failure of the maintained sector to prepare for Oxbridge entrance has meant the slewing of admissions towards the private sector which has inevitably meant a less balanced social mix. A particular gripe about governments of both persuasions is their accusation that we favour the private sector, when a very large number of those running admissions (and indeed the Colleges) are from a meritocratic background.

Women have civilised the student body and have added an intellectual spur. They have also shown the Downing men how to be Head of the River.

But what of the changes in education in Cambridge over fifty years? Little has changed. The sixties undergraduate would find today's pattern of lectures, practicals and supervisions very familiar. There are fewer lectures on Saturdays and the wearing of gowns to lectures has completely disappeared. Triposes and departments have merged or changed their names. The supervision remains at the heart of the process. It is easy to forget how modern, in Cambridge terms, the supervision system is. Before the University reforms of the late 19th century, those keen to do well in the Tripos would hire private tutors, the Colleges providing little guidance. Supervisions (or Oxford tutorials) were developed by Jowett at Balliol in the 1860's and imported first to Cambridge in the women's Colleges, partly in response to the refusal of some dons to lecture to women. The supervision system clearly works. The criticism that the professions take a disproportionate number of Oxbridge applicants takes no account of the fact the employers realise the value of the critical thought, analysis and synthesis taught weekly in supervisions.

Research has burgeoned. In the sixties there were a few LLM and PhD students. Now one third of our students are post-graduates taking a plethora of Master's degrees. While humanities research has not fundamentally changed direction, the sciences have. Until the sixties the physical sciences ruled, especially physics; the influence of J J Thompson, Earnest Rutherford, Paul Dirac, James Chadwick, John Cockcroft, the Braggs and Ernest Walton was palpable. But change was in the air. Jim Watson, Francis Crick, Max Perutz and Fred Sanger were already at work, harbingers of the massive expansion in the Biological and Medical Sciences producing one of the world's most important Bio-medical centres at the Addenbrookes site.

Cambridge in the sixties was a market town with few opportunities for employment outside the University at Pye, Marshalls and Cambridge Scientific Instruments. This has changed. Starting with Cambridge Consultants and encouraged by the Mott report on Intellectual Property Rights, spin-off companies proliferated in the seventies. I was a founder of the splendidly named Applied Research of Cambridge and later chairman of the equally well-named venture capital company Cambridge Research and Innovation. The Cambridge Phenomenon now encompasses around 1,000 companies employing around 40,000 people. As with other Cambridge successes there is a downside; the influx of that number of well paid professionals has forced up house prices making it difficult for young academics and College staff to afford to live in the city, so we are now in the era of commuting academics having to buy houses in St Neots, Ely and Newmarket.

Back to the quotidian. College food and accommodation have improved beyond recognition. In Lent 1965 a colleague of mine who had eaten breakfast, lunch and dinner each day in Pembroke was diagnosed with scurvy. Luckily Colleges have since discovered salads and fruit. Also since the abolition of compulsory hall, students can vote with their feet so the food on offer in College has to appeal to them. The abolition of formal hall has had an unforeseen consequence. When you sat with your year group, five or so nights per week for the first year, you got to know almost everyone. Today people will eat with their subject group or their club and society friends.

As to accommodation, there was no bath or shower on my staircase when I was an undergraduate. It was around this time that the Master of St Catharine's was reported to have remarked at a Governing Body, "Baths, baths! Why do they need baths? They are only here for nine weeks". Today the majority of student rooms are en-suite.

So, plus ça change, plus c'est la même chose. Over fifty years the one unchanging characteristic of Cambridge has been the continuing pursuit of excellence in education and research. Long may that continue.

Enterprise and Academe

Peter Duffett-Smith

The summer of 1982 was long and hot, a good year for claret, and in August I found myself in the middle of a cornfield 60km south of Bordeaux with my wife, Trisha, and three-year old son, James.

SolarCache+

www.solarcache.co.uk

We were using a portable radio telescope of my own devising to make astronomical measurements at a radio frequency quite close to that of Radio 4 VHF. We formed the southern end of a two-element radio interferometer, and our task was to make recordings simultaneously with a large radio dish at the Lord's Bridge radio observatory near Cambridge, operated by my research students John Hartas and Gareth Rees.

It was most uncomfortable. The Sun was unbearably hot, turning the inside of our motor-caravan mobile laboratory into an oven, but outside we had to wear Wellington boots to protect our feet from the razor-sharp shards of cut corn sticking out of the baked earth. We set out our television-like antennas in two parallel rows standing 20 feet tall,

pointing up at the sky and precisely aligned east-west. At pre-ordained but irregular moments throughout the day and night, measured to within a microsecond, we fed the recording equipment with the eight-inch 'floppy disks' on which the astronomical data were recorded. Much later, in the cool of the Cambridge autumn, we were able to correlate the recordings taken simultaneously at each end of the interferometer and hence deduce something about the structures of the cosmic objects we had been observing.

This unusual experiment, funded by the Science and Engineering Research Council at a time when pressures on resources were not as severe as they are today, saw the start of my first foray into the world of business.

This unusual experiment, funded by the Science and Engineering Research Council at a time when pressures on resources were not as severe as they are today, saw the start of my first foray into the world of business. The need to determine the precise location of the portable end of the interferometer led to the invention of a new radio positioning system, which I called CURSOR. The development of this system was supported from the first both by the University and by Cambridge Research and Innovation Ltd, a seed-corn investor in new technology. Richard Stibbs was a director, and a lunch-time conversation with him was all that was needed for me to hasten off to their offices in Station Road. Later, I started Cambridge Positioning Systems Ltd (CPS) to develop CURSOR into something more useful and put it onto mobile phones. I was the Chief Technical Officer, and later Chief Scientific Officer, working closely with Chris Wade, the Chief Executive Officer, whose father (I found out later) was at Downing. I believed strongly that the academic inventor of the technology in a start-up company should not try to run it. I discovered that a completely different set of skills was required.

At one stage, the Sun never set on CPS with its outposts in the USA, Far East and Australia, and it was hugely rewarding, if exhausting, to travel the World to visit everyone. The business was sold to Cambridge Silicon Radio in 2007, and I returned to academic research from an extended leave of absence from the University. However, the techniques and software developed by CPS found their way into mobile phone positioning applications, and in 2009 I learnt that about forty per cent of all such transactions, World-wide, went through CPS technology. A result, you might say!

More recently, I have become involved with another venture with my business partner, Terry Mann, known around the College for his electrical contracting work. We and our wives have set up DSM Energy Control Ltd, but unlike CPS this has been funded entirely by us and is a cottage industry by comparison. We make a gizmo for people with photo-voltaic solar panels on their roofs which helps to save money on the water-heating bills. Anyone with solar panels knows that, when the Sun shines, much more electricity is generated than can be used within the house. The excess is usually just 'exported' to the grid, going backwards through the electricity meter. Unfortunately, the meter does not wind backwards (unless it is one of those ancient devices), so the householder receives little extra benefit for it. DSM Energy Control's device, called SolarCache+, monitors the power flowing through the meter and puts any surplus into the hot-water tank via the immersion heater.

Setting up a new manufacturing business has meant that Terry and I have had to learn a whole new set of business skills. It was interesting travelling to China last year to set up a relationship with a small company to make the electronic circuit boards for us. The first set of plastic enclosures was also made there, although we have since repatriated that aspect to a factory a few hundred yards away from my house in Godmanchester, being a near neighbour of the owner. Business has been slower than we had hoped, but we sold a four-figure number of units in the first year, and are now struggling to keep up with demand. It is important not to expand too quickly and take on commitments which cannot be paid for. On the other hand, it is also important to satisfy the market. This recent upsurge may have been caused by the rises in energy prices which have focused householders' minds on the costs of electricity and gas.

My academic prejudice, that somehow business was a less-noble pursuit filled with less-able people, was soon banished. My experience had shown me that, on the contrary, the business world is full of brilliant stars.

The academic who chooses to pursue a business idea must meet the challenge presented by the different constraints of the different disciplines. On the one hand, climbing the scientific academic ladder requires a steady stream of publications significant enough to be cited by others. Success in business, on the other hand, requires concentrated and sustained attention coupled with a measure of good fortune, with tight budgets and ruthless commercial pressures. I tried at first to balance research and commerce, but soon discovered that I had to make a choice: devote time to the business and it might succeed; or carry on with astronomy. My academic prejudice, that somehow business was a less-noble pursuit filled with less-able people, was soon banished. My experience had shown me that, on the contrary, the business world is full of brilliant stars.

Q&A with The Tab

Anthea Milnes

The Tab, a tabloid-style student newspaper, was launched by Cambridge students Jack Rivlin and George Marangos-Gilks (Downing College) and Taymoor Atighetchi (Trinity College) in 2009. Their controversial online site was originally designed to provide a racier alternative to the serious voice of Varsity, but the concept quickly caught on. Versions of The Tab are now produced at 30 universities around Britain, and together they have a combined readership of over 1.3 million students per month. Anthea Milnes talks to Jack Rivlin about changing the face of student journalism.

Q The name "The Tab" brings together the idea of a tabloid with "Cantabs" and your news site was originally marketed as "Cambridge University's Online Tabloid". So why did you want to bring tabloid journalism to Cambridge in the first place?

A In my second year at Downing, I applied to be comments editor for Varsity, Cambridge's main student newspaper, but I was rejected. I took the rejection really badly! It felt like journalism in Cambridge was a closed shop, but I also thought they were doing it all wrong. Typically, students were submitting opinion pieces on Israel and Palestine or writing about some obscure society they had set up. The articles were dry, conservative and covering stuff few people cared about. We wanted to do something for people who didn't take themselves so seriously and wanted to have fun.

Q The word 'tabloid' conjures up images of busty blondes, sensationalist stories and bad puns. So what do you think is at the heart of good tabloid journalism?

A The good thing about tabloids is that they write about the stuff people care about in a style they want to read. As a tabloid editor, you need to get away from tradition and think, "What do my readers care about? And how can I reveal new information on that topic?" That's what journalism is. People care about people – about sex, drinking, and misbehaviour – not about research grants. We recognised that students who were puritans are already very well represented by student newspapers, but students who weren't puritans weren't.

Q You won Downing Enterprise, the College's annual Dragons' Den style competition open to its students and alumni. How did that money help you?

A George and I originally put in £500 each to set up the website, and after that we raised a bit of money from advertising to pay server fees and so on. But our first serious investment was when we raised £200,000 a portion of which came from

George Marangos-Gilks and Jack Rivlin

winning the Downing Enterprise competition and the rest from alumni investors. We have used the money to hire staff, rent office space, develop our website and grow the business. Downing and the investors have been completely brilliant and they have really helped us to stay on the right track.

Q In its first year of existence, The Tab made more than 20 appearances in the national media, hitting the headlines in particular for its "Tab Totty" section, featuring semi-naked female students posing in punts and bars. It was also sued for libel by a children's TV presenter. Did you deliberately set out to create controversy?

A We did set out to cause controversy in Cambridge, absolutely! But I didn't expect there to be so much interest in what we wrote outside Cambridge. When we set up "Tab Totty" it was probably rather unthinking, but we were doing it for Cambridge students. Doing a Page Three style feature is a good way to get attention, but it's not something we would want to do any more and we regret it. In the wake of the phone hacking scandal, and as the industry has changed, we have changed our focus. We want to keep a sense of fun, mischief, and cheekiness, and we want to keep writing about what people care about, but without carrying the baggage that tabloids do. People can be far too prissy about what goes on their records, but we don't want to ruin people's future career prospects and we're very careful about naming people.

Q Many newspapers are struggling to make the transition from print to online. The Tab has put digital first. Are you committed to a digital only strategy? And how will you make it work financially?

A We originally planned to publish the newspaper in print, but we realised very quickly that the numbers didn't stack up. The key advantages we have are our independence and the fact that we are online – it's so much quicker. We are by no means profitable but we're getting bigger clients advertising with us now, like Spotify, Netflix and Pot Noodle. We haven't cracked how to make journalism profitable, but we are currently looking at initiatives like selling more job listings for students on the site, for example.

Q What do you know now that you didn't when you started?

A Everything! There are two key formulas – the editorial formula and the management formula. On the editorial side, it took us quite a while to figure out what was popular and what mattered to people. Now we face a huge management job, managing 1,000 students and helping them to get enough out of the experience. I've also learnt that developing websites is very expensive and never turns out quite how you want it to!

Q What has been your finest hour to date?

A Some of our best stories have been about exposing the Christian Union in Bristol for not allowing women to speak and exposing homophobic bullying in Liverpool. Some of our most fun things have been kiss n' tells with celebrities like Cheryl Cole and Spencer Matthews.

Q And your most memorable headlines?

A "Chundergraduates"?

Q Where next?

A We want to build our network of universities and attract a broader youth audience. I don't think anyone does news well for young people. The Daily Mail website is probably the closest, but we are much closer to young people than they are and we know what they care about.

JACK RIVLIN was named in the London Evening Standard's Power 1000: London's Hottest 25 under 25 in September 2013.

www.tab.co.uk

Photograph by Mike Finn-Kelcey

Sir John Pendry

Anjana Ahuja

Sir John Pendry graduated in Natural Sciences in 1965, gaining a PhD in 1969. He is now chair in Theoretical Solid State Physics at Imperial College, London where he was head of the Department of Physics (1998–2001) and Principal of the Faculty of Natural Sciences (2001–2002). He won the 2013 Isaac Newton Medal of the Institute of Physics, its most prestigious prize, for "his seminal contributions to surface science, disordered systems and photonics". He is an Honorary Fellow of Downing College.

I have just disembarked at a train station outside London, when I spot a tall, thin, bespectacled man in a woollen jumper. We shake hands and I climb into his polished black Lexus, while the driver, one of the world's leading theoretical physicists, chats about property prices in this well-heeled part of the world.

Professor Sir John Pendry, who has been Professor of Theoretical Solid State Physics at Imperial College since 1981, speeds me to an immaculately kept bungalow. The sitting room and study are decorated not with equations but with framed photographs, courtesy of the digital camera that he carries everywhere in his briefcase. The scenes, Isles of Scilly landscapes and sunlit doorways in South Kensington, reveal a decent eye. "It's all about the geometry, the visuals," he explains of his photography. Only later, when transcribing our interview, do I realise how similar his response is when I ask him to describe his approach to theoretical physics: "I think in geometry; I always like to have pictures in my mind." This unique clarity of vision has enabled John, 70, to 'see' and solve mathematical challenges in physics across a staggering breadth of subject areas, from surface science to optics to the completely new discipline of metamaterials, which he largely invented.

Metamaterials are artificial materials whose effects derive from their physical structure, not their chemical make-up. In brief, they are engineered from collections of microscopic structures that, at a larger scale, do unexpected things to electromagnetic waves, such as deflecting them. Such materials can theoretically be used to bend light around an object, rendering the object invisible, a 2006 finding that led to him being lauded in the international press as the inventor of a Harry Potter-style invisibility cloak.

Not that his other major pieces of work have been dull. In 2000, he published a short but explosive paper in Physical Review Letters explaining the theoretical possibility of a perfect lens. It built upon work done nearly 40 years earlier by the forgotten Russian scientist Victor Veselago, who suggested that a material with a negative refractive index (something never seen in nature), could produce a new sort of lens. However he did not realise that its resolution could be perfect.

He recalls: "It turns out that the lens was so simple that anyone from Maxwell's time onwards could have solved it quite easily, even a third year undergraduate." Really? "Yes!" And it only took him a day? "One morning!" he chuckles, leaning back in his chair. "It's just that nobody asked the question. Amazing, isn't it?"

John still regards it as one of his most spectacular achievements, exemplifying his philosophy of diligently following where the numbers lead. Google records more than 7,000 citations for the paper. While John will not comment, it is increasingly likely he will achieve a Nobel Prize for Physics. According to impeccable sources, he has certainly been nominated.

John might well have become an experimental scientist. Even as a grammar school boy growing up near Manchester above his grandmother's sweet shop he had a practical bent. "My uncle was an engineer and he put magazines like Wireless World my way, that's where spotty kids went in my day. I take pride in being able to fix things and love knowing how things work."

The decision to abandon experimental work, taken while he was reading Natural Sciences at Downing, was a pragmatic one: "The problem with being an experimentalist is that you're shackled to your kit. As a theorist you travel much more lightly, so you can hop about."

He can still enjoy, vicariously, the thrill of experimentation through collaboration. "I love going into a lab and asking questions about the kit. For someone who's not a full-time experimentalist, I have a good understanding of what's likely to work. It's a bit like being a composer, you can't play all the instruments but you have to know what they do. That's the difference between mathematics and theoretical physics. In mathematics you're often generating results for their own beauty, but for me, the crucial thing is whether someone can do an experiment. If they can't, then the idea is dead."

His ability to generate novel ideas is still very much alive. Recently, John and Professor Stefan Maier, a renowned experimentalist, won a £4.9 million grant from the Leverhulme Trust to properly establish the field of metamaterials with Southampton University, and, crucially, move it into optical wavelengths.

While they are working towards constructing the perfect lens out of metamaterials (which could revolutionise the storage of data on optical disks), they are also pioneering a specialist field called plasmonics, which is the control and manipulation of light down to the nanometre scale. It could, he says, drive a new industry.

When we met, he was slightly nervous about a forthcoming talk to a secondary school. He and his wife Pat, 66, whom he met at Cambridge, don't have children, he explains, so he feels a little out of his depth with younger pupils. Admirably, he's going to feel the fear and do it anyway. Just mention Harry Potter, I advise; he is, after all, the real-life inventor of an invisibility cloak.

And no, he does not begrudge being mentioned in the same breath as the bespectacled boy wizard. "What constitutes success for an idea?" he muses. "It's other people picking it up and running with it. So, by going around and getting publicity, and it's been my good fortune to ride on the coat-tails of these wonderful Harry Potter stories, you encourage other scientists to do something with your ideas. Ultimately, if you're going to pay your debt to society for having all this fun with science, somebody has to make something with it."

This is an edited version of an interview that first appeared in Imperial, the magazine for friends, alumni and supporters of Imperial College London. www.imperial.ac.uk/imperialmagazine

ANJANA AHUJA is a freelance writer. Twitter:@anjahuja

John was obviously destined to become a Downing man: both his headmaster and physics master had attended the college. "So I never really had a choice," he laughs. "But I really had the most wonderful time. It was a very fine college and it did me proud."

He first visited Cambridge in the winter of 1961 to take his scholarship exam, and was immediately struck by the "extraordinary beauty" of the place. When he arrived the following year to read Natural Sciences, a bitter winter froze the Cam; he recalls fellows skating across the lawns. It was a time of great social change too: his generation of short-haired, deferential schoolboys who wore their gowns everywhere, would quickly be joined by "hordes of long-haired, unkempt students." The Sixties had truly arrived.

He loved the college system, with its tight-knit familial atmosphere and mix of disciplines. "I hung out with the music crowd, and voraciously attended concerts and musical societies." Of course, he attended lectures too, but valued the hands-on nature of tutorials more. "My character is better suited to doing than watching, and by the third year I was heartily sick of lectures. A PhD gave me the chance to be part of a small group." He is proud to have had Frank Wild and Peter Gay as tutors – and relates with amusement that Downing was often referred to as the Wild and Gay College. Another highlight of his time as a Fellow was being able to raid Downing's celebrated wine cellar for a pittance: "The claret was so cheap you could put it on your cornflakes."

His 13 years at Cambridge, between 1962 and 1975, not only laid the foundations for a formidable career but also great personal happiness: he met his wife Pat, an Oxford-educated mathematician, when she arrived as a post-doc in the Cavendish Laboratory. They married in 1977.

Brett Kennedy and Nick Coleman

Current Research

Nick Coleman

Professor Nick Coleman and his colleagues in the Department of Pathology have identified an 'on/off' switch in a type of cancer which typically occurs in the testes and ovaries called 'malignant germ cell tumours'. The research was published in August 2013, in the journal *Cancer Research*.

Malignant germ cell tumours arise in sperm– or egg–forming cells and usually occur in the reproductive organs, the testes or ovaries. The cancerous tumours are seen in patients of all ages, both in childhood and adulthood.

Although many patients do well after treatment, current chemotherapy treatments can have severe long-term side effects, including hearing loss and damage to the kidneys, lungs and bone marrow. For some patients, outcomes remain poor and testicular cancer continues to be a leading cause of death in young men.

Nick and his colleagues found that all malignant germ cell tumours contain large amounts of a protein called LIN28. This results in too little of a family of tiny regulator molecules called let-7. In turn, low levels of let-7 cause too much of numerous cancer-promoting proteins in cells. Importantly, the cancer-promoting proteins include LIN28 itself, so there is a vicious cycle that acts as an 'on' switch to promote malignancy. The researchers have likened these changes to a 'cascade effect', extending down from the large amounts of LIN28 to affect many properties of the cancer cells.

The researchers also discovered that by reducing amounts of the protein LIN28, or by directly increasing amounts of let-7, it is possible to reverse the vicious cycle. Both ways reduced levels of the cancer-promoting proteins and inhibited cell growth. Because the level of LIN28 itself goes down, the effects are reinforced and act as an 'off' switch to reduce cancerous behaviour.

Nick says, "We need new ways of treating patients with malignant germ cell tumours, to minimise the toxic effects of chemotherapy and to improve survival rates when

tumours are resistant to treatment. Having identified this 'on/off' switch, it will now be important to identify new drugs that can be used to keep it in the 'off' position."

"It is encouraging that the switch effect is present in all malignant germ cell tumours, whether they occur in males or females, young or old. Such a fundamental abnormality makes an excellent new target for treating these tumours."

Susanne Owers, Director of Fundraising at Addenbrooke's Charitable Trust, which funded this research, said: "We are delighted to have supported this study, which has identified a key protein that triggers this type of cancer. ACT funds clinical academic researchers, like Professor Coleman, because they are perfectly positioned to understand the clinical problems, working closely with patients, an insight not available to all researchers. Studies like this have the potential to make a tangible difference to patients, by identifying targets for the development of new drugs which may improve survival and have less side effects compared with standard chemotherapy treatments."

NICK COLEMAN is Professor of Molecular Pathology at Cambridge University and an Honorary Consultant Pathologist at Addenbrooke's Hospital. He is Verjee Fellow at Downing where he has been Director of Medical Sciences since 1997. His research is centred on novel approaches to cancer diagnosis.

Brett Kennedy

Traditional magnetic resonance imaging (MRI) allows doctors to take detailed images of our insides by using the abundant water molecules within our body. In theory, it is also possible to take images using molecules other than water, such as the products of metabolism.

Many metabolic molecules are present within the body at such low concentration (~100,000 fold lower than bodily water), that imaging them in patients is often impractical. A new technique, called 'hyperpolarization', allows us to increase our ability to detect certain molecules with MRI by >10,000 fold. After hyperpolarization in a machine, hyperpolarized molecules can be injected into a test-tube, an animal, or even a person. The hyperpolarized molecules and their downstream metabolic products can then be imaged in real time with hyperpolarized MRI.

Imaging tumour metabolism is of considerable interest. In contrast to healthy cells, tumour cell metabolism is often abnormal. Somatic changes accompanying solid tumour formation frequently select for cells with increased 'hunger' for glucose. Tumour cells often derive energy from the incomplete breakdown of glucose to lactate. Lactate formation is an inefficient method of generating energy, so large amounts of glucose must be consumed. Cancer treatment aims to kill tumour cells and to halt tumour metabolism. Changes in tumour size are the 'gold-standard' for assessing response to therapy in the clinic. However, changes in tumour size may take weeks to become manifest, if at all. Alterations in tumour metabolism have been shown to precede changes in anatomical size. Imaging tumour metabolism with MRI after administration of hyperpolarized glucose could therefore give vital information on tumour hunger. Additionally, MRI imaging of changes to tumour metabolism following therapy may also allow a more detailed assessment of therapeutic efficacy.

In this study, we injected hyperpolarized glucose into tumour-bearing mice. After 15 seconds, we took images of hyperpolarized glucose and its metabolic products using hyperpolarized MRI (Figure 1). Panel 1 shows traditional MRI images with the tumour outlined in white. Panels 2 and 3 show traditional MRI images overlaid with hyperpolarized MRI images of glucose and its metabolic end-product, lactate. These hyperpolarized images show that the administered hyperpolarized glucose is distributed throughout the mouse after injection. However, during the experiment, lactate production from glucose is confined to the region of abnormal metabolism within the tumour. We then treated the mouse with a drug known to kill tumours. 24 hours later, we injected more hyperpolarized glucose and re-acquired hyperpolarized MRI images. After treatment, the amount of lactate produced by the tumour had decreased

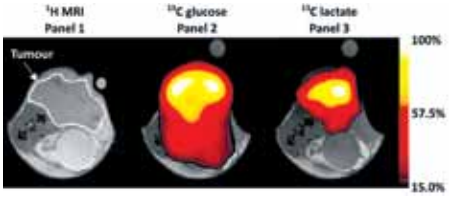


Figure 1

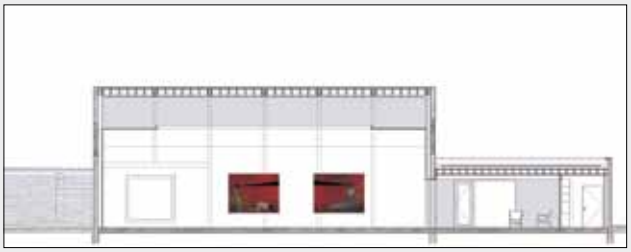
by 62%. Therefore, evaluation of tumour metabolism with hyperpolarized MRI may give useful information on therapy efficacy shortly after treatment begins.

In anatomy class, we are taught that 'form fits function'. In the near future, hyperpolarized MRI may allow us to image both the form of cancer and its altered metabolism. Doctors of tomorrow may therefore need to assess not only the physical form of tumours, but also their metabolic function.

BRETT KENNEDY came to Downing in 2008 and obtained his PhD in 2013 in the field of cancer biochemistry in Professor Kevin Brindle's lab, specialising in the use of magnetic resonance imaging. He is now reading for a degree in medicine at Worcester College, Oxford. The research presented in this article was conducted towards the end of Brett's PhD and was accepted for publication in Nature Medicine (online publication, December 2013).

From the Development Office

First Court and Parker's House

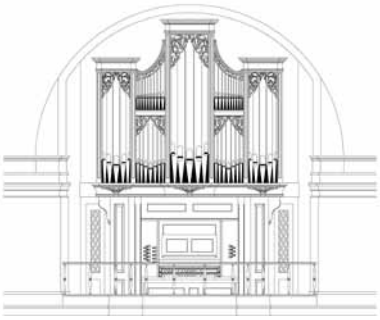


First Court and Parker's House represent an unprecedented opportunity in the College's 200-year history to house all students, undergraduate and graduate, together on the Domus as well as to enhance the cultural life of the College and all of Cambridge with a new art gallery.

It will involve the refurbishment of an extensive office building on Regent Street that is already owned by the College. Planning permission for this work has been secured and construction will begin in 2015. The project will bring:

- a new courtyard at the entrance of the College (First Court)
- an art gallery by converting the Edwardian stables (built in 1902–1903) which will be open to the public
- 77 student rooms
- a third range to the existing West and East Range

Further details about the project will be forthcoming to all alumni in early 2014.



Organ Fund

Efforts on behalf of the Organ Fund continue with more than half the funds raised towards the goal to install the new organ in the autumn of 2014. One of Downing's most renowned musicians Martin Baker (1985) who is Director of Music at Westminster Cathedral and a much sought after organist will give the inaugural recital. The date will be set for January 2015. Further information will be made available when it is confirmed.

Downing College Boat Club

150th Anniversary Honorary Row Past

On 6 July 2013 DCBC enjoyed an Honorary Row Past at Henley Royal Regatta as part of the club's sesquicentenary celebrations. On one of the hottest days of the summer, emotions ran high as a large crowd of Downing faithful including Fellows, alumni and students, gathered to cheer on the crew. Packed with several of our past Olympians the crew consisted of: Charlie Green (1983), Tom Brown (1983), Annie Vernon (2001), Tom Middleton (1995), Rod Chisolm (1992), Kate Panter (1981), Gus Pope (1982) and Zara Goozee (2009), coxed by Guy Henderson (1976). The event was celebrated with a well-attended drinks reception in the car park afterwards. A wonderful occasion and a very fitting end to DCBC's year of anniversary celebrations. Feroces ad Mortem!

London Alumni Reception 2013

The London Alumni Reception 2013 was held on 28 November at the Royal Society. For many it was the first opportunity to meet the new Master, Professor Geoffrey Grimmett who took over from Professor Barry Everitt on 1 October. Professor Grimmett had the chance to address the gathered alumni and guests, introducing himself and giving his first impressions of life at Downing. In particular he thanked the Fellows, students and College staff who have made him and Rosine so welcome, and expressed his wish to meet many more alumni at the various events throughout the year.

Special Wedding Packages for Alumni

James Gunton (2001) and Ellen Burgess (2001)

As an alumnus, the classical style and peaceful surroundings of Downing will already be familiar to you, and make it an ideal venue for your wedding.

In addition to an exclusive wedding package, on-site hotel standard ensuite accommodation and outstanding cuisine created by the College's award-winning chef, alumni can marry in the Chapel (subject to availability) and benefit from an exclusive discount.

The original Neo-classical buildings set in 20 acres of lawns provide a perfect backdrop for your wedding photographs.

The gardens are ideal for drinks receptions in fine weather, with patio doors opening onto a stunning Sunken Garden and the Fellow's Garden where you can play croquet on the lawn.

The College is licensed for civil ceremonies too: up to 150 in the Howard Building or for more intimate weddings, up to 50 in the West Lodge.

For the reception, there is a choice of the Hall which can seat up to 150 guests, or for smaller gatherings up to 46 in the West Lodge & Maitland Room. There are also options to extend into the evening with bar and buffet.

To ensure everything runs smoothly our dedicated Wedding Co-ordinator and her highly experienced team are on hand to guide you through the planning of your special day.

Bookings are now being taken for 2015 with an alumni discount on wedding packages, so why not come and re-acquaint yourself with Downing?

For further information, please call 01223 334860 or email conference@dow.cam.ac.uk
www.downing-conferences-cambridge.com

A note of thanks

On 26 February 2013, a reception and private view was held at the Queen's Gallery in the presence of HRH The Duke of Edinburgh in support of the Everitt Butterfield Research Fellowship in Biomedical Sciences, made possible by The Earl of St Andrews (1982).

Events Calendar 2014

1 FEBRUARY
Griffins Club Dinner

8 FEBRUARY
DCRUFC Celebratory Reunion Match

13 FEBRUARY
Cranworth Law Society Dinner

5 APRIL
Annual Reunion Dinner
Pre-1954, 1954, 1964, 1974, 1984, 1994, 2004

26 APRIL
Segreants Club Dinner

17 MAY
MA Awards Dinner

14 JUNE
Donors' Garden Party
May Bumps

26 JUNE
Graduands' Reception

19 JULY
1749 Society Garden Party

26 SEPTEMBER
Year Representatives Meeting & Dinner

27 SEPTEMBER
Alumni Day & Association Dinner

OCTOBER/NOVEMBER
London Alumni Reception TBC

DECEMBER
Varsity Rugby TBC

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Wilkins Fellows

2013 saw the admission of two new Wilkins Fellows and we are enormously grateful to both them and their families for their generous support of the College.

ROBERT LLEWELLYN JOHN 1968, Economics and Politics, and Law

Robert John is a proud Welshman who after leaving Downing was called to the Bar (Middle Temple) in 1972 and undertook pupillage at 1 Garden Court before succumbing to the call of the City.

After spending 14 years in finance, he was recruited by Paul Reichmann to be Deputy Chief Executive of Canary Wharf, a project then surrounded by controversy, though now it is difficult to find anyone who ever questioned the idea of creating a new business district in East London. After the excitement of a very public crash into administration in 1992 but a subsequent "buying back" by the Reichmann team in 1995/6, Robert finally left the company in 2004 having been involved in all the key decisions including identifying and successfully lobbying for key infrastructure improvements such as the Jubilee Line and Crossrail. Recently he has been involved in various aspects of the Olympics, including the future use of the site, with Welsh organisations in London and in development in sub-Saharan Africa.

Angharad Dodds John

A great supporter of the College, Robert is a former Downing Enterprise Competition judge and a former year representative. He is married to Philippa with 4 surviving sons and has happy memories of their daughter Angharad in whose name they have supported a fellowship, and it is in recognition of this support that he has been admitted to the Wilkins Fellowship.

Louise Arnell and Dr Paul Millett

LOUISE ARNELL 1987, Classics

After graduating from Downing in 1990, Louise moved to Osaka in Japan for three years where she worked as an English teacher. She returned to London to work in the charity sector firstly at a refugee training project in Stoke Newington, then at St Mungo's, a charity which houses, supports and cares for homeless and excluded people.

Louise is married to alumnus Jamie Arnell with two children. They live in West Sussex where she has studied for two consecutive MAs – first Linguistics with the Open University followed by Nineteenth Century Literature and Culture at the University of Sussex. She now runs a charity called The Pebble Trust which exists to improve the lives of people in Brighton and Hove, the city in which they now live. The Pebble Trust supports organisations that work with vulnerable people in some of the most deprived areas of the city, and is also the main charitable sponsor of the Brighton Fringe. In addition, the trust awards grants to local teenagers who have a particular talent – sporting, musical, artistic or academic – and who need financial assistance in order for their skills to develop.

Louise and her family believe strongly in access to higher education for all and it is in recognition of her support given to access at Downing that she has been admitted to the Wilkins Fellowship.