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pelican

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FOREWORD

AN INTRODUCTION FROM THE MASTER

We are delighted to present this edition of the Pelican, another fine and beautifully illustrated production from Liz Winter and the Development team. Sometimes I wonder whether we should not persuade them to turn the camera on themselves, since we owe a lot to them for their effective work both in communicating news and events to alumni, and in fundraising to help meet the needs of the College and particularly the students.

A highlight of this edition is an interview, kindly conducted and written by Simon Heffer, with Colin Blakemore, the neurobiologist, who for some years has been an Honorary Fellow of the College, and was honoured with a knighthood in the 2014 Birthday Honours – long overdue, in the opinion of many. We are privileged to have this fascinating interview between Pelican covers.

The issue also features pictures and interviews with several of our Fellows, with particular focus on some of our early-career Research Fellows. You will be intrigued to find out more about their areas of expertise.

Have a look too at Kate Poskitt's piece on Corpus Blues. As well as our College teams, who compete in a wide range of inter-college competitions (sometimes joined up with other colleges, but often as Corpus alone competing against much larger colleges), we have a significant number of individuals who win places in University teams, Kate herself being one of them. This article celebrates their achievements.

To complete this bumper issue, the Development Office have prepared the annual Donor Report, which is also enclosed. This contains short profiles of some of our donors and feature articles by some of the students who received travel grants as a result of donors' generosity. Publication of the Donor Report also gives me an opportunity once more to thank our benefactors, the vast majority of whom are alumni and parents, who are doing so much to help the College keep its position as a place of world-class learning and research.

Stuart Laing

PROFESSOR SIR COLIN BLAKEMORE

INTERVIEWED BY SIMON HEFFER (m1979)

THERE IS NO POINT EVADING THE ISSUE: PROFESSOR SIR COLIN BLAKEMORE IS SIMPLY ONE OF THE MOST DISTINGUISHED SCIENTISTS IN THE WORLD TODAY AND HE IS A CORPUS ALUMNUS – HE CAME UP TO READ MEDICINE IN 1962, AND HAS BEEN AN HONORARY FELLOW FOR THE LAST 20 YEARS.

His CV reads like a history of scientific activity in the last half-century – he has lectured all around the globe, broadcast on radio and television, written books and for national newspapers, chaired, won prizes from and been honoured by too many scientific institutions to mention, been chief executive of the Medical Research Council and taught at Cambridge and Oxford – where he was appointed Waynflete Professor of Physiology at the age of 35, three years after being the youngest person ever to give the Reith lectures.

Now a youthful 70, he works in an office overlooking a leafy Bloomsbury square in the Senate House of London University, where he is Professor of Neuroscience and Philosophy – a remarkable and intriguing combination – in the Institute of Philosophy.

HE WAS APPOINTED WAYNFLETE PROFESSOR OF PHYSIOLOGY AT THE AGE OF 35, THREE YEARS AFTER BEING THE YOUNGEST PERSON EVER TO GIVE THE REITH LECTURES.

He has specialised in the study of vision and the development of the brain in early life. Universally respected by his peers, Sir Colin has also won a wider audience through his media appearances, where he performs the public service of explaining science in straightforward terms to those who might normally struggle to comprehend it. He is a prominent humanist and rationalist. He is also a keen runner and has completed 18 marathons.

He was knighted in the 2014 Birthday Honours, scandalously late in the view of most in his world. The knighthood that normally attends heading the MRC – which Sir Colin did from 2003 – was, according to media reports, considered difficult for someone who had attracted controversy in the 1990s by his reasoned and principled commitment to animal testing in the interests of medical science, which resulted in threats on his life, letter bombs and physical attacks by animal rights extremists.

Sir Colin's parents lived in Coventry but, that city having been devastated in the Blitz, he was born at a Forces Hospital in Stratford-upon-Avon, because his mother had served in the Land Army and his father was in the Air Force. 'I was only there for 24 hours, but it was a nice distinction to be born in the same town as the Bard,' he says. He attended Coventry's King Henry VIII School and from there won a scholarship to Corpus.

'I was certainly interested as a small boy in the more traditional aspects of science, such as observing animals and collecting plants – the stamp collecting approach to science,' he continues. 'I didn't come from the sort of background that understands the range of professions open to anyone who was interested in science, but I realised at school that I was pretty good at science because I did well at it. Medicine was the one profession I was aware of, because I'd had some illnesses when I was young and I knew and respected doctors. I didn't know about lawyers and bankers, not to mention politicians. So when I did well enough at school, medicine became sort of inevitable – not just because I was interested in it, but because it seemed like a good job, with some prestige and a reasonable salary. My family were pleased, and so was my school.'

HE WAS IN JFK'S AMERICA FOR THE LEAD-UP TO THE CUBAN MISSILE CRISIS AND THE VIETNAM WAR AND THE GROWTH OF THE CIVIL RIGHTS MOVEMENT.

It was just after his O levels that he realized medicine was for him, when his science results were marginally better than those in arts subjects. 'But I've always been interested in the arts, and in fact did A level art as an extra subject with my sciences.' He prospered in the VIth form, and 'approaching A levels, teachers at school started to say they thought I might be good enough for Cambridge. I was willing to take the year off that was necessary then to do entrance exams, and my long-suffering parents, who were not in any way academic – neither had gone to school after the age of 14 – were incredibly supportive. So I did the exams, and went to Cambridge.

'My father drove me to Cambridge to choose a college to apply to. I liked the name and the look of Corpus and the diminutive scale. I loved the Old Court. Perhaps it didn't have the glamour of King's or Trinity, but it had gravitas and presence. I applied and got an invitation to an interview with Michael McCrum [then senior tutor]. But I also had an invitation from Queens', which was in the same group, and they said there was nothing to stop me seeing them too. So I had the interview there and they offered me a place before I'd even had an interview at Corpus, which presented something of a moral dilemma. But I played it straight, told Corpus, and they asked to see me before making up my mind. Michael McCrum offered me a place and I leapt at the opportunity.'

He went to America in the months between securing his place and going up. 'I had this romantic idea of working my passage on a banana boat. I remember going to Liverpool and wandering round the docks and even finding a boat that I could have worked my passage on, but it would have taken seven weeks to get there. So I told my father what I wanted to do and he lent me £100 – which was incredibly generous of him. I blew £60 of that on a one-way fare on Aer Lingus to New York, which was the first cheap transatlantic air fare. It did concentrate the mind rather, that I had spent 60 per cent of my resources just getting there.'

He was there for four months, and travelled all over the country working in hotels, cleaning up people's gardens and delivering cars. 'Those were the days, when you could just walk into a car delivery company and get work. I was under age to do the job – I was still only 17 – but they were happy to bend the rules. I remember driving an ice-cream truck all the way from Washington DC to Chicago, which was deadly – it was a tall vehicle that, around 50mph, developed this terrible terminal wobble. But once you got through that it was fine.'

He was in JFK's America for the lead-up to the Cuban missile crisis and the Vietnam war, and the growth of the civil rights movement, and the experience had an important bearing on his subsequent career. 'I visited Berkeley and was incredibly impressed; it was an extraordinarily liberating place even for someone just passing through – and I vowed that if I ever had the opportunity to work there I would.' He did his PhD there. He remembers going up to Corpus in

Michaelmas 1962. 'For a working-class kid from a Midlands grammar school, Cambridge in the early 1960s was a much more socially intimidating place than it is now. There would be questions at breakfast such as 'are you going out shooting today, Blakemore?' And I did go shooting one day. I shot a pigeon, and was so appalled by what I had done that I vowed never to hunt anything again.' He recalls that his cohort of medics in Corpus was most definitely not stuffy, but 'there was a very obvious presence of upper-class toffs' in Cambridge more generally.

He remembers some of his contemporaries becoming disillusioned by that atmosphere, but says that 'most of us just dealt with it, put all the crap to one side, and got on with making the most of all the opportunities that Cambridge offered to all of us.'

He found the teaching superb and it 'really inspired me' because of the personal contact with leading researchers. His teachers were 'standing up in front of us and telling us of the latest developments in research. Even for medics, the curriculum was entirely based on science. Nowadays there's more emphasis on clinical medicine, but undergraduate teaching is still rooted in basic science, unlike most medical schools elsewhere.' This research-based approach 'was what shifted my interest from medicine to science'. He remembers his director of studies, Peter Lewis, as being 'wonderful, very supportive, and totally devoted to the lives and interests of his students.' and, significantly, he was 'very supportive of those of his students who were thinking about a career in science rather than medicine.'

He knew by the end of his second year that he wanted to pursue the scientific route, and was already fascinated by neuroscience and particularly the study of vision. So for his third year he chose to pursue his interest in the brain by studying physiology and experimental psychology, rather than more conventional choices such as pharmacology or pathology. He talks of the 'atmosphere of excitement' engendered by research on vision at Cambridge in those days, which steered him into his subsequent career, though it was not until after his PhD that he finally ruled out medicine.

HE CONCEDES THAT THE CAPACITY OF MODERN SCIENCE TO ALTER PEOPLE'S LIVES CAN BE FRIGHTENING AND INTIMIDATING.

He won, but postponed, a scholarship to St Thomas's Hospital to study clinical medicine, and then won a Harkness fellowship, which he used to do research at Berkeley on vision with the leading neurophysiologist Horace Barlow, who had gone from Cambridge a year before. He arrived there in 1965, just in time for Flower Power, and found the place even more exciting than he had remembered.

However, Americans of his generation were now being drafted to fight in Vietnam. 'A lot of graduate students were getting very twitchy about that possibility,' he recalls. He was active in anti-war demonstrations and was even nervous about the possibility of deportation.

Fast forwarding to the present day, he calls his current role 'a post-retirement real job'. He was given a one-year extension beyond normal retirement age at Oxford, because of the time that he had spent at the MRC. 'But I'm now emeritus in Oxford, although I still have a lab, a grant and a post-doc there and I go there at the weekends to work and write papers. But it was wonderful to have an opportunity at this stage in my life to make a major shift in my work. I'm getting to understand more how the humanities work and even trying to break down some of the barriers between the arts and the sciences.'

He says he has been fortunate to come to a philosophic institution that has 'a very physicalist approach to the philosophy of mind. People around here like science, admire science, and are hungry to know about it and to incorporate it into their thinking. I was very fortunate too to arrive here just as the Arts and Humanities Research Council announced a major funding theme called 'Science in Culture', and I got one of three large grants – a £2m grant. Some grants in the humanities are about three and sixpence for a rubber and a pencil sharpener. But this is real money, to do a mixture of science and philosophy and to try to integrate the two, around the question of how we perceive the world.'

He explains his method as 'trying to put together the type of reasoning and questioning that philosophers delight in, with the scientists' ability to answer questions. So we hope the debate will throw up questions that can be answered empirically, but which scientists have never thought of.' He gives an example. 'I couldn't believe, when I arrived, that really serious philosophers were still hung up on the question of how many senses we have. This might have been an interesting question for Aristotle, but now? We know how many different forms of specialised receptors we have in our bodies –more than 100. But then I realized what the philosophical issue is – it's about what it is like to have a visual experience, as opposed to an auditory experience or a touch experience. And this turns out to be a serious scientific question. In my current research I'm now asking 'how could the brain 'know' whether physical activity inside it represents a visual-type experience, as opposed to, say, an auditory-type experience'.'

He illustrates his point. 'Let's say you're driving down the road at night, it's raining, and you see something in the road – it could be a cow, a person, a fallen tree. You might not know what it is, but you never have any doubt that you are seeing it rather than hearing it. It's a very robust aspect of our perceptual experience, but not one for which there is an obvious physical explanation. Nerve impulses come into the brain from the eyes and from the ears, but the chemistry of those impulses is identical. So what is it that makes the brain 'know' it's seeing something rather than hearing it? Especially when we know that different aspects of a visual experience – the colour, the form, the distance, the movement – are all being processed by different parts of our brain. How does the brain attach a visual label to all the different components of things that we see?'

I ask him how we know we aren't hallucinating, and that what we see is actually there – and he tells me that four per cent of the population do indeed have 'extra' sensory experiences that the rest of us do not – they have synaesthesia. 'Many synaesthetes see coloured shapes floating in front of them when certain words are spoken, such as the days of the week. They can reliably match their imagined colours to real colours and with brain scanning we can detect activity in the visual areas of the brain, corresponding to the colours and spatial location of their 'hallucinations'. In that sense these experiences are real.' He calls this 'the inappropriate crossing of modality boundaries'. So if perceptual philosophy is a discussion of how we see the world, what Sir Colin's work is trying to discover is the physiological reasons for why we see the world in that way.

Asked what else he is doing at the moment he answers 'too much', which from his CV is a statement of the obvious. I wonder whether he ever sleeps, and he says he fears he probably sleeps too much.

And he says, with innate modesty, 'if I get things done it's only by doing them less well than I should,' not a complaint that is widely made about him. 'One of the things that I'm trying to do, connected with the research grant, is to work with the world of creative arts. There are now many artists who want to incorporate scientific ideas and results in their work. One of the main themes in our research is the way the senses interact with each other, and many visual artists, composers, musicians, chefs and other performers are also interested in the interaction of sensory experiences. So, I think we can learn from each other. We're also working with the Tate, trying to evaluate what people get out of visiting galleries and museums. And we hope to make a documentary film about the project.'

He has never relented in his passion for art. He knew Francis Bacon, and he knows and works with Patrick Hughes, David Hockney and many other living artists. 'I'm trying to persuade the National Gallery to do an exhibition on the representation of halos in Renaissance and Pre-Raphaelite painting'. He says he is becoming 'very interested' in what the brain does when a person has an aesthetic experience, whether looking at a work of art or listening to a piece of music.

We come on to the question of his role in communicating science to the masses. He disclaims having a 'mission' to do this, but says 'I have always liked performing, from an early age.' He was in the Footlights – 'my great contemporaries were Eric Idle, Graeme Garden and Tim Brooke-Taylor'. Jonathan Miller is 'a very good friend. But he both benefited and suffered from success in the Footlights. He has had phenomenal success as a director, but was interested in neuroscience too, and still feels torn by doubt about whether he made the right choice.' Having always enjoyed performing he says it 'was natural to keep on doing so, through communicating about science. I suppose there was an element of mission, yes. Given the background I came from, and realizing how lucky I was to learn about

the beauties of science, I do like having the chance to convey that story to others, particularly young people, and to make them realise that anyone can contribute to science, irrespective of their social background.'

As to the ethics of science – he has written in his newspaper columns about drug policy, embryo research and euthanasia – he concedes that the capacity of modern science to alter people's lives can be 'frightening and intimidating'. He fears that recognising how the power of science may be outside most people's control may turn people against it, and he wishes the whole subject were more democratic. 'It's important to demonstrate to people that science can be as beautiful as a Rembrandt, and that it belongs to them and not to an elite.'

'I feel very privileged to have had the opportunities I've had. At every stage in my life I've had a lot of luck, a lot of breaks, and I want to tell young people that those kinds of breaks and luck could be there for anyone who wants to take them.' He refers back to a 'pivotal' report from the Royal Society in 1985 arguing that it was the duty of scientists to communicate to the public. 'It was the age when so-called 'telly dons' were looked down on by the rest of the scientific community'. He says that there is still an element of prejudice, which he first encountered when he was doing the Reith Lectures.

'I've been acutely aware of that, and have tried to steer away from what we might call the 'quiz show' aspect of public engagement.' He worries about some of his colleagues who enjoy the fact that media work is not subject to the strict constraints on communication between researchers, and who go into the media and give their opinions 'liberated from peer review – it can be intoxicating to some scientists.'

He is concerned with one ethical question that does not often arise in debate among scientists: that most research is paid for, in one way or another, with public money. 'We have a duty to report back to the people who fund us, and the whole of society has a right to know what is going on and, if necessary, to intervene. So many areas of science are generating possibilities about which the public ought to be better informed – GM crops, climate change, artificial viruses, stem cells, nuclear power, the use of animals in research are just some of them – and ultimately the public need to be involved in decisions about how science will be used in their lives. But decisions can't be made sensibly without evidence.'

Finally, this brings us on to God, in whom the humanist Sir Colin does not believe. Did he ever? 'I think until about the age of 14, I would have said that I did, but it's like drinking, sex or voting – you can't be trusted to make such a judgment before a certain age. At the age of 14 or so I lost any sense of religious belief – my own growing commitment to science reinforced the doubts, concerns and questions that I had about religion. What I saw was that science proceeds from huge ignorance to a gradual understanding of how things probably happen. What religion seemed to me to deliver was ready-made, but inadequate solutions to ignorance. The methods were very different from science. If you can learn about combustion and you can make an engine; it works. Religion didn't seem to work in that way. It rests on assertions rather than empirical evidence.'

He exhibits a cool rationalism in his every pronouncement. In his new and manifestly very fulfilling role, Sir Colin is far from done with empiricism.

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DR SARAH BOHNDIEK

INTERVIEWED BY LIZ WINTER

THERE WAS A MOMENT IN A RECENT GOVERNING BODY MEETING WHEN THE MASTER CONGRATULATED SARAH BOHNDIEK ON RECEIVING YET ANOTHER AWARD FOR HER RESEARCH IN MEDICAL PHYSICS AND JOKED THAT HE HOPED SHE WOULD GET ONE NEXT MONTH OR THE GB MIGHT FEEL LET DOWN.

ALTHOUGH THIS REFERENCE TO HER ASTONISHING STRING OF ACCOLADES WAS INTENDED AS GENTLE IRONY THERE CAN BE FEW SCIENTISTS AS YOUNG AS SARAH WHO HAVE ACHIEVED SO MUCH AND WHO WEAR THEIR SUCCESS SO LIGHTLY. SHE HAS IN THE PAST FEW MONTHS WON THREE MAJOR AWARDS; THE WISE RESEARCH AWARD FOR OUTSTANDING RESEARCH BY A FEMALE-LED TEAM; THE INSTITUTE OF PHYSICS'S PATERSON MEDAL FOR DISTINGUISHED RESEARCH IN APPLIED PHYSICS; AND THE MARIE SKODOWSKA-CURIE PRIZE FOR NURTURING RESEARCH TALENT. YET HER ENTHUSIASM FOR HER SUBJECT REMAINS AS INFECTIOUS AS IT WAS WHEN SHE FIRST APPEARED IN CORPUS AS AN EVEN YOUNGER RESEARCH FELLOW BACK IN 2009.

Today, at the age of 30, with her own research group and a string of peer-reviewed publications, Dr Sarah Bohndiek is one of a new breed of scientists whose work crosses boundaries between disciplines; in this case, physics and biology, and improves the prospect of new discoveries specifically in cures for cancer. Sarah has described her group as 'physics, engineering, chemistry meet biology and medicine. We are', she says, 'a small, highly interactive and international research team whose passion is using new technological innovations to improve our understanding of metabolic processes in disease.'

The Paterson medal recognises her remarkable work in developing advanced molecular imaging techniques and applying them to address questions at the interface of physics, biology and medicine and it is impressive at any level, particularly so in someone so young. Sarah's rapid career trajectory has involved working at three of the world's leading research universities – Cambridge, UCL and Stanford.

Sarah is also a University Lecturer in Biomedical Physics at Cambridge, splitting her time between the Department of Physics and the Cancer Research UK Cambridge Institute at Addenbrookes. She holds a Fellowship at Corpus, a college she feels particularly close to as it was here that she spent three years as a Research Fellow.

When you first meet her, Sarah's manner is friendly and easy-going and for a moment this disguises her razor-sharp mind, intelligence and determination. She was one of the youngest lecturers in Cambridge, when at the age of 29, she started her own lab; her focus on her work is compelling and exciting. The Institute of Physics citation for the Paterson Medal commented on her 'great tenacity in getting experiments to work,' and this tenacity is apparent as we talk.

She grew up in Greenwich, south east London, where proximity to the Royal Observatory sparked an interest in astronomy and physics, and she came up to Cambridge, to Pembroke, to read natural sciences. When she graduated, she went to UCL to do a PhD in radiation physics and entered what in 2005 was emerging as one of the most exciting fields of physics at the interface of medicine. Sarah's goal was to improve the accuracy with which X-rays can detect breast cancer.

SHE WAS ONE OF THE YOUNGEST PRINCIPAL INVESTIGATORS IN CAMBRIDGE, WHEN AT THE AGE OF 29, SHE STARTED HER OWN LAB.

Traditional mammography uses X-rays that pass straight through the tissue. Any X-rays that scatter from the tissue are eliminated using special hardware, as they usually just add noise to the image. But actually, it is those X-rays that interact in the tissue at a molecular level and could therefore provide the clinician with a more relevant diagnosis than normal X-rays. In order to exploit these scattered X-rays, the team at UCL had to design an approach that was as cost effective and easy to apply as traditional mammography or it wouldn't be taken up by hospitals. Sarah's PhD work involved first developing mobile phone camera technology, which is cheap and widely available, to enable digital imaging with conventional X-ray sources. Most mammography is now digital, which has improved its accuracy considerably. There remains, however, up to15% error rate from sampling during histopathology of breast cancers. To reduce this Sarah then developed a system to directly detect the X-rays scattered from breast biopsy samples using the technique she had pioneered using mobile phone camera technology. This low cost system enabled a diagnosis to be made using the entire biopsy sample, directly informing on the chemical composition and providing a much more accurate picture of the tissue sample.

MOST MAMMOGRAPHY IS NOW DIGITAL, WHICH HAS IMPROVED ITS ACCURACY CONSIDERABLY.

After her PhD spent studying biopsy samples, Sarah decided she wanted to understand the biology and biochemistry behind the cancer, so she applied to and joined Professor Kevin Brindle's lab in the Department of Biochemistry in Cambridge. 'I was lucky' she says 'that Kevin was prepared to take on someone who had never held a pipette and knew nothing about biology.' She did however know something about imaging, so her contribution to the lab was immediately valued. The aim of the laboratory is to develop imaging methods that can be used in the clinic to detect early tumour responses to treatment. The primary focus of the work in the lab is developing imaging methods that could be used to get a rapid and non-invasive indication of how well drugs are working, and subsequently in the clinic guide treatment in individual patients.

I ask Sarah how long she thinks it will be before cancer treatments are tailored to each individual patient. Precision healthcare, as it's now called. 'Well, it's already happening to a limited degree,' she says. 'But a major problem is the cost; targeted drugs are expensive. There has to be a good argument that there will be a significant benefit to the patient to make it an efficient use of funds as far as NICE (the National Institute of Clinical Excellence which decides how NHS funds are spent) is concerned. A targeted therapy may work incredibly well in 10% of patients, but you have to determine which 10% will respond. That's the current problem; we're still not profiling all cancer patients at the molecular level.'

Presumably one day highly targeted drug treatment guided by sophisticated imaging techniques will successfully treat both primary tumours and metastases and cancer will no longer be a killer in the majority of cases. But we're not there yet. There is now a clinical trial of the new imaging technique developed in Professor Brindle's laboratory underway at Addenbrookes. It uses hyperpolarised magnetic resonance imaging (MRI) of pyruvate, an energy substrate for cells, as a marker to visualise energy consumption by tumours and how this changes in response to therapy. Changes in cellular metabolism happen within the first 24 hours of response, preceding the usual measurement of tumour shrinkage by weeks or months. In particular, Sarah's work while in the lab looked at how drugs targeted towards the tumour blood vessels could be used to deprive tumours of oxygen and nutrients, effectively starving them to death. Not surprisingly, she admits it is incredibly rewarding to have contributed to this research which is now starting to be used in the clinic.

The lab at Addenbrookes was highly stimulating and scientifically demanding and rewarding, but there were not many opportunities to meet people working in other fields, so Sarah applied for a Junior Research Fellowship at Corpus and in 2009 joined the College as a non-stipendary JRF.

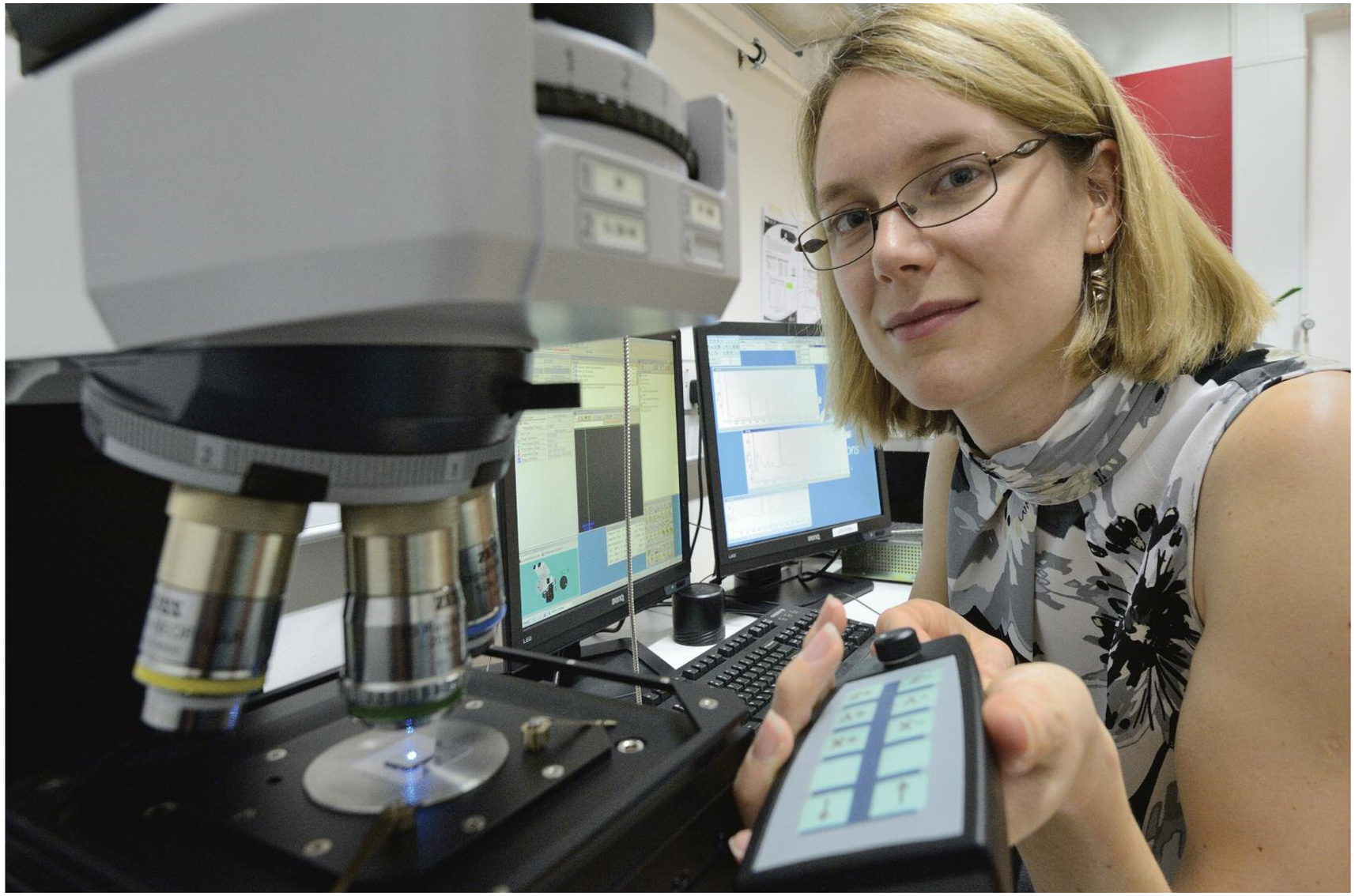
THAT'S THE CURRENT PROBLEM; WE'RE STILL NOT PROFILING ALL CANCER PATIENTS AT THE MOLECULAR LEVEL.

She loved it here, living on the top floor of the Beldam Building with a view over the city centre roof tops and a quick hop across the road to dine at high table. She made a lot of friends and also enjoyed interviewing and supervising the first year Natural Scientists.

In 2011 she moved to Stanford University in California, to Dr Sam Gambhir's lab in the Department of Radiology. There, having explored the very high and low energy ends of the electromagnetic spectrum in the past, she settled right in the middle, using visible and near-infrared light for imaging. This is a particularly exciting regime for Sarah's inner instrument maker, as the technologies driven by telecommunications and aerospace industries are opening it up for medical imaging. 'Using red light for imaging allows us to create tools that report directly on oxygen metabolism in tumours without having to inject a contrast agent, using the same interactions as a pulse oximeter that clips on the end of your finger'.

Stanford and its beguiling environment and ambient weather gave Sarah two very happy years, made all the more so because her British fiancé, Andy Clark, (now husband) was working in Silicon Valley. But she knew she didn't want to remain a post doc for much longer, so when a lectureship opened up in Cambridge in biomedical physics, she applied for it.

She was successful, and was appointed as one of the youngest PIs in the University. She was also successful in obtaining a prestigious Cancer Research UK Career Establishment Award and Marie Curie Fellowship to start up her laboratory. However, despite the stimulation of the research she missed the close interaction with biologists and clinicians that she had fostered for the past 5 years, and so in August she took up a joint appointment which allowed her to spend more time at Addenbrookes.



I DON'T EVER SEE THE PATIENTS, BUT I ALWAYS HAVE A CLEAR SENSE OF THE IMPACT OF THE RESEARCH I AM DOING.

Her current work focusses on trying to image oxygen in tumours, particularly in cancers, that are accessible to infra-red light. A better understanding of the delivery, uptake and utilization of oxygen in cancer will help physicians to identify suitable treatments for a given tumour and hopefully also increase early diagnosis. In this research she collaborates with a number of clinicians, including Professor Fiona Gilbert, (Head of Radiology at Addenbrookes), Professor Rebecca Fitzgerald (Medical Research Council Cancer Unit) and Professor Bruce Ponder (Director of the Cambridge Cancer Centre). I ask if she enjoys being in translational science? 'Yes, very much so', she says emphatically. 'I don't ever see the patients, but I always have a clear sense of the impact of the research I'm doing.' In 5 years' time, she hopes she will see the imaging techniques she currently uses in the lab being applied in the first patient trials.

And of all the predictions about the impact of genetics, stem cells, personalised treatments, what does she think the important shift will be? 'There's an exciting trend for diagnostics to move from doctors to patients,' she says. The new Apple Watch, for example, interacts with the wearer to monitor and relay information about health that alerts the wearer as soon as something changes. 'I remember Professor Gambhir once saying that what we need is an intelligent toilet,' she elaborates with some enthusiasm. 'One that measures various parameters as you perform your normal daily functions and can alert you quickly if you need to take action. This patient managed healthcare is not far off.' I comment that I can see this opening all sorts of cans of worms and that we don't have a health service that can cope with a thousand anxious-well patients flooding GPs' surgeries because their loo told them they'd overdone the alcohol the night before. But I take her point. We, the patients, both expect and are expected to take charge of our health more than ever. And diagnostics and treatment are becoming finely tuned by genetic analysis to treat our specific disease in our individual body. It's an exciting time to be working in medical science.

Sarah returned to Corpus last year as a class A Fellow. 'I really liked Corpus and it is fantastic to come back.' She and Andy got married in in a civil ceremony in the dining Hall in College this summer. He is finishing his work in California and coming back to the UK. 'Not Cambridge, but at least we'll be in the same time zone.' I ask her what she would like to have achieved by the end of her career? 'I'd like to think that something I developed in the lab made it into clinics in all hospitals up and down the country; in other words, was universally available, not just in the big centres of excellence, and made a real difference in diagnosing cancer accurately and helping to target treatment successfully.' My question may have been banal but her answer is not. It may be hard to believe right now, but the idea that one day a diagnosis of cancer won't strike fear into whoever receives it is a dream worth holding on to.

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BORN IN VIENNA, JOHANNES STUDIED GERMAN LITERATURE AND CHINESE STUDIES IN HIS HOME CITY, BEFORE READING FOR A DPHIL AT OXFORD.

DR JOHANNES KAMINSKI

ENTER THE MAZE OF WORLD LITERATURE

JOHANNES IS A RESEARCH FELLOW AT THE COLLEGE. IN HIS BRITISH ACADEMY-FUNDED PROJECT, HE LOOKS INTO THE CONTEMPORARY RECEPTION OF CLASSICAL LITERATURE IN CHINA AND GERMANY. QUITE OFTEN, THE MASTER OF CORPUS LOOKS AT HIM WITH AN BEMUSED EXPRESSION AND WONDERS WHAT CHINESE AND GERMAN LITERATURE COULD POSSIBLY HAVE IN COMMON. NOT VERY MUCH, ADMITTEDLY. BUT THERE ARE STRIKING SIMILARITIES IN THE WAYS CONTEMPORARY READERS APPROACH LITERATURE DESPITE DIVERSE CULTURAL BACKGROUNDS. THE FOLLOWING DIARY GIVES EVIDENCE OF HIS ONGOING STRUGGLE WITH CROSS-CULTURAL COMMUNICATION OVER LITERATURE.

It is 8.05 AM, and I am taking a cab from Beijing airport to my conference hotel. The driver's eyes fixate on me through the rear-view mirror, he asks me in English: 'On business trip?' I explain that I will be attending a conference on world literature. 'Sha-shi-bi-ya, Di-gen-si, Zhen Ao-si-ting, I know!' Since I am neither an expert on Shakespeare, nor Dickens, nor Jane Austen, I decline and answer in Chinese: 'No, I will actually be speaking about Chinese literature.' He frowns and looks incredulous. So I specify: 'As it happens, I will be speaking about *Dream of the Red Chamber*.' He gasps and breaks out in impolite laughter. Eventually, he shakes his head and asks a question that I dread and fear: 'But how can you, as a foreigner, ever understand *Dream of the Red Chamber*? Generations of Chinese scholars have tried to figure out this novel - and failed. Don't get your fingers burnt, young man.'

He is right in a way. Sometimes, it happens that I open a Chinese novel - and I see nothing but clusters of random strokes devoid of any meaning. Even when my inner dictionary is working and I understand every single character and every sentence, I wonder: will I ever become knowledgeable enough to grasp all those obscure cultural references? But right now, I cannot admit this struggle in front of the rude driver, so I wave about and highlight: there is always a need to look at old and familiar texts from new and different perspectives. But no matter what I say, my driver just shakes his head.

At 8.50 AM, we finally arrive at the conference hotel. As he drives away, I can hear him sighing through the open window: 'The foreigner thinks he can understand *Dream of the Red Chamber!*' Biting my lip, I enter the lobby. The receptionist sits behind her desk, absorbed by the book she is reading. So I tap the bell, she comes to her senses and closes her book. While she proceeds to enter my passport details into the system, I catch sight of her book cover. Turns out she is reading *Nineteen Eighty-Four* in English. She hands me over the keys, points in the direction of the elevator, but I hesitate. 'I just saw you reading George Orwell. Do you feel you can understand it?' She shrugs: 'How wouldn't I? Just take a look at all the cameras here.' Spot on. And yet when somebody picks up a book and applies its content and images to the surrounding world - isn't this a rather forceful reading? But then, isn't it the only kind of reading that allows literature to come alive? Is there a difference between understanding a book and allowing it to resonate?

AS HE DRIVES AWAY, I CAN HEAR HIM SIGHING THROUGH THE OPEN WINDOW: THE FOREIGNER THINKS HE CAN UNDERSTAND *DREAM OF THE RED CHAMBER.*

EVERY PAGE I READ APPEARED TO BE TYPICAL OF SOMETHING THAT I HAD ALREADY READ ELSEWHERE.

It is still early in the morning; the conference will not start until 1 PM, so I fetch my toiletry kit and proceed to shave my stubble. As I apply the foam to my face, the jetleg plays a trick on my mind and my mirror image looks at me with concern: 'Wasn't it tomfoolery to get involved with Chinese texts? Why didn't you stick to your guns and remain on safe ground with German literature?'

My reply comes in waves, with every razor stroke: 'I started to feel too much at home within the German, the European literary tradition. There was this point at which I would randomly flip through a book. Automatically those categories would appear: 'I see, realist prose, maybe mid-nineteenth century - most apparent bourgeois values, yet pretty satirical - it's a Thackeray, no doubt.' Every page that I read appeared to be typical of something that I had already read elsewhere. Actually, I was wrong in the above example, and it was a novel by Jonathan Swift and not Thackeray. But in many cases it worked. Connoisseurship often comes hand in hand with a blind reiteration of concepts. And if we repeat a text's interpretation too many times, the text itself becomes sterile. It becomes like a joke: once you've heard it, you cannot enjoy hearing it repeated again and again. According to my job description (as a critic), I should develop new and refreshing perspectives on old texts - but the more familiar I got with those texts, the more I failed at this task. But then, one day, I had this refreshing experience in the University Library. I was strolling through the corridors and picked up a Chinese eighteenth century novel. It drew me in - simply because it left me completely helpless. The familiar categories appeared ('A mythological frame narrative, interrupted by ... very, very realist prose'), but I had to discard them immediately ('That does not go together!'). Intrigued, I wanted to read it in the original. After this monologue, I am finished shaving. Time for some breakfast with dumplings and hot soy milk!

Now it's 5 PM, and I am about to give my presentation. My hands are incredibly sweaty. But it's not because of the current heatwave-cum-pollution, but because of my stage fright: this is the first time I am presenting a Chinese topic to a Chinese audience - in Chinese. As I read off my text and take a glimpse at the audience after each paragraph, I see bemused faces. Some are already shaking their heads. As I finish, there is polite applause. But since Chinese conferences do not allow for immediate discussions afterwards, I have to wait until dinner to see what listeners thought.

By 6.30 PM, we sit around round tables, waiters come and place large plates and bowls on the lazy Susan. Chopsticks and spoons dig into a colourful selection of double-cooked pork, hot and sour soup, mapo tofu etc. Eventually, my table neighbours become more talkative and start telling one joke after the other. Hm. It has been noted on many occasions that Chinese jokes can be remarkably unfunny to foreigners: either these jokes overindulge in mother-in-law stereotyping or they are based on obscure homophones that defy our linguistic sensibilities. Out of politeness, I try to detect the punchlines, then laugh. As this technique seems to work, I become more confident. A middle-aged man with a remarkably wrinkled collar is now telling his favourite joke. After a while, his voice performs the neuralgic pitch, I detect the punchline, break out in laughter - alone.

Admittedly, my technique has its limitations. Yet I am surprised that my inappropriate laugh occasions a series of harsh remarks: 'Your presentation was full of mistakes. As a foreigner you cannot understand *Dream of the Red Chamber*. And what Mao Zedong thought of it (that was the topic of my talk) even less.' Pitiful looks around the table. I inquire which points lead to their dismissive judgement, but then we are interrupted by the sudden advent of white ceramic bottles. The contortion in the face of the American professor on the other table mirrors my own reaction: it's baijiu, a remarkably strong and nasty spirit. As I try to decline politely, the emeritus professor next to me shakes his head violently: 'Young man, if you ever want to understand Chinese literature, you must drink baijiu!' Nodding everywhere. 'Li Bai, the great poet, was a drunkard, every second chapter of *Dream of the Red Chamber* has to do with drinking - so drink!'

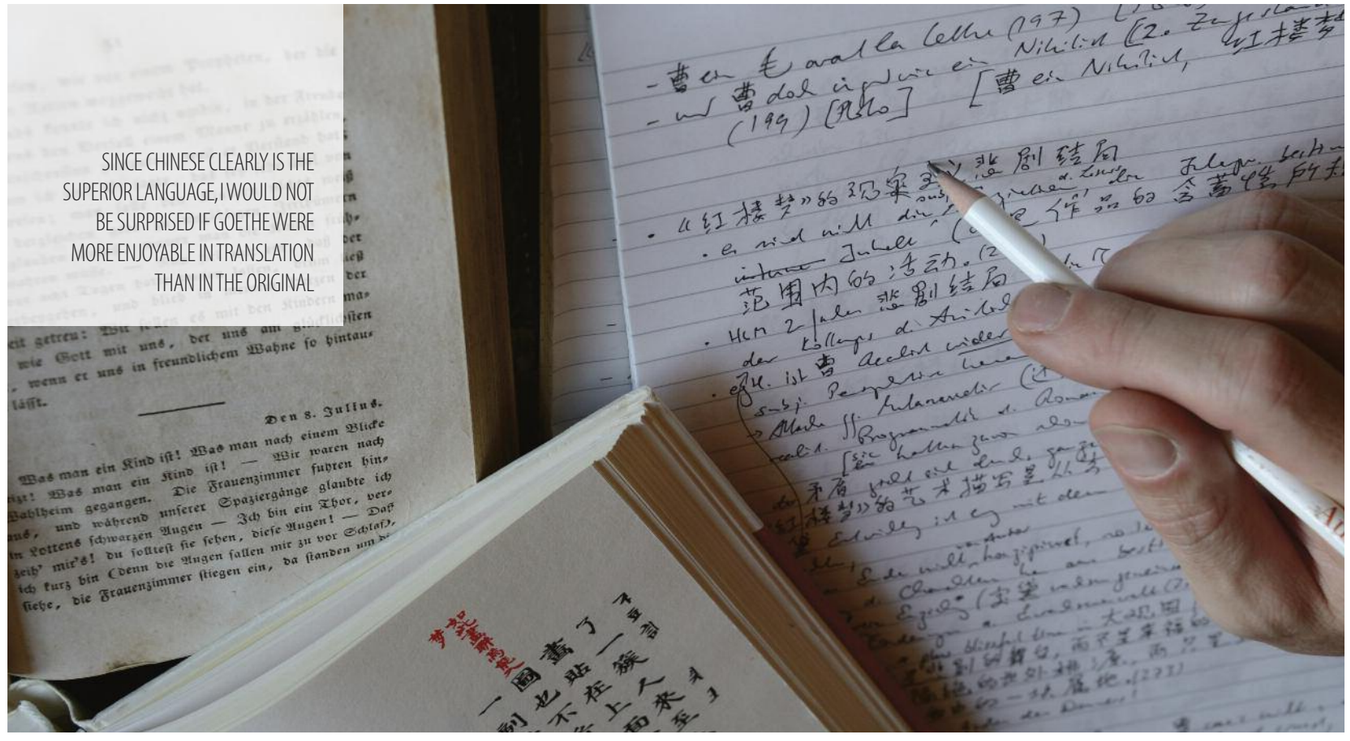
THIS IS THE FIRST TIME I AM PRESENTING A CHINESE TOPIC TO A CHINESE AUDIENCE – IN CHINESE.

Thinking of my unsuccessful presentation, I give in and empty the first glass. In this melancholic mood, I accept every single baijiu-shot and chuck it back. After a dozen shots, I feel a hand on my shoulder: 'Your presentation was brilliant. You belong to the few foreign researchers who deeply understand Chinese culture: just look at how you can drink!' Phew! But then, the other people around the table look at me smilingly and confirm: 'Yes, it was brilliant. I never thought of Mao's drinking, er, reading habits in this way.' As two editors approach me and want me to publish the article in their journal, my nostrils start to shiver. Something is escaping me. The drinking continues for another hour, then, at about 11 PM, I fall into bed with a spinning head.

The next morning, around 8 AM, I return to the same round table for breakfast. Understandably, the mood is quite different today, people talk with muffled voices. I order coffee but am served a sickeningly sweet, light brown liquid. As I slurp my congee, the emeritus next to me twitches my sleeve. He picks out a volume of Goethe's poetry in Chinese translation. He says: 'I was browsing through this book and thought Goethe a bit wordy. But in terms of the imagery, he surely matches up to our poets.' My eyes are still itchy, but I try to focus: 'Do you mean all the references to quiet wells, withering buttercups and water striders?'

He tips his chin with his finger: 'I am thinking of the moonshine in particular. Listen, have you ever read a poem that delivers a factual description of the moon? When you only read poetry and never look at the night sky with your own eyes, you assume the moon is square and does not move. All those poets look up - but are blind! No matter whether it's Li Bai or Goethe. But no wonder they were always occupied with drinking wine and keeping the company of beautiful ladies! They never got the opportunity to seriously observe anything.' Sceptically, I finish my congee. His observation is certainly accurate. But then, I wonder, what is the point of researching Chinese literature – if I end up sitting at a table with a Chinese scholar who wants me to admit that all great poetry does the same thing? That poets are all equally blind?

LISTEN, HAVE YOU EVER READ A POEM THAT DELIVERS A FACTUAL DESCRIPTION OF THE MOON?



SINCE CHINESE CLEARLY IS THE SUPERIOR LANGUAGE, I WOULD NOT BE SURPRISED IF GOETHE WERE MORE ENJOYABLE IN TRANSLATION THAN IN THE ORIGINAL

At 8.55 AM, the conference organisers bustle about and urge us to proceed to the lecture theatre. I help the emeritus fetch his walking stick, then I ask: 'Assuming what you said were true, then it would not matter if we read Li Bai or Goethe. After all, they articulate the same thing - just in different languages.'

Noddingly, he replies: 'Indeed! And since Chinese clearly is the superior language, I would not be surprised if Goethe were more enjoyable in translation than in the original.' Ouch! I am still irritated whenever I encounter the cultural chauvinism of Chinese scholars. Well, that's what life in a postcolonial world is like, I remind myself. (Note to self: identifying similarities between two different literary traditions seems to come hand in hand with establishing a hierarchy between them. Paradoxical, yet true!)

By 3 PM, I retreat into my room with a blasting headache. You can only take so many Chinese presentations at a time. Still slightly angered by the chauvinism of the emeritus professor, I fetch a volume of Hölderlin's poems that I always carry with me on travels. I resolve to read one of those lengthy odes, flip the book open - and squint my eyes. I find the page covered with swivels, columns and bars. Slowly, as I go from line to line, I want to fetch my Chinese dictionary - wait - I realise I am reading German, my mother tongue! As two halves of my brain connect that hardly ever communicate, I start reading line after line. After several stanzas I pause and start to smile: 'How can I, as a sinologist, ever understand German literature?' Indeed, the inner conflicts of a comparativist never stop, an endless battle against the accusation of senselessness.

Ten days later, I sit on the BA38 back to London. Next to me sits a book agent who stores bundles of hand-written manuscripts under his front seat. Upon hearing that I work on Chinese literature, he is pleasantly surprised and orders red wine for us. As he opens the small bottle, he jokes: 'Have you ever tried Great Wall wine? Well, I started using it as vinegar!' After a sip or two, however, his mood changes and he starts to pour out his heart. He complains that he had high hopes for Chinese translations on the English book market. 'Especially when Mo Yan won the Nobel Prize in 2012 - wasn't it incredible publicity for us? But the average reader still prefers to read about his or her own society and class, and that works in favour of Hilary Mantel and Zadie Smith, I guess.'

I hold against his reasoning that the middle classes are equally squeezed around the world at the moment - isn't this a good precondition for worldwide literary exchange? Who knows. But now I know that I can give the book agent a pill from my personal medical cabinet. This pill is a quote from Goethe. In 1827, he made the following proclamation: 'The age of world literature is beginning, and everybody should contribute to hastening its advent.' The book agent smiles and seems to recall that it's 2014 already. After a while, he raises his glass and says: 'Cheers! To the hastened advent of world literature!'

'THE AGE OF WORLD LITERATURE IS BEGINNING, AND EVERYBODY SHOULD CONTRIBUTE TO HASTENING ITS ADVENT'.
GOETHE

DR ELENA KAZAMIA

RESEARCH FELLOW IN PLANT SCIENCES INTERVIEWED BY SIMON HEFFER

MANY CORPUS MEN AND WOMEN TAKE AN UNUSUAL ROUTE TO CAMBRIDGE, BUT FEW HAVE EXCELLED ELENA KAZAMIA, WHO IS IN HER SECOND YEAR AS A RESEARCH FELLOW STUDYING THE DEVELOPMENT OF BIOFUELS AND, MORE SPECIFICALLY, THE PRODUCTION OF ETHANOL FROM ALGAE.

Dr Kazamia was born in Leningrad, as it was then known, to a Russian mother and Greek father, and went to a French school there. Her paternal grandmother was from Constantinople, which shortly after our meeting she was planning to visit for the first time, as part of the College Chapel trip. At the age of seven the family moved to Athens, where her father had a travel business. Elena attended the English school there, a legacy of which is that she speaks the language flawlessly but with a slight South African accent – that having been the homeland of many of her teachers.

Recalling now that she had wished to be a biologist 'for as long as I can remember', and with the committed support of her parents, she decided to try for Cambridge – and although her school warned her the odds were stacked against her secured a place to read Natural Sciences at St John's.

That was the beginning of her glittering academic progress. After John's she did an MSc at University College, London, and then came back to Cambridge – this time to Corpus – to do her PhD. In 2013, having completed it, she was awarded her research fellowship, but took time one morning in late summer to leave her laboratory for an hour or two and talk to the *Pelican*.

'I was born in Russia a few days before the Chernobyl explosion,' she says. 'I hope to make a more positive impact!' She lived as a small child through the end of the Soviet Union, and witnessed some of the changes there. 'I remember things suddenly becoming available,' she recalls. 'I remember my first Snickers bar, which was delicious – I still can't get enough. I remember Hollywood films arriving; my favourite was *'The Mask'*.

'My mum was a civil engineer but she hated it, so then she pioneered tourism into Russia. That's how she met my father. He brought Greeks into Russia, and she started sending Russians to Greece – in those days people who were allowed to leave the country, such as pilgrims or archaeologists, and then, eventually, mass tourism. She enjoyed that – she's very much a people person.'

MY PARENTS HAVE ALWAYS PRIORITISED ME AND MY EDUCATION. THEY MADE ALL OF MY CHOICES SEEM RELATIVELY EASY.

Then came the move to Greece, which was not easy. 'My father lost his business. My mother found it very difficult to adjust. But they pulled through. And whatever I have done, I definitely owe to them. They have always prioritised me and my education. They made all of my choices seem relatively easy.'

Once in Athens she spent two years in a Greek school and then from the age of 10 went to St Lawrence College. 'That was the only school that offered the full British educational system, including A levels, and that was what my parents wanted for me.' Greeks are not allowed to go to international schools, but she got in thanks to her Russian mother. 'It was very difficult, because everything was in English – but it really helped me to come to Cambridge. 'My school was really interesting – a very small school, full of misfits, people who for some reason found themselves in Athens and needed to teach. Some were fantastic, and some… well not so much.They brought stories and a life lesson'.

She formed her ambitions at a very early age. 'I couldn't stop reading about biology. I loved reading encyclopedias. My parents would buy them for me. The first one I read was the encyclopedia of sharks, which I read on the beach, to everyone's dismay – I told people about the different sorts of sharks, and reassured them that there weren't many in the Mediterranean.

'I then got an encyclopedia of general biology, and became more and more interested in the subject at school. I loved the study of life. I think it's both intriguing and exciting, and rather romantic as well.'

She was, perhaps, an unusual student. 'Nothing excited me more than revising for exams. I was a geek through and through. I obsessed about everything in my textbooks.'

She had never been to Britain, but says that 'everyone had heard of Cambridge and everyone wants to come here. It was my absolute dream, this magical place that I couldn't picture.' She was 'completely stunned' by the town when she came for her interview at John's, particularly by the sight of King's Chapel in the moonlight. 'Even now, having lived here for years, I still go and look it sometimes at night and catch my breath.'

She chose John's on the basis of the University Prospectus, which her school 'after months of arguing' obtained for her. 'My headmaster didn't like Cambridge. He had a prejudice. A lot of people do. He was one of them. I was 17.

I didn't care. So after a lot of arguing he said 'OK. Apply. You won't get in.' He'd rather I'd applied to Oxford.'

However, her biology teacher, Mr Macklin, was a Trinity man, who encouraged her ambition and told her to pick a college rather than make an open application. 'He didn't push Trinity on me, but told me to pick one in the centre because I didn't know how to cycle, and to pick an old one because it would be more authentic – and I picked John's because it had a river flowing through it on the map. I thought to myselt that must be nice'

She says that when she got to John's 'I was just overwhelmed by how big and beautiful it was, so austere and masculine'. But apart from the aesthetics, she was also impressed by the quality of the teaching and pastoral care. 'It was more than I could have hoped for. They gave me a lot of support, including academic scholarships. It was definitely a home away from home.' She was surprised that when she met people their first question should have been 'what school did you go to?' 'I said to myself 'what an odd thing to ask!'' She realised that was how people were placed in Britain, but still found it 'strange'.

'I WAS OVERWHELMED BY HOW BIG AND BEAUTIFUL ST JOHN'S WAS'.

I CAME TO CAMBRIDGE WANTING TO CURE CANCER, WHICH A LOT OF BIOLOGISTS DO.

Asked when she decided to become an academic biologist, she answers: 'I don't think I've committed to that decision.' As an undergraduate she considered going to work in the private sector because 'I was incredibly driven, I wanted to be the best I could possibly be. It's an incredibly competitive environment, and I became very stressed – when I'm teaching undergraduates who are going through periods of stress I try to help as a result of my own experience and I take their welfare very seriously.

'I applied to various consultancies because that was what everybody else was doing. I applied to management consultancies, IT consultancies, BP, because it felt like that had to be the right decision. But very quickly I got rejected from almost everything, usually at second interview, usually when they asked me a question such as What do you know about IT consultancies? Obviously I didn't know anything, because at heart I wasn't interested.'

She was offered the job with BP, but turned it down when she saw it would be based in Aberdeen with an early re-location to Sudan – 'I thought, no, probably not.'

So, instead, her focus remained on biology. 'I had come to Cambridge wanting to cure cancer, which a lot of budding biologists do. But I loved doing Natural Sciences here because of the flexibility and the options. I thought I knew what I wanted to do, but then I discovered nature. I did an ecology course in my second year with biochemistry and the history and philosophy of science – those three courses have never been taken together, as far as I'm aware, and any director of studies would advise you against it.

As was predicted, my grades suffered because there's no overlap. But I did biochemistry because I thought I wanted to do molecular biology. I loved the history and philosophy of science, which I still think is the most interesting course I did as an undergraduate, and I did ecology because I'd been on a field trip to a forest in Surrey where I discovered I was really, really good at the subject. I fell in love with ecology. In my third year I did zoology taking all the ecological modules and as much plant science as I could. The one thing I found missing from the course was the marine environment – I really love the ocean – and I wanted to do a proper degree in conservation, so I applied to UCL to do a master's degree in it.'

She says that when she first came across committed conservationists she found their attitudes a little 'extreme', but 'the longer I spent in conservation and with science and policy interfaces you realise how valuable it is to have people like that. You need extremes in order to find the golden middle.' For her part, 'I felt strongly about marine life, and the collapse of fisheries. There are not many laws regulating the use of the sea because for the most part of it nobody owns the sea whereas somebody always owns the land. I felt there was a strange lack of understanding and a big gap in policy in that respect. And I discovered David Attenborough along the way!'

In an area that has become heavily politicised, Dr Kazamia says she hasn't 'become politicised, but I have become more and more aware of the importance of politics and policy. I've never campaigned for anything and I've never belonged to a political party. I don't see the world as binary. But I've noticed a real absence of science from policy. Of course the science-policy relationship is a sour divorce for both sides. Few scientists know how to properly engage in decision making.

'I'm still learning. I did a placement in parliament – and just when I had got a handle on how the civil service side of things works, and on policy and legislation, I realised the importance of media. I'd never quite appreciated how much sway and influence the media have.' On her placement, for the non-party Parliamentary Office of Science and Technology, which advises both Houses of Parliament on long-term scientific issues likely to become important over the next 10 years, Dr Kazamia had to interview experts and analyse their answers before making projections about the subjects they had discussed. 'If you are talking to experts they are usually very balanced with their area of expertise. They won't give you black and white, they'll usually give you grey. But people seem to be incredibly quick to jump to conclusions when it comes to areas outside their expertise – it's terrifying.'

After her MSc at UCL she came back to Cambridge to do her PhD with some reluctance, not because she had anything against the institution but because she wanted to diversify her experience. However, she regarded Professor Alison Smith, another Corpus Fellow, as 'absolutely unbeatable – I really enjoyed working with her as an undergraduate and I jumped at the opportunity to work with her again. I remember distinctly our phone conversation. I rang her up to ask if she was interested in supervising me for a PhD in algae biofuels research, and when she said she was, we applied together for funding for my time in her lab. The applications were successful, and I was offered the Gates Scholarship and a UK Energy Research Centre studentship. I picked UKERC because it was more specialised.'

ELENA REGARDED PROFESSOR ALISON SMITH, ANOTHER CORPUS FELLOW, AS ABSOLUTELY UNBEATABLE.

Dr Kazamia says that the subject of her PhD studies – *Synthetic Ecology - a way forward for sustainable biofuel production?* 'really excited' her. 'I sat in the original meetings when algal-based biofuels were discussed – I was actually the first person in Alison's lab working on this. I was the first PhD student to come in and then it exploded – a year later we had three post-docs and the field grew very quickly. When it came to the title of her thesis, she and Professor Smith 'argued over the question mark. Alison is an incredibly rational and very balanced scientist and she will never make a statement that she doesn't actually fully believe in – so she said I'd have to keep the question mark. We're not quite there yet, so we weren't ready for the full stop.'

'BECAUSE OF THE LOVE THE GREEKS HAVE FOR ONE ANOTHER, AND FOR THEIR COUNTRY, I AM SURE THEY WILL RECOVER'.

She concedes that in a world where energy sources are under increasing pressure there are huge commercial possibilities for the work she is doing. 'There are very few biotech companies that I have met that I would like to work for, because usually the economic drivers of the business preclude it from doing the science that I find most interesting and important. I appreciate the constraints within which they are working – I know that to stay economically viable you have to do certain things a certain way, and only when you have a large enough portfolio of clients, or your production facilities are big enough, can you move towards something more sustainable in the biological and environmental context. For now I believe I can contribute and excel best in academia.'

The conclusion of her PhD thesis was 'not to ignore basic biology and fundamental ecology – algae are living things and if we want to produce fuels from them we mustn't ignore basic aquaculture. Observing how they interact with other living things can have great benefits in learning more about sustainability.' We talk about what Dr Kazamia calls the 'energy security aspect' of the development of biofuels – providing an alternative source of energy if, for example, someone such as Vladimir Putin turns off the gas taps to the west. 'That is a political question,' she says. 'I can see why governments would be interested in biofuels for that reason, but it's not why I do it.' She does, though, hope her work might help wean countries – whether in the developed world or elsewhere – off 'dirty fuels' and, in developing countries, instead of having a debate about 'food or fuel' to change it to 'food and fuel'.

The work she is doing during her Fellowship to an extent is trying to replicate agriculture in aquaculture: but instead of growing a crop in a field, she is 'looking at how to grow algae – you pick a species that produces your desired chemical and try to grow a large crop of it. But it's difficult, because natural systems veer towards complexity.' In a field of crops, if you don't spray them with pesticides, weeds will grow. Dr Kazamia and her colleagues have decided that a better approach is to 'have a designed community with lots of species, but where we pick the players and engineer a desirable state, which is complex ab initio'.

We end by talking about Greece, which she still regards as home, and which is, she says, 'going through a very difficult period'. She believes the media are guilty of a 'gross misrepresentation' of what is going on in her country. 'There is no such thing as an absolute truth. But I think Greece is recovering. I think Greece is on the rise again. But there are changes that need to happen, especially restructuring the government. But because of the love the Greeks have for each other, and for their country, I am sure they will recover. I have absolute faith in that.'

Would she ever go back to Greece to work? 'Yes, I think I would: probably not in the near future, as I have a lot of career development still to do. But at the worst of it, I, like a lot of educated Greek people thought it was my duty to bring back my talent and help my country. I wouldn't rule it out one day, but not just yet.'

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DR BEN PILGRIM, WHO WAS APPOINTED AS A FELLOW IN CHEMISTRY AT CORPUS IN 2013 HAS BEEN TRYING TO PUT A SPARK BACK INTO THE SUBJECT WITHIN THE COLLEGE, IN MORE WAYS THAN ONE.

DR BEN PILGRIM

I DIDN'T ALWAYS KNOW THAT I WAS GOING TO BE A CHEMIST, BUT IN HINDSIGHT THE SIGNS WERE THERE FROM AN EARLY AGE. AS A YOUNG BOY I WOULD MAKE MUD PIES IN THE GARDEN. THIS THEN PROGRESSED TO VARIOUS CONCOCTIONS FROM THE CHEMICALS THAT I COULD FIND UNDER THE SINK, MUCH TO THE ANNOYANCE OF MY PARENTS WHO WOULD OCCASIONALLY DISCOVER ONE OF THESE MORE FRAGRANT BREWS HIDDEN IN A CUPBOARD SOME WEEKS LATER. MY FASCINATION WITH FIRE WAS ALSO APPARENT. I THINK THERE IS AN ELEMENT OF A PYROMANIAC IN MANY A CHEMIST; I MEAN, WHO DOESN'T LIKE BANGS AND EXPLOSIONS?

At school I studied the sciences and mathematics for A-level, but by then I knew that chemistry was my true calling. So why chemistry then, as opposed to the other sciences? Chemistry to me is the central science, and by far the most intriguing. In the broadest sense as the study of matter, I feel that a knowledge of chemistry gives us a better understanding of the world we live in and how we interact with it than any other science.

Why, are some things coloured, some things heavy, some toxic, some hard and some highly reactive? Why was silver (rather than gold, copper or tin) the ideal choice for Corpus' fine collection of tableware that has lasted for hundreds of years; or why have some colours on the portraits that adorn the hall faded, but others look much the same as the day they were painted?

Chemistry has done more than any other science I believe to improve our quality of life; from fertilisers to medicines to polymers and plastics, to batteries and LCD displays, it is hard to find a product that has not needed a chemist along the way. Hence as a science that gives fundamental insight into our world, but that is also highly relevant to everyday life, no other science is even a close second to chemistry.

With a strong passion for chemistry above the other sciences, I chose to apply to the University of Oxford , where you could specialise in chemistry from day one, rather than one of the broader natural science type courses that are offered in places such as Cambridge. I spent eight years at St John's College, Oxford; four to complete my MChem. and a further four to complete my DPhil.

For the latter I specialised in organic chemistry, broadly speaking the chemistry of carbon-based compounds. This might appear rather niche to some readers, but there are more carbon-based molecules known than all other molecules put together. Carbon-based compounds form the backbone of life as well as many modern synthetic materials.

More specifically, during my doctoral research I developed an interest in the chemistry of a class of organic compounds called aromatic heterocycles. The 'cycles' referring to the fact that these are compounds containing a ring of atoms and the 'hetero' that these rings contain atoms other than carbon. The aromatic term (historical in origin due to the aroma of such compounds) describes the type of bonding that is present in these ring systems. Aromatic heterocycles form the core of the majority of pharmaceutical drugs, herbicides, pesticides, dyes and pigments as well as being the backbone for many larger structures. Thus, the study of novel methods for the construction of these systems is a highly worthwhile endeavour.

I STILL LIKE THE FLASHES AND BANGS OF COURSE – BUT IF MY EXPERIMENT EXPLODES NOWADAYS, THAT IS USUALLY A BAD SIGN!

I focussed particularly on methods that involved using small amounts of a metal catalyst to promote such reactions. A catalyst is a substance that increases the rate of a chemical reaction without itself being chemically altered. Palladium was my catalyst of choice – more commonly found in a car's catalytic converter (where it performs a similar task of increasing reaction rate). Employing modern catalytic reactions in the synthesis of these heterocycles often therefore has the benefit of shorter routes to the target compound, reduced cost, milder reaction conditions and fewer waste products than traditional synthetic methods.

In October 2013, I moved to Cambridge to take up a Herchel Smith Research Fellowship in Organic Chemistry in the Department of Chemistry. Herchel Smith himself was a distinguished organic chemist whose work on steroidal hormones led to the development of oral contraceptives. His work had a profound effect on society and generated enormous wealth for him personally, of which he donated a large amount to Cambridge University upon his death (at the time the largest individual bequest to a British university). The University uses a share of this estate to fund a few positions like mine each year across the sciences, designed to be a good starting position for an academic career. I took up a Fellowship in Chemistry at Corpus at the same time, where I am also a Director of Studies.

My research has now moved into the field of supramolecular chemistry. Often termed 'chemistry beyond the molecule', supramolecular chemistry studies how discrete molecules can assemble into larger, more complex structures that are held together by multiple weaker intermolecular interactions. These intermolecular interactions, although weak, can be highly selective leading to incredible specificity in which molecules bind to each other.

The DNA double helix is perhaps the best known example of a supramolecular structure, where thousands of weak hydrogen bonds keep each strand tightly paired with its partner despite there being no permanent chemical bond linking the two strands together. The supramolecular systems I work with are completely synthetic and have no biological components. They take the form of molecular cages (often tetrahedral or cubic in shape) that can self-assemble in solution. This means that rather than having to painstakingly construct each cage atom by atom, you can essentially just mix the pieces together and they will form the cage by themselves. This occurs because these numerous intermolecular interactions are highly dynamic in nature, easily being formed and broken, hence allowing the system to sample a multitude of potential ways of assembling before it settles on the most stable (lowest energy) configuration.

By appropriate design of the components for these cage systems we can direct this assembly process towards the formation of particular structures of interest. For example, by mixing appropriately designed edge pieces (a rod-shaped molecule often containing an aromatic heterocycle) and corner pieces (a metal ion) in a ratio of six edges to four corners, the formation of a tetrahedral cage is most favourable as this is the simplest structure where each edge piece is bonded to its desired number of corners and each corner piece to its desired number of edges.

As well as developing new highly complex architectures, the real excitement is in examining the potential function of these systems. The inner cavity of these cages can often bind a suitable guest molecule – a molecular inmate in a molecular prison if you like. This binding can have a profound influence on the properties of the guest molecule.

For instance white phosphorous, normally highly pyrophoric, can be rendered air stable by encapsulation in such a cage which prevents it from reacting with oxygen in the air. It is also possible to use these systems for catalysis, whereby the precious metal catalyst is temporarily locked up inside the cage keeping it safe until you choose to release it to perform your desired reaction in the bulk solution. It is also possible to carry out the catalysis inside the cage cavity itself.

If you were trying to encourage a fledgling romance between two of your friends you might try to create a situation that would get the two of them together. In the same way, two molecules that you are trying to react with each other won't do so until they are brought together. A cage system that encapsulates both potential partners of a chemical reaction can do more to couple them than any posh restaurant would in the real world and hence the cage can greatly increase the rate of a reaction.

Biological enzymes are such efficient catalysts as they employ similar effects, but they also have many drawbacks such as instability to temperature changes, sensitivity to acid, the need to often work in water and so on.

IT IS SOMEWHAT OF A TRADITION FOR CORPUS FELLOWS TO MAKE A DONATION OF SILVER TO THE COLLEGE. HOWEVER, I AM PROBABLY THE FIRST TO PRODUCE FRESH MOLTEN ELEMENTAL SILVER IN THE MIDDLE OF OLD COURT.

THE ATTITUDE TO SCIENCE IN UK SOCIETY NEEDS TO FUNDAMENTALLY CHANGE IF WE WISH TO REMAIN A LEADER IN THE RESEARCH AND TEACHING OF THE SUBJECT.

By designing synthetic shells that work along the same principal to achieve this, it allows us to move beyond the many limitations of biology and access new regions of chemical space.

The long term potential of these cage systems is even more remarkable. Their ability to store guest molecules could make them practical transport capsules, perhaps for drug encapsulation in the human body to ensure the pharmaceutical substance is protected until it arrives at the place where it is required, or perhaps to form the beginnings of artificial cell membranes. Some cages respond to external stimuli giving them the potential to act as molecular switches or stores of logic information. It is fair to say then, that the experiments have now become a lot bigger and more complicated than in my childhood days in the garden, but that underlying fascination of manipulating the properties of a substance remains. I still like the flashes and bangs of course – but if my experiment explodes nowadays, that is usually a bad sign rather than what I was intending!

Throughout my time in Oxford, I was heavily involved in college life, and this is something I have tried to keep up since joining Corpus. What particularly attracts me to the collegiate system is the close contact you have with incredibly bright students. There is nothing more rewarding than seeing a student's understanding of a subject grow over the years of a degree, something you only get from small group supervision. Universities were of course established as centres of high level teaching; the research aspect came later. It is a sad fact that many modern university academics try to avoid teaching as much as possible to 'focus' on their research and in doing so are failing to partake in the primary purpose of the institution that they work for. You have to be incredibly on the ball to teach bright Cambridge undergraduates and I personally find it amazingly stimulating academically. In fact there have been many occasions where an idea discussed in a supervision has given me inspiration for my own research. In addition to being a Director of Studies here at Corpus, I also do extensive work with admissions and outreach. In the past year I have given a demonstration lecture entitled 'The Chemistry of Water' on some 15 or so occasions to groups of school students either in Cambridge or on residential visits to their schools. Sinking ice cubes, saving people on the *Titanic* and the underlying chemistry of the recently popular 'Ice Bucket Challenge' are just some of the facets of water chemistry examined, naturally accompanied by the classic flashes, bangs and smells.

In seeing these experiments first hand I hope many students are inspired in the same way I was as a youngster.

I have also been heavily involved with the International Chemistry Olympiad competition for a number of years. The Science Olympiads seek to select the top four students from each country and pit them against each other in an international competition to find the world's brightest students. In the UK, as well as using the competition to find these students we use it as a medium to promote the relevance of chemistry to everyday society, with far more pertinent questions than those that might arise in an A-level examination. As a team mentor, I have travelled to countries all over the world and made many friends and connections through this competition. I have had some great experiences – discussing university exploits with the normally detached Prince Fumihito of Japan, trying not to trip over during a 500-person Turkish line dance and attempting to take a 'selfie' atop a hotel roof during a Taiwanese typhoon. Over the course of my involvement, one thing that has struck me in particular is the huge value that is put on chemistry and indeed science in general in some other countries, notably those in Asia and Eastern Europe. Science has governmental support and a level of respect from society in general – it's 'cool' to be a chemist – far in excess of what we have in the UK. This attitude is something that needs to fundamentally change in this country if the UK wants to remain a leader in the research and teaching of science.

Outside of chemistry, a big passion of mine is rowing. Before joining university I was not a sporty person and would run a mile at the thought of team sport. However, when I started as an undergraduate I decided to give rowing a try. The inclusiveness of the sport at collegiate level was welcoming to someone who was usually last when teams were picked for school football.

The fact that most people were novices to the sport meant that we were all starting on fresh ground. I loved it, and have been somewhat addicted ever since.

Throughout my undergraduate and postgraduate studies I rowed, coxed and coached numerous crews, winning oars on a number of occasions (with the odd set of spoons as well). Personal fitness also became a much bigger thing in my life, I now regularly go to the gym and have even run a marathon, a real change brought about by the decision to take up rowing as a Fresher.

Of course there are many people around college who share my passion for rowing, but there are also many who don't. Rowing frequently gets a bad press. In fact I often hear Directors of Studies complaining about how rowing nowadays disrupts students' academic pursuits. It's somewhat ironic to note that Corpus had a rowing team in the first May Bumps of 1828, far before many subjects were taught here (certainly chemistry) and so it's hardly a recent thing! Personally I find that the rigours of training and the thrill of competition provide a chance to disengage the brain from academic pursuits and I often return from training highly refreshed. The belief that involvement in rowing (or indeed other extra-curricular pursuits) always negatively affects academic performance is untrue. I know more than one person who topped the Honour School in Finals shortly before winning their oars in the Bumps! Here at Corpus I have taken over as the Hon Senior Treasurer of the Boat Club, where I hope the experience I have gathered over the years is of value to the students running the club. I do also still participate on a day-to-day level, and hope this summer to compete in my 100th Bumps race.

I can neither see nor hear the Corpus Chronophage from my office, but it must have just struck midnight. I can almost feel it eating away the minutes of what little sleep I will get tonight. Tomorrow, a 6.00am trip to the river beckons, then into the lab to see if anything has been encapsulated in my newest molecular cage. In the afternoon I'm off across London to give my demonstration lecture to a group of Year 12 students and then back to Cambridge to meet the first batch of students I helped select to study Natural Sciences at Corpus as they come up to college – quite an all encapsulating day you might say!

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DR DAVID GREAVES

ELECTRONICS ENGINEER AND FELLOW

DR DAVID GREAVES, MIET CENG, IS AN ELECTRONICS ENGINEER. HE JOINED CORPUS CHRISTI COLLEGE IN 1994 TO TAKE UP THE POST OF DIRECTOR OF STUDIES IN COMPUTER SCIENCE. HE HAS BEEN A FOUNDER OF TWO PROMINENT LOCAL ELECTRONICS COMPANIES, VIRATA AND TENISON, WHERE HE SERVED FOR A DECADE AT EACH AS CHIEF SCIENTIST. HE HAS ALSO BEEN A CONSULTANT DESIGNER AND TECHNICAL ADVISOR FOR ABOUT A DOZEN FURTHER UK AND USA CORPORATIONS. HE SPENT HIS FIRST 13 YEARS IN CAMBRIDGE AT ST JOHN'S COLLEGE, STARTING AS AN UNDERGRADUATE, THEN GRADUATE STUDENT AND THEN RESEARCH FELLOW. FOR ALL 33 YEARS HE HAS BEEN STAFF OR STUDENT AT THE COMPUTER LABORATORY - THE DEPARTMENT OF COMPUTER SCIENCE FOR THE UNIVERSITY OF CAMBRIDGE.

My grandfather built his own TV set after the war in the days before the mass production of consumer electronics. At that time it was cheaper to build your own than buy such things and the family home in Kenton was in the north London region served by the early BBC service from Alexandra Palace. My father was an electronics engineer as well. He worked on black and white TV cameras and television sets for Rank and EMI near Shepherd's Bush where the first custom TV studios were built. Then he moved to IBM in nearby Chiswick and worked on modems. Although it is not surprising that I studied electronics from a young age (I still have a screwdriver I owned from the age of four), it is perhaps a coincidence that, like my father, I worked on TV and modems in my industrial career.

I built my first computer at the age of 15. Components were hard to come by and most of my integrated circuits came from scrap circuit boards. I removed them with a blow lamp at the work bench in the garage at home and molten solder would fly across the floor as the charred circuit board sprang back and the precious chip came away in my pliers. Many chips were not marked, but by memorising the pin connections for 100 or so of the most popular logic circuits I could mostly spot the chip type from its pattern of inputs and outputs determined by testing each pin in turn with a volt meter. Each chip had to be tested before assembling into new designs, such as my first computer.

This computer was expanded and came with me to Cambridge when I matriculated in 1980 where it was used for space invaders, Pacman and word processing for my degree work. I was the only student in my year to have a computer; no other student used a word processor for their work, let alone having built the computer and written the operating system and the word processor application. I read Engineering for one year and then changed to Computer Science for my final two years. The Computer Science degree in Cambridge is only just becoming a three year degree and now, as the current chair of Tripos, I, myself, am overseeing that transition!

CAMBRIDGE WAS ONE OF THE FIRST TOWNS GLOBALLY TO PUT KERBSIDE BOXES IN THE STREETS SO THAT TELEPHONE WIRES TO INDIVIDUAL HOUSES COULD BE KEPT SHORT. IN 1994, GREAVES DESIGNED THE FIRST MODEMS TO GO AT EACH END OF THESE NEW GENERATION PHONE LINES IN CAMBRIDGE. HERE HE IS PICTURED LEANING ON A KERBSIDE BOX OUTSIDE CORPUS AND HOLDING HIS 1998 PROTOTYPE RESIDENTIAL MODEM HE DESIGNED FOR TRIALS WITH BT

ACADEMIC CAREER

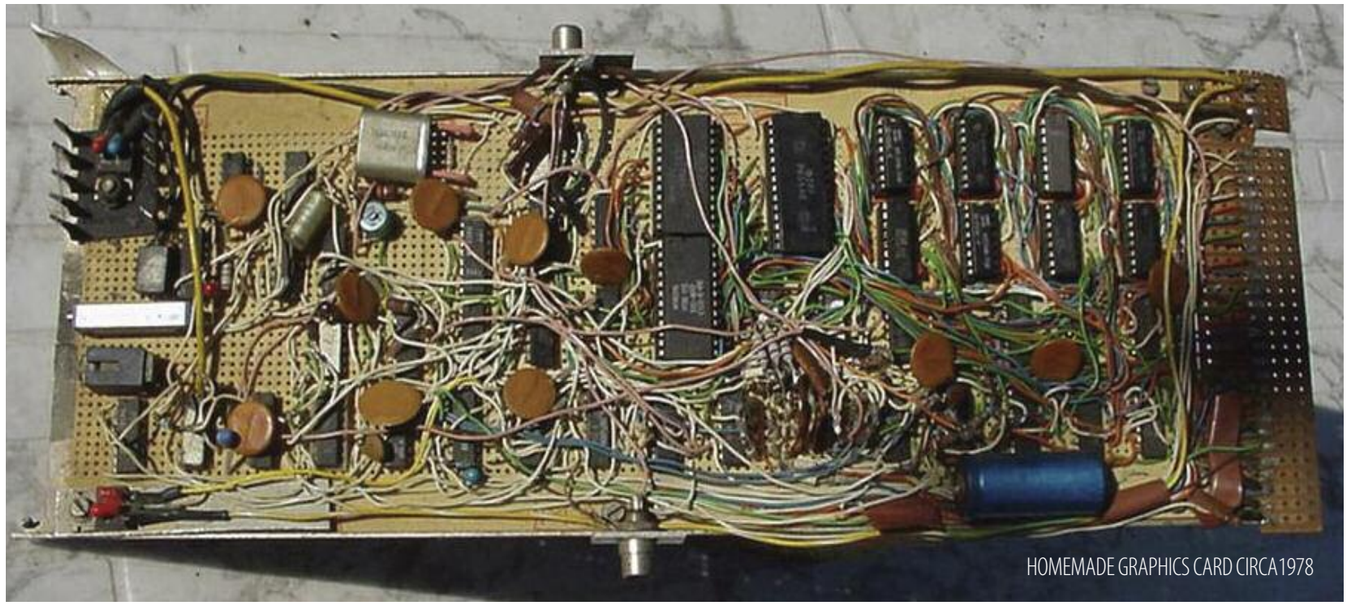
My academic career started when I read for the PhD degree under Professor Andy Hopper at the Computer Laboratory. Andy Hopper and I worked on local and metropolitan area networking. He had already designed the local network for the BBC Microcomputer and in my work I instigated the first high performance connections between separate buildings in Cambridge. The days of carrying magnetic tapes between buildings were about to end. I was involved in digging up the Backs and Tennis Court Road to install optical fibre cables and I constructed a 500 megabit network between the Engineering Department, various buildings of the Computer Laboratory and the Olivetti Research laboratories on the old Addenbrookes site. I also built the first equipment to conduct high-quality videoconferencing over the new SuperJANET connection between Cambridge and London.

I WAS INVOLVED IN DIGGING UP THE BACKS AND TENNIS COURT ROAD TO INSTALL OPTICAL FIBRE CABLES.

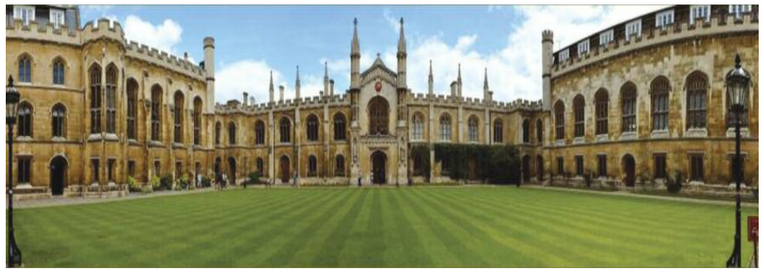
There was considerable commercial interest in all this new networking technology and in 1994, together with Andy Hopper and Hermann Hauser, I was involved in starting two companies to develop it. Virata was started to develop in-home networks and Online Media for residential broadband access networks and digital set top boxes. I wrote the initial business plans for both companies. Hermann Hauser was friendly with Cambridge Cable, the local cable TV company, and he organised for me to install digital, packet-switched network components in the kerbside green boxes that were being installed all over the town for analogue TV. I also designed the modem to go inside the set-top box. In this way, we connected more than 50 homes to the world's first video-on-demand and home shopping network. This was 20 years ago. It was the first version of Netflix. In retrospect, it is most surprising it has taken so long for video-on-demand to replace video rentals. Cambridge's last video hire shop only closed last year.

At Virata we developed increasingly complex chips. All contained embedded computers in the form of ARM processors. There was always the problem of developing the software for the ARM cores before the chips themselves had been made. I addressed this problem by writing a tool to produce virtual prototypes of the chips that could host the embedded software. In this way, the software team could get going the moment the first version of the chip had been fully designed. There was no longer the need to wait the many months that typically elapse before a working chip is delivered to the programmers. I licensed the tool to a company I started, Tenison EDA. The company is named after a road in Cambridge which in turn is named after a former master of Corpus. All complex chips in iPads and smartphones are designed this way now.

The company Tenison suffered considerable competition and was not a financial success whereas Virata was (and remains) the largest private IPO in European history. Both are now owned by large American corporations and I am no longer involved.



HOMEMADE GRAPHICS CARD CIRCA 1978



CURRENT RESEARCH WORK

My research in the last five years has focussed on performance prediction for computer hardware and software. Traditionally, the main performance metric has been speed of execution. The quicker a program ran the better. But there has been a substantial shift in the way computers are made and used in the last half decade and for many situations, the total energy cost of a computation is at least as important as execution time. Large data centres operated by companies like Amazon and Facebook are built near hydroelectric dams in Canada, Sweden and Finland because electricity is cheaper and cooling is simpler. The cost of the optical fibre to route the Internet to such locations is far less than the cost of electrical cables to route the power elsewhere. The hardware itself will have cost less than the electricity it uses after about a year. At the other extreme, with the rise of battery-operated computers in our phones and tablets, energy use is again very important. The most important marketing feature in such devices is the average interval between battery charges.

Both hardware and software design have an impact on energy use. My research applies to both fronts. I am working to increase the availability of energy information to hardware and software engineers.

Software programmers are not currently provided with energy instrumentation and hence they work in the dark in this respect. Computer science and their own experience has trained them to write high performance software, and this is readily measured with a stopwatch and similar timer techniques. But performance is sometimes inversely-co-related with energy efficiency and sometimes not. Without energy metres in the hardware and operating system infrastructure they cannot improve their decision making. The same goes for automated optimisation decisions provided in compiler toolchains that are applied to the software before it is ready to run. I have just completed a small project funded by the government's Technology Strategy Board which is distributing a concrete instrumentation proposal to my various ex-students who hold key posts in technology companies locally in 'Silicon Fen' and around the world (project spEEDO).

Likewise, traditional chip development techniques do not give the hardware designer sufficiently rapid insight into the energy consequences of their design decisions. Today's designers must first decide how many computer cores to put on their chip and what type of core. The ARM processor core, developed here in Cambridge, is very often selected. It is a general purpose design that is a direct descendant of the Von Neumann design which was first built by my PhD supervisor's supervisor's supervisor (MV Wilkes) in the Cambridge Computer Laboratory in 1949 (the first working computer of the modern kind).

The decision today is how many of these cores to put on the chip and what other forms of custom cores to also use, such as for efficient video compression in a camera phone. With the design practices currently in use, it is only after a lot of detailed design work (the best part of a man year) has been invested that the designer can get a feel for how much energy the chip will use and hence what the battery life or electricity bill will be. In my work, designers can get a reasonably accurate energy prediction with one or two day's work on a design. The prediction might be out by a factor of 2-to-1, but its derivative polarity will always be correct. This is the critical thing. The designer can now always tell whether a design change is for the better or the worse.

'AT VIRATA WE DEVELOPED INCREASINGLY COMPLEX CHIPS. ALL CONTAINED EMBEDDED COMPUTERS IN THE FORM OF ARM PROCESSORS, DEVELOPED IN CAMBRIDGE BY MY FRIENDS.'

DR DAVID GREAVES

ELECTRONICS ENGINEER

My most recent work moves away from the traditional Von Neumann computer design into the field of spatial and reconfigurable architectures. Currently I have a project exploring the feasibilty of these systems in collaboration with the Department of Veterinary Medicine which, very handily, is next door to the William Gates Building that now houses the Computer Laboratory on the West Cambridge Campus. Von Neumann's design for the computer is based around the fetch/execute cycle. A register called the program counter steps through the program one instruction at a time, fetching it from memory and then executing it. (Charles Babbage had the same idea a century earlier but had problems building such a machine using cog wheels instead of electricity). Spatial computing does away with the program counter and lays out the program on a programmable gate array - a silicon chip about one centimetre on a side that is totally programmable to take on the functionality of a chip that would be only a couple of square millimetres if hardwired. But rather than being hardwired, the wiring is totally reconfigurable. Hence the gate array can take on the behaviour of any digital electrical circuit that uses up to a million or so transistors. Actually, I started using gate arrays for computation in about 1990, but it is only recently I have seen very great interest in this approach. This is motivated partly by the the availability of wonderful silicon processing technology provided by the physicists, but it is also a matter of energy use. A large class of scientific computer programs can be accelerated using gate arrays. These include weather forecasting, financial market prediction, code breaking and genetic fingerprinting. The speedups gained with respect to the most advanced conventional processors, such as those from Intel, vary depending on the application, but are typically in the range 10 to 250. The energy use, however, is reduced by a staggering amount, perhaps by a factor of 50. The energy saving is through avoiding the fetch/execute cycle. The instructions are permanently placed on the reconfigurable circuit for the duration of the execution. The data moves between the instructions as needed. The overall movement of bits is low and much more effective parallelism can be realised.

My project with the Vet School is a highly-pragmatic usability study. Genome sequencing on gate array has now been done in student projects around the world. In my view, rapid prediction of system performance is, yet again, the critical aspect to effective deployment. Programmers are used to being able to run a program almost immediately after making an edit to it. But with the gate array approach we have the obstacle that compilation takes several hours! Although the final program will run in an afternoon instead of a week, we do need to get it right and be sure this speedup will accrue. If it takes an afternoon to find a design decision that has destroyed the envisioned performance gain and a programmer does this several times in succession, it does not take long for the saved week of execution time to get used up. Clearly this is not a problem with programs that are to be run time and time again, such as for weather forecasting, but it is a big disincentive to speculative 'what-if' style investigations that researchers have to explore to be creative. In my approach, still being developed, the vets will get rapid indication of the energy and speed of their program as they edit it. Once they are happy with their design decisions they can hit the main 'compile' button and do something else for the rest of the afternoon. They know that later on that evening they will get the results from a test that previously took a week to run. And the head of department will be very happy to see a much lower electricity bill.

'IN MY VIEW, RAPID PREDICTION OF SYSTEM PERFORMANCE IS, YET AGAIN, THE CRITICAL ASPECT TO EFFECTIVE DEPLOYMENT.'

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SPORTING BLUES

BY KATE POSKITT

3RD YEAR UNDERGRADUATE IN PPS AND VICE-PRESIDENT OF THE JCR

DESPITE OUR SMALL SIZE, CORPUS CONTINUES TO PUNCH WELL ABOVE ITS WEIGHT IN UNIVERSITY SPORTS TEAMS. THE YEAR 2013-14 SAW 6 FULL BLUES, 6 HALF BLUES AND 2 CLUB COLOURS AWARDED TO MEMBERS OF THE COLLEGE. MANY OF OUR ATHLETES ARE HEAVILY INVOLVED IN THEIR CLUBS, TAKING ON LEADERSHIP AND ADMINISTRATIVE ROLES, ON TOP OF THEIR SPORT AND WORK AND ADDITIONAL EXTRA-CURRICULAR COMMITMENTS - TRULY EMBODYING WHAT IT MEANS TO BE AN 'ALL-ROUNDER'.

ALL OF THE STUDENTS AWARDED FULL BLUES ATTRIBUTE THEIR INVOLVEMENT AND SUCCESS TO GREAT FRIENDS, EFFICIENT TIME-MANAGEMENT, AND A WHOLE LOT OF TRAINING!

FOR ARCHIE, A KEY PART OF BEING A BLUE IS THE HONOUR OF BEING PART OF THE HAWKS CLUB.

Men's Modern Pentathlon Captain Archie Myrtle is a third year Historian. He had a very successful season, building on his Half-Blue awarded in his first year, to gain a Full Blue whilst also leading his team to Varsity victory for the first time in 18 years. He has been doing tetrathlon (pentathlon minus the fencing) through the Pony Club since he was 10 years old, and transitioned to pentathlon when he came to Cambridge. The past year also saw him placed 4th at the Army International Pentathlon. He aims to be as efficient as possible with work, doing a couple of hours 'here and there in between training' which he believes hones focus when actually working. For Archie, a key part of being a Blue is the honour of being part of the Hawks Club, due to its rich history, with members including olympic greats and men who have gone on to represent their country. This year he will continue in a leadership role as President of the club.

Alice Kaye, a third year PPS (psychology) student, was again awarded a Full Blue for her performance in athletics. She got involved in athletics at a young age, starting at the sports day at her village primary school where the boys and girls ran together. Every year she beat the boys to the finish line, so the head teacher suggested to her parents that she join an athletics club. The success of this decision speaks for itself: as Women's Captain, she lead CUAC at the 150th Anniversary of the first Varsity match, held in Oxford at Iffley Road, to victories for both the second and first team. Alice came 2nd in the 100 but won the 200, 400, 4 x 100 and 4 x 400. She also set a new Varsity Match Record and is now top of the 400m all time list for CUAC. In the Indoor Varsity match the women's team broke five Indoor Varsity records, and Alice was involved in breaking three: the 4 x 60m, 4 x 200m, and 4 x 400m. She says that it is her team mates' support that gets her around the 400m reps in the winter! For Alice, going down to the track is a key stress-management tool; it helps her refocus and maximise her time in the library. She believes that making the most of all aspects of Cambridge is essential, and has certainly shaped her experience here — something she will miss hugely when she graduates this coming July.

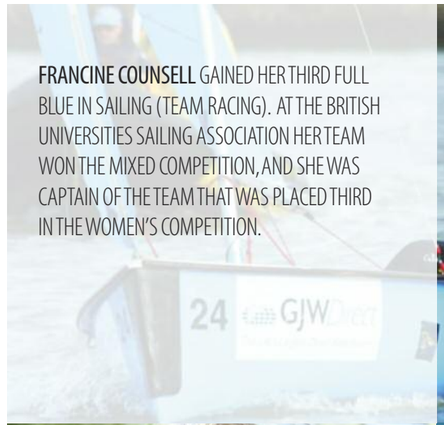
2013-14 was also a big year for Cambridge University Women's Football Team, as they topped the league, cup and Varsity, leading to their recognition as Ospreys 'Team of the Year'. This success was shared by three Corpus women: third year PhD student in Biological Anthropology Marielle Brown, third year PPS (politics) student Kate Poskitt, and Emilie Aguirre, a Research Associate in Law and Public Health.

GREG STREET CONTRIBUTED TO CAMBRIDGE'S IMPRESSIVE VICTORY IN LIGHTWEIGHT ROWING AT HENLEY BOAT RACE.

KATE POSKITT WAS AWARDED A FULL BLUE. CAMBRIDGE UNIVERSITY WOMEN'S ASSOCIATION FOOTBALL CLUB WON THE LEAGUE AND THE MIDLANDS CONFERENCE CUP, BECOMING OSPREYS 'TEAM OF THE YEAR'

EDWARD RAFE MARTYN WAS AWARDED A HALF BLUE FOR WINNING HIS MATCH IN VARSITY CHESS.

MATTHEW VOKES WAS AWARDED A HALF BLUE IN ORIENTEERING, AFTER BEING PLACED INDIVIDUALLY FIRST IN THE VARSITY MATCH IN SWEDEN.



FRANCINE COUNSELL GAINED HER THIRD FULL BLUE IN SAILING (TEAM RACING). AT THE BRITISH UNIVERSITIES SAILING ASSOCIATION HER TEAM WON THE MIXED COMPETITION, AND SHE WAS CAPTAIN OF THE TEAM THAT WAS PLACED THIRD IN THE WOMEN'S COMPETITION.

TOP RIGHT: **MARIELLE BROWN.**

RIGHT: 400M RELAY TEAM.

LEFT: **CAITLIN OWENS.**

BELOW: 100M START.

ARCHIE MYRTLE, CAPTAIN OF MEN'S MODERN PENTATHLON, GAINED A FULL BLUE, LEADING HIS TEAM TO VARSITY VICTORY FOR THE FIRST TIME IN 18 YEARS.

MANAGING WORK AND SPORT GIVES HER DAYS A STRUCTURE, ARRANGED AROUND TRAININGS AND MATCHES, SOMETHING WHICH IS INHERENTLY LACKING IN A PhD PROGRAM.

Marielle, captain of the team, has been playing soccer since she was 5 in her town's PeeWee league— imagine ten 5-year-olds crowding around one ball while wearing massive t-shirts that go down to their knees. For both Marielle and Emilie, as girls in the US, soccer was a huge part of their childhood and school years. Marielle played throughout her time at school, and also during her undergraduate degree at Dartmouth College. She believes that continuing football at Cambridge has proved invaluable to her smooth transition to life in a new country. Managing work and sport gives her days a structure, arranged around trainings and matches, something which is inherently lacking in a PhD program! For her, the pure act of playing football provides scheduled mental downtime that fully rejuvenates her for the next bout of PhD work. Three years on the football team has left Marielle with many fond memories and lifelong friends.

On the shorter side of her primary school cohort, Kate was never going to be a netball star for the NZ Silver Ferns. It was in football that she excelled, captaining her mixed boys and girls school team. Balancing work and sport hasn't always been easy: she had to make a decision not to attend training camp for the national team when she was 14, as it would have meant ongoing academic sacrifice. However, at Cambridge, football has become a welcome break at the end of the day, promoting more efficient work, better sleep quality, and effective time-management of everything else in the schedule.

Emilie also started football at a young age, as she was 3 when her elder brother first started playing in a league. She recalls wearing socks as long as her entire leg, and running all over the field the whole game, attempting to be in the action and play every position at all times. She came back to football at Cambridge after a long hiatus. The 'football season' for Emilie at school had been year round, and combined with academic commitment, this had led to burn out. As a result, during her time at college in the US - at Princeton, then Harvard - Emilie actively decided not to get recruited. Nearly ten years later, at Cambridge, she rediscovered the joy of the game and her love for football. For her, taking a break to exercise, get some fresh air, and spend time with a team she loves both on and off the pitch enables her to return to work with a clear head and increased concentration and productivity.

Francine Counsell, a fourth year Chemical Engineer, gained her third Full Blue sailing (Team Racing) this year on the 9th of July. She has been sailing and competing in national and international fleet racing since school, and claims that her involvement in sailing was due to not being so good at the other summer sport option — tennis. Her favourite memory from this year was winning BUSA and getting thrown into the water with her team after an extremely tense final, as well as captaining the Ladies Varsity team to a win after 5 years of losses. Sailing takes out an entire weekend, so Francine has learnt to plan ahead in scheduling her work week when she knows she is going to be away. For her, this scheduling has meant she simply doesn't procrastinate, so time spent working is as efficient as possible.

Kristen MacAskill, a 2nd Year PhD in Engineering, was introduced to squash by her father and brother, and has played on and off since she was 12. However, this was only socially in the women's inter-club level in NZ, and it was discovering that she was good enough to play for the Blues that really rekindled her enthusiasm for the sport. She was awarded her second Full Blue for her performance in the Varsity match, which was played as per tradition at the RAC in London against a very strong Oxford team, including a new no. 1 who came from Harvard and was a Junior International. Oxford won with a match score of 4-1. Kristen played at 3rd seed and lost her individual match 3-0. However, the team was successful in the Cambridgeshire squash league, where they were placed 2nd. For Kristen also, the exercise and mental concentration that squash requires is a great break from work; it actually helps her to work better and more efficiently.

Playing sport at Cambridge is not easy, as athletes face conflicting demands with academic work and ongoing pressures to minimise their sporting commitment. All of these individuals also foot large club fees, equipment costs, and the additional financial pressure of travel to fixtures and accommodation at Varsity matches, with tiny amounts of funding available for only a select few. It is the relationships formed in teams, the battle-like annual Varsity match, and the pure exhilaration that accompanies physical excellence that keeps these students competing. Through sport, they gain not only accolades and life-long friendships, but also develop a huge range of transferable skills that assist them in their work, and will continue to serve them beyond Cambridge.

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CORPUS HAS NURTURED THEATRICAL TALENT FOR CENTURIES. OVER FOUR HUNDRED YEARS AFTER HIS DEATH, MARLOWE'S DARK TRAGICOMEDIES CONTINUE TO THRILL AND CHALLENGE AUDIENCES, WHILE IN RECENT YEARS CORPUS ALUMNUS HUGH BONNEVILLE HAS BECOME A FAMILIAR FACE ACROSS THE WORLD FOR HIS PORTRAYAL OF LORD GRANTHAM IN *DOWNTON ABBEY*, AS WELL AS ROLES IN FILMS SUCH AS *MONUMENTS MEN* AND *NOTTING HILL*.

THREE OF CORPUS' RECENT GRADUATES, RYAN AMMAR AND BEN POPE (WHO ARE INTERVIEWED LATER IN THIS ISSUE OF THE PELICAN) AND ISABELLE KETTLE REFLECT THIS THEATRICAL LEGACY, SHOWING CONSIDERABLE TALENT IN WRITING, DIRECTING AND PERFORMING, FROM CUTTING-EDGE COMEDY TO SHAKESPEAREAN TRAGEDY.

ISABELLE KETTLE

INTERVIEWED BY SARAH GORDON

DESPITE HER WARM, OPEN PERSONALITY AND EVER-PRESENT SMILE, ISABELLE KETTLE IS MORE DRAWN TO TRAGEDY THAN TO COMEDY. 'THERE ISN'T THE PRESSURE TO REACH THE END POINT OF MAKING PEOPLE LAUGH; IT'S MORE CONCERNED WITH THE PROCESS OF THE EVENTS TAKING PLACE ON STAGE'.

It is the process of dramatic performance that makes the theatre so exciting for Isabelle; theatre is immediate and unpredictable, while 'in film you end up with a finished product, and once it is made it cannot be changed'. This unpredictability can make the role of a theatre director challenging for someone who is clearly a perfectionist. 'I find it difficult to let go of a play and just let it happen. I directed *The Duchess of Malfi* in my third year and when friends said they had enjoyed it I refused to believe them'. However, she thinks 'letting go' is important for directors, who ideally should be able to watch a play they have directed as if they were an audience member seeing it for the first time.

When she first arrived at Corpus Isabelle entered the world of Cambridge theatre through acting. 'I auditioned for some plays when I first arrived but didn't get in, then I acted in two plays in the second term of my first year and really enjoyed it'. However, when she put on a stage version of *The Bloody Chamber* by Angela Carter she realised that her real interest was directing. This has grown into a passion for directing Shakespeare, which she has found offers more freedom than directing modern playwrights as 'it is less prescriptive; there is more opportunity to play with the text'. Isabelle has set up the all-female theatre company Footfall Theatre with friends from other colleges, which adapts Shakespeare plays using a small cast. The company draws inspiration from recent all-female productions such as Phyllida Lloyd's *Julius Caesar* and *Henry IV*, but differs from these by focussing on female characters, rather than simply having women playing male roles. Isabelle is interested in exploring female characters, who are often on the edge of the action and have 'meaningful silences' which can be fleshed out in new adaptations.

Giving female characters a greater voice is a fundamental part of *Lear's Daughters*, which Isabelle directed at last year's Edinburgh Fringe Festival. This did provoke strong reactions: 'one man on the Royal Mile told us to 'drop the tragedy and drop the feminism''. Isabelle's motivation behind the project was not to make a political statement, although if 'political' means giving women a stronger presence on stage, then she is comfortable with being perceived in such a way. Focussing on female characters also allows her to put on a Shakespeare play in a new, creative way, as a small company like Footfall Theatre cannot put on high-budget, large scale productions. *Lear's Daughters* does this by having only four characters: Lear's three daughters, Regan, Goneril and Cordelia, and the Fool, who in this production is Lear's carer. The company developed the script from the original text in a week, realising it was possible to tell the story using these four characters. Lear is represented by a wheelchair and is envisaged as an elderly parent with dementia.

> **'ONE MAN ON THE ROYAL MILE TOLD US TO DROP THE TRAGEDY AND DROP THE FEMINISM'.**

IT IS IMPORTANT TO MAKE SHAKESPEARE SEEM MODERN, AS 'THE ACTING TECHNIQUES SHAKESPEARE WAS USING WOULD HAVE SEEMED MODERN TO HIS AUDIENCES.'

The production is set in 2014, but despite the modern setting the company decided to keep most archaic terms such as 'knight' and 'retinue'. They discussed at length whether this discrepancy would be confusing, but 'we needed to give the audience credit that they would understand it'. Isabelle adds that 'it can be jarring to replace a Shakespearean word with a modern one, and it can make the audience focus on that decision rather than what is being said'. She believes that it is important to make Shakespeare seem modern, as 'the acting techniques Shakespeare was using would have seemed modern to his audiences', so productions attempting to recreate the Renaissance theatre result in a less authentic experience than those that reimagine the play in a modern context.

Isabelle wanted to avoid including scenes from *King Lear* in *Lear's Daughters* just because they are famous, but 'you can't perform *Lear* without an eye gouging'. In the original play this scene shows Regan's husband, the Duke of Cornwall, plucking out the Duke of Gloucester's eyes. In *Lear's Daughters* Regan, jealous of Goneril due to their rivalry for off-stage love interest Edmund, mistakes the Fool for her sister, ties her to a chair and plucks out her eyes. The play is set in a kitchen, so she does this with a fork, releasing fake blood made with blackcurrant jam, cornflour, water and instant coffee. Isabelle seems rather proud of the audience's physical reaction, exclaiming that 'one woman nearly fainted!' She also had to cope with some unexpected consequences of a close-up live performance. 'One night, the fake blood fell onto an audience member's white linen trousers. We reassured her that it would wash out – we had washed the Fool's costume every night – but she wanted us to buy her a new pair. In the end I collected the trousers from her the next day, washed them and gave them back to her to prove that they weren't ruined'.

'NOW IS THE TIME TO EXPERIMENT - I HAVE NOTHING TO LOSE.'

At the time of our interview, Footfall Theatre was preparing to put on a London run of *Lear's Daughters* at The Hope Theatre in Islington from 9 to 20 December. The company is also contemplating a new name. Appropriately for a company including a female Corpuscle, one possible name is Pelican Daughters. This is a quotation from *King Lear*, and is a likely choice 'as the company was set up by a group of women' and they first worked together on *Lear's Daughters*. Whatever the company is called, Isabelle would like to work next on a production of *As You Like It*, exploring three different versions of the play in two hours as 'now is the time to experiment – I have nothing to lose'. As for the more distant future, we discuss the dangers of setting prescriptive career goals or having rigid criteria for 'success' and Isabelle responds that: 'If I'm busy, doing what I love and meeting interesting people – that might be what 'success' is for me'.

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RYAN AMMAR AND BEN POPE

INTERVIEWED BY SARAH GORDON

BEN POPE (left) and RYAN AMMAR (right).

'BEFORE MY FIRST GIG I FOUND MYSELLF HAVING A BIT OF AN EXISTENTIAL CRISIS. I WAS STRUCK BY THE ARROGANCE OF THINKING I COULD MAKE PEOPLE LAUGH.'

THE CAMBRIDGE FOOTLIGHTS HAS PRODUCED SOME OF BRITAIN'S BEST LOVED COMEDY PAIRINGS; DUOS FRY AND LAURIE AND MITCHELL AND WEBB BEGAN THEIR CAREERS AT THE STUDENT COMEDY CLUB. IT SEEMS APPROPRIATE THAT THIS YEAR'S FOOTLIGHTS INTERNATIONAL TOUR INCLUDED A PAIR OF NEWLY-GRADUATED CORPUSCLES AMONGST ITS PERFORMERS; RYAN AMMAR AND BEN POPE, ALONGSIDE THREE OTHER CAMBRIDGE STUDENTS.

Although Ben and Ryan are very much aware of the Footlights' formidable reputation, they are keen that their work is not always viewed in the light of their famous predecessors. Ben observes that 'some audiences seem to arrive expecting half the cast of Monty Python to be there', when much has changed in the last fifty years. Ryan and Ben had very different expectations about comedy in Cambridge when they arrived at Corpus. 'It was a third of the reason I applied to Cambridge!' exclaims Ben, quickly adding that his passion for his subject, Classics, featured highly in the remaining two-thirds of his motivation. Ryan came to Cambridge from New Zealand, where he was only 'vaguely aware' of the Footlights. 'I really learnt about how famous they were on the plane to England, when I was listening to Stephen Fry's autobiography *The Fry Chronicles*'. He did not immediately join the comedy group, trying his hand at acting but later realising that he was really motivated to write, and that comedy provided a good opportunity to write for the stage.

Both admit that comedy can be an intimidating environment. 'Before my first gig I found myself having a bit of an existential crisis. I was struck by the arrogance of thinking I could make people laugh', remembers Ben. However, 'once you get your first laugh, it just clicks into place'. He also believes that to an extent comedy is a skill that can be learnt, like writing or playing a sport,

'WHEN YOU'RE PERFORMING COMEDY THERE'S A LOT MORE AT STAKE THAN WHEN YOU'RE PERFORMING A PLAY. IT'S AN INTERACTIVE ENVIRONMENT, SO YOU GET CONSTANT FEEDBACK ON YOUR PERFORMANCE.'

but it is a skill where success and failure are especially stark. 'I read Jimmy Carr's *The Naked Jape*, where he compares comedy to a bear pit. It can be quite binary; a joke is funny, in which case you've won, or it's not, and you've lost'. Ryan adds that 'when you're performing comedy there is a lot more at stake than when you're performing a play. It's an interactive environment, so you get constant feedback on your performance'.

Given the ruthlessness of writing and performing comedy, I ask how far they analyse whether something is funny, and how much they rely on instinct. 'I think it is dangerous to analyse it too much,' says Ben, but he admits to enjoying rephrasing his comedy and pin-pointing what is funny. Ben and Ryan started working together for the Corpus Freshers' Play, and now often send writing back and forth for feedback, as well as occasionally writing with the whole Footlights committee. Ryan suggests that the current committee's style has generally moved away from self-consciously clever comedy. 'I don't want to draw too many comparisons with the past, but our style's sillier, a bit more like Monty Python'.

They have recently taken their comedy outside Cambridge, on tour to Edinburgh and the United States. Have they noticed a difference between audiences in Cambridge and elsewhere? 'Cambridge audiences like subtle detail and character comedy. In Edinburgh there were a lot more families, so we had to make sure the comedy was clear and well-explained', says Ben. They also had to make sure that the jokes worked outside the Cambridge context. 'We didn't want it to look like the comedy was just for us, and we were just laughing at ourselves'. Ryan says that in the United States 'we performed in a lot of comedy clubs and universities, so they were used to seeing a lot of comedy. We wondered if the quirky British sense of humour would translate, but it really did'.

I ask Ryan if he's noticed a difference between the British and New Zealand senses of humour. 'I tend to think of British and New Zealand humour as being similar, and Australia as being more like the US. In fact, British comedy has taken a bit of a Kiwi turn in the last few years, after *Flight of the Concords*'. We discuss the popularity of this now world-famous musical comedy pairing, who self-deprecatingly term themselves 'New Zealand's fourth most popular folk-comedy duo'. Ryan is similarly willing to make himself the butt of a joke, drawing attention to the comic potential of his New Zealand accent, with which Ben quickly agrees: 'The other night the rest of the committee spent forty-five minutes recording ourselves imitating his accent'.

The committee is clearly a close-knit group, as the four members who are leaving Cambridge are planning to live together in London. Although both Ryan and Ben will continue to write comedy, they plan to go in quite different directions. Ben is interested in stand-up, while Ryan wants to write children's comedy, having adapted Roald Dahl's *Esio Trot* for the stage while he was a student. He is also writing a children's book about a boy who is afraid of flying, which seems appropriate for someone who was first inspired, while sitting on an aeroplane, to do something that would intimidate most people.

Ryan and Ben came to Corpus from opposite sides of the globe, and plan to go in very different directions within the world of comedy. Nevertheless, it is exciting to think that Corpus was the backdrop for bringing this engaging, sharp and creative pair of young comedians together.

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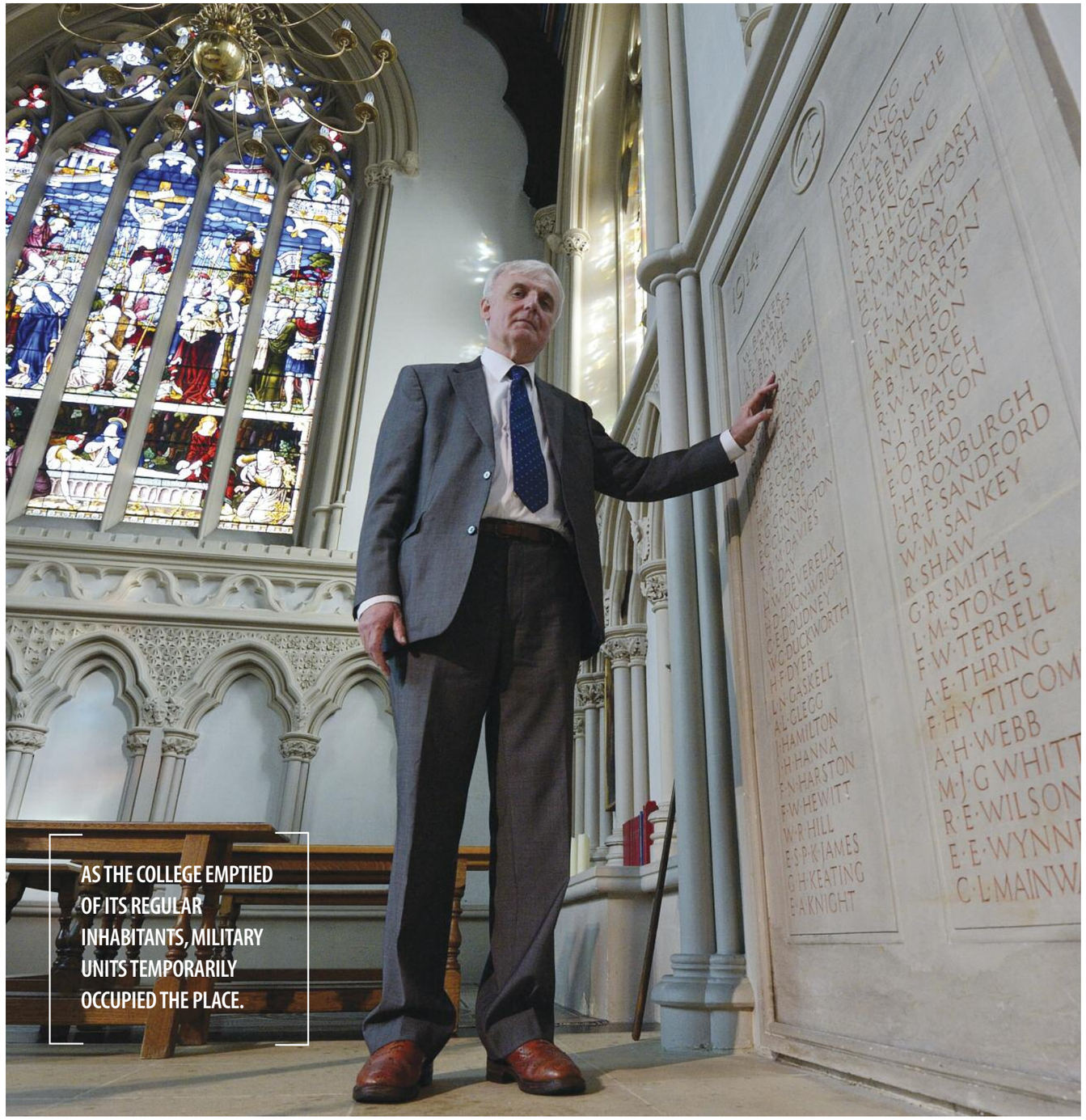
THE LOST YEARS

CORPUS DURING THE FIRST WORLD WAR BY DR PETER MARTLAND (m1982)



AS THE COLLEGE EMPTIED OF ITS REGULAR INHABITANTS, MILITARY UNITS TEMPORARILY OCCUPIED THE PLACE.

THE FIRST WORLD WAR LEFT BRITAIN TRANSFORMED AND TRAUMATISED. IN ITS WAKE AS THE RECKONING IN HUMAN LIFE WAS MADE AND THE SHOCKING LOSSES REVEALED, PEOPLE ATTEMPTED TO UNDERSTAND, CONTEXTUALISE AND MOVE ON AND TO MEMORIALISE THOSE WHO HAD BEEN LOST.

The University and individual colleges were part of that process and it resulted in, among other things, substantial alterations to the architecture of Corpus and to many other colleges. In Corpus, for example, the fourteen sets of attic rooms in the New Court were built in 1920 and premises were acquired outside the College deemed necessary to accommodate the increased numbers of students wishing to study here. But the most tangible witness to this war and the Second World War twenty one years later are the memorial tablets in the Chapel. These stand in mute testimony to the terrible losses our College suffered in the first half of the 20th century; it was truly a time when the men of Corpus swapped the elysian fields of Cambridge for killing fields in foreign lands.
As with every other British institution the First World War brought fundamental and permanent change to Corpus. It is not farfetched to suggest that the war imposed on the College a crisis on a par with other great national traumas such as the Black Death, the Reformation and the Civil War. Indeed, such is the long shadow cast by this war that its impact continues to bear down on us to the present. To mark the centenary of the outbreak of the war we have been subjected to acres of newsprint and many hours of television and in Corpus we too held events on Remembrance Sunday to honour those members of our College who saw service in that and other wars and especially those who made the ultimate sacrifice to ensure our freedoms and way of life.

The purpose of this article is to examine what happened to the College during the war and the experience of some of its students, Fellows and alumni who engaged in that titanic struggle. The first and most obvious place to start any such research is Patrick Bury's excellent history of the College. However, although Bury surveys the period he does not deal with the trauma and its human consequences. It's as though he was unable to confront the enormity of it all; he was after all born in 1903 and grew up during these years and like all of his generation found it impossible to deal with the sheer scale of the losses. For, in all, 253 members of College, Fellows, alumni, current students and those who had been admitted but had yet to come into residence saw war service and of these 63, or almost 25% overall, were killed. This compares to the national average of eleven per cent and the Cambridge University average of eighteen per cent.

The coming of war impacted on the College and its Fellowship almost from the start. In addition the Fellows had to deal with another pressing and personal crisis. For three weeks into the war the Master, Colonel Robert Caldwell, was killed in a motoring accident whilst visiting his estates in Scotland. During the seven years he held office he had been a towering presence, for during that time he had not only reformed the College, sweeping away the Victorian cobwebs left by his predecessor Edward Perowne, but he also brought into the Fellowship a number of new high flying academics, increasing the number to 13. Caldwell also modernised the College estate and under his leadership student numbers and examination results improved dramatically.
His successor Edmund Pearce was a safe pair of hands. An academic and a cleric he steered the College through the uncertain wartime period and the immediate post war years.

The war came to Corpus early as a College meeting dated 17th August noted 'that the buildings of the College be placed at the disposal of the Government during the war in case of necessity'. The meeting also noted 'that the action of the Steward in giving facilities for cooking rations for the Royal Army Medical Corps in the College Kitchens during the months of August and September be approved'. As the College emptied of its regular inhabitants military units temporarily occupied the place before it was finally taken over first by the staff of the 2/2 Mounted Division and finally the men of the No 2 Officer Cadet Battalion. Writing in the *Newsletter* after the war it was said of them: 'The cadets came from every class in the community and from every part of the empire, and were of every complexion. They entered whole-heartedly into the spirit of the place, made use of the College, Chapel, played games on the College grounds, rowed in the College boats, even wore the College colours, and became de facto, if not de jure, Corpus men.' Clearly the use of the College by the armed forces helped stave off financial ruin and helped keep a sense of community for the young men who were soon to leave for the front.

Many of the Fellowship left to undertake some kind of national service. Four Fellows or prospective Fellows saw war service with the armed forces; for example historian Kenneth Pickthorn took a commission and was posted to the War Office. Others were engaged in other kinds of service with scientist Will Spens in the government scientific service and historian Geoffrey Butler in the United States as part of a British government mission; he worked in Philadelphia and during his stint there married. Another Fellow engaged in war service was Lieutenant-Colonel Duncan Burgess RAMC, FRCP. He had matriculated in 1871 and between 1905 and 1917, after a career teaching medicine at Corpus, became Professor of Medicine at Sheffield University. He served in a British military hospital and, according to Bury, died from overwork on 17th January 1917 aged 67. Although his name appears in the University Listing this one Fellow who died on war service is curiously not recorded on the College war memorial.

The war transformed student life, which frankly ceased to exist for most of these years of conflict. Of the handful of students who came up for the 1914 Michaelmas term many were simply marking time awaiting their commissions and left as soon as the paperwork came through. By contrast, some were finishing off relevant courses in medicine, natural sciences and engineering before joining the armed forces, whilst others had been rejected by the military on health grounds.

THE WAR TRANSFORMED STUDENT LIFE, WHICH FRANKLY CEASED TO EXIST FOR MOST OF THESE YEARS OF CONFLICT.

ALTHOUGH MOST CORPUS STUDENTS AND ALUMNI WHO SAW SERVICE DURING THIS WAR SERVED AS OFFICERS, THIS WAS NOT ALWAYS THE CASE.

TROOPS IN TRAINING EXERCISE

FRENCH TROOPS IN THE TRENCHES

Of these many served later in the war as medical standards were reduced. By early 1915 scarcely 20 men remained in residence, and thereafter these numbers dwindled to zero, as did the number making the journey to the Senate House to collect their degrees. In these circumstance all College and University student activity ceased for the duration; indeed for many long-standing student societies it was the end and they never restarted after the war. To explore at least something of the wartime experiences of students and alumni we must look for examples (and they by their nature are invidious but inevitable given the number involved) outside the confines of the College.

Perhaps the most famous Corpus First World War warrior was Captain Sir Basil Liddell Hart who later became a military strategist and Honorary Fellow of the College. Described as more of a games player than a scholar, Liddell Hart came up in 1913 and passed the 1914 Prelims to the Historical Tripos with third-class marks. He landed in France in September 1915 but soon after suffered severe concussion, though he recovered in time to take part in the July 1916 Somme offensive. Two weeks into this campaign he was severely gassed to the point that it ended his active service career; which paradoxically probably saved his life. This experience of combat transformed his life and he spent the rest of his career writing about strategy and military history.

Another survivor of these years was Justice Sir Cecil Robert Havers, who matriculated in 1908. He graduated with a first-class degree in classics in 1912 and took his LLB the following year. A good sportsman, he played tennis for the University and later in life played at Wimbledon. For much of the war he saw service in infantry regiments on the Western Front and in 1918 transferred to the Tank Corps where he was mentioned in dispatches. After the war he became a distinguished jurist and was made an Honorary Fellow of the College shortly before his death in 1977.

In the late 19th century Corpus was known for the numbers of students who went into the church. These men were not exempt from war service, several serving as chaplains to the armed forces and some were killed in action. Exemplifying this group are two such clergymen both of whom matriculated in 1889 and whose names are recorded on the College war memorial. One was Henry Dixon-Wright, MVORN who served as chaplain on the Dreadnaught class battleship *HMS Barham*. He died on 31st May 1916 at the Battle of Jutland from wounds received in action; *Barham* was hit by six large calibre projectiles which killed 4 officers and 22 men, and wounded 1 officer and 36 men. He was 46 years old and married. His colleague and contemporary Charles Edmund Douney was an army chaplain. He died on 16th October 1915 of wounds received in action in Flanders. Before the war he had been vicar of South Lyncombe, Bath, having served his church in both England and South Australia. He was 44 years old and married.

Although most Corpus students and alumni who saw service in the armed forces during this war served as officers this was not always the case. One clearly extraordinary example was that of Private Noel James Stanway Patch of the Australian Imperial Force. Patch had matriculated in 1892, the son of a Suffolk clergyman. He left for Australia at the start of the 20th century and served as Shire Clerk for a district in Queensland. Australia did not have conscription and in 1916, at the age of 42, he volunteered for service as a private soldier. He left Australia on 27th Oct 1916 and saw active service for less than one month before being killed in action at Passchendaele on 13th October 1917; his name too appears on the War Memorial.

Several other Corpus alumni served with British imperial forces. One of these was George Reginald Smith, who was born in Gloucestershire and matriculated in 1902. Within College he was a well-known rower and stroked the Corpus Lent boat, which achieved the phenomenal feat of gaining nine places in four nights' racing. He left for Canada on graduation in 1905 where he became a schoolmaster. He gained a commission in the Canadian forces on the outbreak of war, was wounded in 1916 but subsequently returned to the front. He was killed in action on 6th May 1917 at the age of 33 and is recorded on the War Memorial.

In 1911 the Scot Henry Maitland Macintosh matriculated (in the same year cohort as future Fellow Archibald Edmund Clark-Kennedy). Like Clark-Kennedy, Macintosh epitomised the new College created by Caldwell, for in addition to his academic achievements he was also an athletics Blue. He became captain of University athletics team and is the only Olympic gold medallist the College has ever produced; he won gold in the 1912 Stockholm Olympics men's relay race. When war came Macintosh had just graduated. A member of the Cambridge OTC he was quickly commissioned into the Argyll and Sutherland Highlanders reaching the rank of captain. Incredibly, he survived almost to the end. He took part in the Second Battle of the Somme and died on 26th July 1918 of wounds received in action at the age of 26; his name too can be seen on the War Memorial.

There was a special category of war dead noted in the University List and by Bury and they are recorded on our war memorial. These were the young men (and they would have been no more than 17 or 18) who had been admitted to the College for the 1914-1915 academic year but never came into residence or matriculated. I give just two examples. John Edward Templeman Barnes was educated at Sherborne School where he was a member of the OTC and had taken part in the pre-war British army shooting trials at Bisley. Barnes won a history scholarship to Corpus but war intervened and he obtained an early commission. He saw action in Gallipoli and Egypt and subsequently in the attempted relief of Kut al amara, Iraq. He was killed in action on 3rd February 1917 and is commemorated at the British military cemetery in Basra. He was 21 years old. Another was Louis Mander Stokes, only son of Rev Henry Paine Stokes, Honorary Fellow of the College, Vicar of St Paul's Church, Cambridge, Antiquary and Hebrew scholar. He would have come up in the Michaelmas term 1916. Instead he was commissioned into the Royal Marine Light Infantry and was killed in operations on the Ancre 13th November 1916. He was 19 years old.

These examples give just a tiny flavour of the lives of so many men of this College who we know today simply as names on a tablet in Chapel and whose lives were cut short by the wars of the early 20th century. Their lives and what they did and achieved deserves to be remembered by us all in this centenary year. They had so much unfilled promise and gave it all away for us – the future generations they did not live to see. So if you get the chance next time you are in the Chapel take another look at our memorial to the courage and sacrifice of so many Corpuscules.

PETER MARTLAND

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