

Reminiscences on Mathematical Physics

Peter Szekeres

[University of Adelaide: Mathematical Physics 2024 Reunion](#)

Monday 8 April 2024

This is a strange meeting, celebrating a department that is no more and ceased to be an independent department about 40 years ago. And I am probably the only person in this room who was not actually a graduate of that department.

My chosen field at university was pure mathematics, not because my father George was a lecturer in that department, but because I couldn't hack the idea of doing Physics III, with its associated lab work. Math Physics III did not exist at the time and the only way in to that discipline was through doing Physics III. Not that I have anything against laboratory physics, I just felt was all a big fudge to getting the "right" answer. I think I've had an abiding distrust of experimental physics ever since.

However through my father I became aware of the Mathematical Physics department from its earliest days while I was still at school, as George quickly befriended Bert Green on his arrival. As my mother was also a mathematician there were frequent kitchen table discussions about the latest seminar given by Bert or his colleague Harry Messel. And I lapped this stuff up.

Although he was a pure mathematician Dad had a big interest in general relativity which he passed on to me, and in fact he wrote some important papers in the area. The most significant was his discovery of the double null coordinates in the Schwarzschild solution, which some people mistakenly attribute to me and which he published almost simultaneously with another non-specialist Martin Kruskal. It is a kind of early paper on black holes, Nobel prize sort of material it turned out much later, yet he buried it in an obscure Hungarian Journal which it took quite a few years to be discovered at all.

A large number of my schoolmates from Adelaide High went on to do Mathematical Physics, in fact they were the first "large" honours class of about six or more. Some are here today – Lindsay Dodd, Tom Wigley, John Corbett, Ken Klæbe and Ken Amos.

I did attend a few lectures by Bert when I was at university, but I specially remember Angus Hurst's lectures on classical mechanics which I had to do as part of Applied Math III. It formed the basis of a course I later gave regularly at Adelaide both at second and third year levels. I think I felt it was the best course I gave in my years as a lecturer. He also gave courses on ordinary and partial differential equations. They were all difficult courses but incredibly rich courses which it took me several years to absorb properly.

For me, the most significant event I remember from my undergraduate years was the visit in 1960 of Hermann Bondi, the theoretical cosmologist from Kings College London, who gave a public lecture in Bonython Hall entitled "*Why is the Sky dark at night?*". From this simple observation he went on to deduce the expansion of the universe and his preferred theory,

the now defunct “Steady State model”. I was totally inspired by this lecture to do cosmology. As Dad knew Bondi he invited him home after the talk for coffee in our trust home house in Blair Athol.

Later in the year I was awarded a Commonwealth Scholarship and I resolved to go to London to do a PhD with Bondi on cosmology. When I wrote to him he replied saying, surprisingly, that nothing much was happening in cosmology, and recommended I do general relativity with his colleague Felix Pirani. It was a fortunate turn of events, as Bondi turned out to be a pompous and difficult person who had little time for supervising students, while Felix was the most wonderful supervisor, who really enjoyed spending time with his students. He also had a thorough and inquiring mind, although over the years he became very disenchanted with the whole academic scene and took an early retirement during the Thatcher years. I was to spend the next ten years at Kings, except for a couple of years at Cornell, later giving Bondi’s lectures while he went on to bigger administrative roles such as head of ESRO and then became Britain’s Chief Scientist.

But with time the British weather began to wear me down and I began to think of Australia again, particularly as my time at Kings was coming to a close with Bondi threatening to return (he actually never did). Then one day an ad appeared on the departmental notice board for a lectureship in Math Physics in Adelaide. They were particularly looking for somebody specializing in GR as they clearly had a number of interested PhD students whom Angas and Bert did not feel able to supervise adequately. I felt fate calling and decided then and there to apply for the position and I was fortunate enough to be appointed starting in 1971.

The time I remember most were those first years in the 70s. It was a kind of golden age, Whitlam got in, tertiary education became free, and Adelaide was a lively place to be. As I look back on it all from advancing years those two decades, the 60s and 70s were quite outstanding and I feel quite fortunate to have lived through them. It was a time of incredible optimism, despite terrible events such as the cold war and the Vietnam war, but there was always a sense of moving forward to better things. I feel today, in a culture powered largely by physicist’s inventions such as the computer and the internet, the negativity is overriding. The focus is entirely on problems with no resolution in sight.

I want to conclude with one abiding memory from the 70s, the visit of the great Paul Dirac. Dirac had been a kind of hero of mine since undergraduate days, when one day I was working in the big hall of the Barr Smith library (does it still exist?) and found myself sitting next to the physics theory section. I spied a book on quantum mechanics by Dirac, whose name I certainly knew. I picked it up and started reading. Suddenly there was a whole new world of bras and kets, language I had never heard before. I took the book home and read it almost from cover to cover. I never really became a quantum physicist but I always remember the excitement of delving into that book, it was all so logically laid out.

The only time I met Dirac in my London years was with his wife in a lift going up to the swanky restaurant in the Eiffel tower. The event was a NATO funded conference in Paris on general relativity, and NATO was footing the bill for the conference dinner. Those were the days. Academic salaries in the UK may have been pretty rubbish, but there were perks.

When he came to Adelaide in about 1976, I was incredibly impressed by his fluent lecturing style. He never used notes and delivered his talk flawlessly. He was of course a notoriously shy person, although I did see him once or twice at conference engage in lively conversation with people he obviously felt thoroughly at ease with. On this occasion Angas and Barbara entertained him and he pretty much retreated in his shell. His wife who was Wigner's sister was a totally different sort. Being Hungarian she seized on my name and enjoyed calling out to me using the proper pronunciation whenever I was within range "Szekeres, come and talk to me".

We had organized a complicated walk in the Adelaide hills on the weekend whereby we all met for a barbecue in one part of the Adelaide Hills, then walked for two or three hours to the Montacute Road. There we were to wait for Angas to return with his car from the barbecue venue and take us to Government House where Dirac was staying with the governor Mark Oliphant and was expected for dinner. We stood around in the cold for about two hours, as it rapidly got darker. After a bit we felt Government House had to be notified so I found a telephone booth on the Montacute Road which amazingly worked and managed to tell somebody that Professor Dirac would be delayed for dinner. Mrs Dirac meanwhile was becoming quite fractious but Dirac remained silent throughout. Finally Angas arrived and we all got in the car. Mrs Dirac complained relentlessly about what a shamozzle the organization of our outing had been. Finally Dirac spoke up "it's been a wonderful afternoon, spectacular views". That was it and Mrs Dirac was silenced.

Another notable visitor was Freeman Dyson who came a couple of times in the 1980s. The first time he came I became quite friendly with him and on one occasion he came to in to my office to sound me out about some thoughts he had about Hawking's analysis of black hole radiation. It really was an area I struggled to come to grips with, and I thought what is this — Freeman Dyson, one of the smartest guys on the planet, asking *my* opinion on Hawking's work? Bert, whom he knew from Princeton days, was not around as he was on one of his solo trips to the States. Dyson asked me if Marlies was around as he had fond memories of her, so I put him in touch with her. I felt like I was setting up a sort of date, as he seemed quite sweet on her. But she was alright about it and quite delighted to see him again after many years.

The second time Dyson came he gave a kind of semi political talk on nuclear arms and the cold war which I chaired. Chernobyl had just happened and he had unwisely said in a radio interview that it was the best thing that could have happened, meaning of course that it gave a strong warning on the dangers of nuclear energy. But not everyone read it like that and some thought Dyson was a monster to say that Chernobyl was a good thing. So they disrupted the meeting, shouting out politically correct things, and it took all my non-existent chairman skills to quite them down but I did eventually manage to send them packing.