Professor Ian Glynn celebrated his eightieth birthday on 3 June 2008

PROFESSOR IAN GLYNN

I must have been about eight years old when I walked into my grandmother's kitchen and saw my youngest aunt sitting at the table dissecting a human brain. (The rules about the disposal of body parts were, of course, more lax in those days.) She was the second member of the family to 'do medicine' – her younger brother having led the way – and there was a feeling in the family, as I think there may have been in many second-generation Jewish immigrant families in those days, that medicine, both in its worthwhileness and in its professional prospects, was the ideal career. 'Well, get qualified first; then you can decide what you want to do!' was almost standard family advice to a dithering teenager. And it worked. We still have, in a cupboard, a family skeleton – more accurately a family half-skeleton – that was used to learn anatomy by eight members of the family, spread over three generations; and of those eight, all but one went on to qualify. I am glad to say that, of those eight, five are here tonight, including one who has the interesting distinction of being the only consultant in the National Health Service who was once president of the Trinity Mathematical Society.

We lived in Hackney, and I went to the local elementary school, which had a narrow curriculum but excellent teaching. In learning to read, at the age of five, I was happy with the association between sounds and letters, but I remember being surprised at the gaps between printed words because when someone talked there were usually no gaps. I have never been able to decide whether being surprised at the gaps was particularly clever or particularly stupid of me. Anyway, at the age of eleven I took the exam for a Junior County Scholarship – not yet known as the eleven plus. The importance of 'the scholarship' was made clear to us by a pictorial map we were each given at the beginning of that school year. It showed us at the junction of three roads. The road to the left led to an attractive group of 'secondary school' buildings, and beyond that to a 'university', complete with domes and spires. The middle road led to a less attractive 'central school', and beyond that to a landscape of many-chimneyed factories. The road to the right led to a gaunt rectangular 'senior school', with nothing beyond. Which road each of us would take, the map explained, depended on how we did in the examination. Well, I took the examination and, thanks to the splendid teaching of our form teacher – a large red-faced plethoric Mr Abrahams – I was offered one of the much sought after places at Christ's Hospital. This was the second year in succession that a pupil of the school had been offered such a place and the school was delighted; but I was appalled at the idea of going to a boarding school. Fortunately the London County Council – socialist, but not too doctrinaire – was happy to pay the fees for me to go to the City of London School, where, looking back, I realise that the teaching was always good and that in mathematics, in physics, and in English it was superb.

By the time I joined the school, we were at war, and the school was already evacuated to Marlborough College, where it remained for four years, returning to its own splendid buildings on the Victoria Embankment just in time for the Flying Bombs. Despite the Flying Bombs schooling went on very much as normal, though I remember taking Higher Certificate Exams – not yet called A-levels – in the basement of the massive Unilever building next door.

Having decided I wanted to do medicine I had to choose a medical school. My uncle, who had gone to University College in London, recommended Cambridge, but

I then had to decide which college to apply to. And here I am enormously indebted to a conversation between my mother and her greengrocer, in the greengrocer's shop in Sandringham Road, Hackney, then a pleasant residential street though later a notorious centre for the drugs trade.

In an earlier conversation, my mother had mentioned to her greengrocer the advice of my headmaster that, if I wanted to go to Cambridge, I ought to apply either to Caius, because it was a good medical college, or to Pembroke, because one of the Tutors at Pembroke had been at the City of London School. The choice of a college for one's son might seem an odd topic to discuss with one's greengrocer, but this greengrocer, whom I remember as a statuesque widow with a huge leather pouch full of loose change, had a son who had gone to Pembroke and turned out to be a brilliant mathematician. Cyril Domb, as he was called, later became a leading authority on statistical mechanics and a Fellow of the Royal Society, and he is, I think, still remembered with affection by elderly Cambridge mathematicians. Anyway, the greengrocer had discussed my problem with her son, whose advice was: 'Tell Ian that he had much better apply to Trinity, because if he later wants to do research they have more Research Fellowships.' My mother, who knew nothing whatever about such things, therefore went back to my headmaster and said something like: 'They tell me' – I don't suppose she said who had told her – 'They tell me that Trinity is a very good college; would it be a good idea for Ian to apply to Trinity?' And the headmaster – who was a Trinity man and should have known better – replied, 'It's a very good college if you can get into it' – implying (what I think was untrue then and I believe is still untrue, except perhaps for mathematicians) that unless you were a potential star or the nephew of a Marquis, your chances at Trinity were much smaller than at other colleges. Anyway my mother preferred the advice of her greengrocer to that of my headmaster, and I duly sat for – and failed to get – a Trinity scholarship. But I was accepted as a commoner, so the wheels of destiny got on to the lines that eventually led to this evening.

But right at the start those wheels were very nearly derailed. Being accepted as a commoner was all very well but, long before the introduction of league tables, schools liked to boast of their yearly bag of Oxford or Cambridge scholarships. In those days, two colleges, Caths and Selwyn, held their scholarship exams a few months later than the other colleges, so in due course I was persuaded to try again, at Caths. And here I performed rather better and might have got a scholarship – and perhaps ended up a clinician – had I not been saved from that fate by the viva in Zoology. The examiner had a table in front of him covered with various zoological objects, and I hoped he would ask me about the creepy-crawly things or the wormy things, but instead he pointed to a large drab stuffed bird – I later learnt that it was a cuckoo – and asked me what it was. I didn't know what it was, but I had been taught that if you couldn't identify something fully, you should follow the standard zoological classification of animals, going as far as you could. So you might say of some obscure beetle that you couldn't identify, that it was *metazoon*, *triploblastic*, *coelomate*, phylum *Arthropoda*, class *Insecta*, order probably *Coleoptera*, or whatever. I knew this, but it seemed so artificial, faced with a stuffed bird, to go through such a rigmarole, that all I could do was to stammer: 'It's . . . It's . . . It's a stuffed bird'. Not surprisingly, this was not thought worthy of a college scholarship; so I was saved for Trinity and a career in physiology and this dinner.

When I came up to Cambridge in 1946, I called on my Tutor, Mr. Evennett, who was then living in the grand rooms in Nevile's Court now occupied by John Marenbon, and on my way up the stairs I noticed the name of Prince Obolensky.

Knowing nothing about Cambridge, and being young and romantic, I rather assumed that such grand rooms as G1 Nevile's Court could be found all over the College, and that any staircase might harbour a prince. I then went to see the College Chaplain, who at that time was Bishop Stephen Neill. Knowing nothing about Cambridge, and being young and green, I assumed that colleges routinely employed bishops as chaplains, and that episcopal purple would be common in college courts. Finally I went to see my Director of Studies, a young Mr Hodgkin. Knowing nothing about Cambridge, and being young and without experience, I imagined that Mr Hodgkin was a typical don and that there would be lots like him.

It took me only a few days to recover from my error about rooms and princes, and only a few weeks to be put right about chaplains. But though it is more than sixty years since my wholly inadequate assessment of Mr Hodgkin, I still get mental goose pimples when I remember how wrong that assessment was.

For Cyril Domb's advice was even better than he realised. Not only did Trinity have more Research Fellowships; it also had Alan Hodgkin as a Director of Medical Studies and a supervisor in Physiology. And, in the year before I came up, the young Mr Hodgkin, and an even younger Mr Huxley, had returned to Cambridge from their wartime jobs to resume their work on the way nerves carry information, work which they had had to abandon at a very exciting stage when Hitler invaded Poland in 1939.

Coming up to Cambridge as a medical student in 1946 was a little odd. I think it was in the previous year that, faced with the flood of people being demobilised from the forces, the Government decided to reserve all University places for them. For a short time I thought my own University career would have to be postponed. The Government then realised that, since not many people being demobbed wanted to be doctors, if they went ahead with their plans they would be cutting down the supply of doctors for several years; so they made an exception for medical students. The result was that we medical students at Trinity came up straight from school, to be swamped by older men who gave the impression of having spent the last year victoriously driving jeeps round Europe.

Although the war was over, food was still rationed – indeed bread was rationed for the first time; it was a horribly cold winter, central heating had not yet been installed in the College, and coal was limited to two scuttles per undergraduate set per week. But life as an undergraduate was exciting, work was both exciting and demanding, and time went very fast. In my third year I did a Part II in Biochemistry, encouraged by Kenneth Bailey, who also – a more remarkable achievement given my ignorance of music – taught me to enjoy late Beethoven quartets.

Then back to London, living in the family home in Hackney, and spending three years studying clinical medicine at University College Hospital. I quite enjoyed being a 'medical clerk' and a 'surgical dresser' – I gather, by the way, that those phrases are not used any more – and I enormously enjoyed two weeks spent delivering babies; both the excitement and sense of achievement in the actual delivery, and the pleasure of seeing the happiness of the mother and feeling one had contributed to it. But despite these pleasures I had no desire to practise medicine; and since in those days one could get on the medical register without doing any house jobs, I planned to return to Cambridge and start research as soon as I had passed the final exams. Alan Hodgkin offered me a place as a research student in the Physiology Lab. and I applied to the Medical Research Council for the sort of scholarship they routinely used to support research students. To my dismay Sir Harold Himsworth, the Council's Secretary, sent me a letter saying that the Council felt that having done all the medical training, I ought to do a house job for at least six months, and so strongly did they feel

this that they wouldn't give me a scholarship until I had done one. By this time all the house jobs at University College Hospital had gone, but I was lucky enough to get a job as house physician to Horace Joules, the superintendent of the Central Middlesex Hospital, an excellent physician, President of the Socialist Medical Association, and a friend of Aneurin Bevan – a helpful thing to be in the early days of the Health Service. It was while I was there, in the winter of early 1953, that London had its last great fog, and we admitted so many people with bronchopneumonia that we had to put them in all sorts of wards, and I was asked to write NOT BRONCHO-PNEUMONIA in large letters at the top of the notes of all patients who didn't have bronchopneumonia. The other great event while I was there was the publication of the Doll and Hill Report on the link between smoking and lung cancer. Horace Joules and his wife were said to smoke something like 60 cigarettes a day, but Horace was a close friend of Doll, and decided that they must give up smoking. The local tobacconist was dismayed.

In the spring of 1953, not quite 25 years old, I returned to Cambridge as a research student. By then Hodgkin and Huxley had completed their work on the mechanism of conduction in nerves which later led to their Nobel Prize. That mechanism depends on transient and subtle changes in the permeability of the nerve membrane to sodium and potassium ions, which, in turn, lead to electrical changes caused by the movements of these ions down concentration gradients. It is the concentration gradients of sodium and potassium ions that provide the energy for the process of nervous conduction, and the question then arose: How are these concentration gradients maintained? How are sodium and potassium ions pumped uphill? Since it is this pumping that, quite literally, keeps the brain's batteries charged, that seemed a worthwhile question to work on, and it was to keep me busy for the next forty years.

In October 1955, to my enormous pleasure, I was elected to a Research Fellowship at Trinity, and in the following year I completed my Ph.D. and published my first full paper in the *Journal of Physiology*.

By this time compulsory national service had largely ceased, but not for everybody. It was pointed out to me that, having been exempted for six years as a medical student, six months as a house physician, and three years as a research student, it was time I did my bit. So I joined the RAF Medical Branch and, a few months later, I found myself appointed medical officer to RAF Sutton Bridge – perhaps the least glamorous unit in the Air Force: a small hutted camp on reclaimed land near King's Lynn, whose job it was to service two kinds of aero engine (both already obsolescent), and to pick up any bits of crashed aircraft in East Anglia before they demoralised more important parts of the Air Force. For me, though, Sutton Bridge had the great advantage that I could remain in touch with Cambridge. Which was just as well, as it was while I was there that Tony Jolowicz got engaged, and it was at his engagement party that I met Poppy's old school-friend Jenifer Franklin.

At the end of 1957 the unit at Sutton Bridge was closed down, and I was released from the RAF on condition that I spent the remaining half-year of my national service helping the surgical team at Papworth, who were trying to establish techniques for open-heart surgery using an artificial heart-lung machine – i.e. a machine for pumping and aerating blood – and working with small piglets. The trouble was that the machine pumped plenty of blood through a narrow tube into the piglet's arteries, but very little blood flowed from the piglet's veins through a much wider tube to the reservoir supplying blood to the pump. After three months chasing mainly red herrings, I realised that the trouble was not some subtle physiological problem but simply a question of hydraulics. For a given pressure difference, the flow of fluid

through a straight tube varies as the fourth power of the diameter. Doubling the diameter gives sixteen times the flow. I calculated that our problem could be solved by using a slightly larger tube to drain the blood from the piglet's veins into the reservoir, and that turned out to be right – though it was quite difficult to persuade the surgeons, who remained highly sceptical until they had done some experiments.

At last, in the summer of 1958 – just fifty years ago – I got back to my own work in the Physiology Lab. In December I married Jenifer, and for the next half-century I lived the simple life of a Cambridge academic. But, though I don't want to say anything more about my career, I want to tell you a story that shows what an extraordinary place Trinity is.

In 1990 I wrote a letter to the journal *Nature* criticising the alarming view of Roger Penrose, the Oxford mathematician and theoretical physicist, who claimed that recent experiments by an American neurophysiologist (Benjamin Libet) implied that – and I quote Penrose – 'we may actually be going badly wrong when we apply the usual physical rules for *time* when we are considering consciousness'. Crucial to my argument was the concept of using time-markers to establish precedence between events. If the events are of different durations, time-markers that indicate the beginning of each event may give a different order from that given by time-markers that mark the end of each event. To explain the concept of time markers, I gave an example from the book of Genesis. When the widowed Tamar, who had been made pregnant by her father-in-law Judah when he mistook her for a harlot, was giving birth to twins, one twin put his hand out first and the midwife bound his wrist with a scarlet thread to secure his rights as first-born; to her surprise that hand was then withdrawn and the other twin was born first. The scarlet thread was a time-marker, and a very misleading one.

Because my letter didn't contain any new experimental results, *Nature* said they couldn't publish it as a 'letter', but if I would lengthen it to fill three pages of the journal, and perhaps include an attractive picture, they would be happy to publish it as a 'commentary', and even pay me a fee. This was splendid, but the only appropriate picture I could think of was Tamar giving birth to twins. Where could one find such a picture? I came rather disconsolately into lunch at Trinity and sitting next to Simon Keynes I told him my problem. 'Oh!' he said, 'I think I've got a picture of Tamar giving birth to twins, in my room. Come and look after lunch.' I also talked to Jeremy Maule, alas no longer with us. Oh!' he said, 'You want to talk to George Henderson – the Head of the History of Art Department. I'm sure he'll be able to help'. So after lunch I went back with Simon to his room where in a couple of minutes he produced a microfilm of a drawing of Tamar giving birth to twins, though a slightly anaemic picture. So I wrote to George Henderson, and almost by return of post I received a massive book – a facsimile of a twelfth-century Greek Seraglio Octateuch, from Istanbul. In it, there was a splendid picture of Tamar, sitting on a birthing stool, attended by a kneeling midwife, with one twin already lying on the floor and the other just emerging, with head dangling and one arm waving.

In the sixty years I have been associated with Trinity, its Fellows have of course helped me solve many and far weightier problems; but none, I think, were solved so unexpectedly and so effortlessly as the search for a picture of Tamar and her twins. When, some months ago, I told this story to Amartya Sen, he said I had been spoilt. So let me finish by saying to all the Fellows of Trinity here tonight: 'Thank you for spoiling me'.