

IN SHORT

OBSCURITY TO FAME FOR PROFESSOR THOMAS PARNELL, MA

THE PHYSICIST, HIS PITCH, AND A PRIZE

John Mainstone

The young physicist Thomas Parnell left the Cavendish Laboratory in Cambridge, and St. John's College, for Australia in 1904, firmly convinced that he would soon return to a fellowship at his alma mater. That did not happen. He founded the Department of Physics at The University of Queensland, but still the Cambridge fellowship eluded him. In 2005, however, fifty-seven years after his demise in 1948, he was to receive a great ovation from an audience of more than a thousand people in Cambridge – not his Cambridge, but the one which is home to Harvard University – for his having initiated in 1927 the now-famous UQ Physics pitch drop experiment.

CAMBRIDGE TO MELBOURNE

A young physics graduate from Cambridge left Liverpool on 14 January 1904 aboard the White Star Line cargo and passenger ship *Medic*, bound for Australia and a teaching position at Trinity College, University of Melbourne. Many immigrants to Victoria arrived around this time, but it is significant that on 26 February the *Argus* newspaper chose to inform its readers, via its 'personal' column, of the arrival the previous day of a young man about to join the ranks of Melbourne's elite, 'Mr. Thomas Parnell BA, scholar of St. John's College, Cambridge, the newly-appointed lecturer on mathematics and physics at Trinity College.'¹

Parnell was taking a calculated risk with such a move to far-away Melbourne at this stage of his academic career. In the Cavendish Laboratory he had only just begun to undertake serious research. A few more years in his familiar – if now slightly-overcrowded – research incubator and he *might* then expect to gain a Cambridge fellowship. On the other hand, with the security of a salaried academic teaching post in a vibrant young country, together with an opportunity to be involved in the research effort of an increasingly well-respected Department of Natural Philosophy at the University of Melbourne, he could possibly reach his goal more rapidly. He chose the latter course, and embarked on his new tasks with enthusiasm.

However, when the teaching terms rolled on relentlessly at Trinity College it must have seemed to Thomas Parnell that Kipling had penned his famous line, 'If you can dream – and not make dreams

1. *The Argus*, 26 February 1904, accessed 15 November 2010, <http://trove.nla.gov.au/ndp/del/article/10600282#pstart335982>.

JOHN MAINSTONE (OAM, BSc, PhD, ThA, CSci, CPhys, FInstP, FAIP, FRMetS, Fell. of Univ. USQ), Honorary Professor in the School of Mathematics and Physics at UQ, and Adjunct Professor with ACU National, is a former Head of the UQ Department of Physics. He was Executive Director of the massive UQ seventy-fifth anniversary celebrations in 1984–85. For his long-standing role as custodian of the famous UQ Physics pitch drop experiment, set up in 1927 by Professor Thomas Parnell, Mainstone was awarded the 2005 Ig Nobel Prize for Physics at Harvard.

your master,² specifically with Parnell in mind. He was a physicist, but was required to act as College lecturer and tutor not just in mathematics and physics, but in chemistry as well! His teaching load, and examining duties, left him little time for physics research. His dream of a fellowship at Cambridge began to fade. Nevertheless, all was not entirely lost: he was able to develop a fruitful rapport with Professor (later Sir) Thomas Lyle, and some of the other physicists in Lyle's department.

Cambridge was not to be forgotten entirely. The ancient statutes of his *alma mater* ensured that, with the efflux of time since gaining his BA degree, and the payment of a fee, he could be eligible for the awarding of the MA degree. He attained this elevated status in 1908. Meanwhile, his sporting and other social activities had resulted in a widening circle of friends in Melbourne, and ultimately to his friendship with Hermiene Ulrich, later to become his wife.

MELBOURNE TO BRISBANE

Thomas Parnell MA (Cambridge) and Hermiene Ulrich MA (Melbourne) were appointed within a couple of months of each other as foundation members of the lecturing staff of the newly established University of Queensland when it began its teaching in 1911—in the discipline areas of Physics and Modern Languages respectively. In his application for the physics position within the Department of Mathematics and Physics, Parnell had bared his soul to the University by stating, in relation to his position of Lecturer and Tutor of Trinity College, Melbourne, 'I applied for this position in the hope of being able to continue my research work in Physics and so qualifying for a fellowship at St. John's College, but soon found that the claims made on me by my teaching work were such that there was little prospect of my having sufficient leisure to carry out this purpose.' Unfortunately for him, moving to Brisbane produced very little, if any, change of fortune in this regard. In fact, the physicist Thomas Parnell, having arrived in Brisbane on 21 April 1911, never did get the recognition from Cambridge which he had hoped would come his way.

Instead, a century later the name 'Thomas Parnell' lives on in Brisbane, that name being borne now with pride by three generations of his descendants—his son, a grandson, and a great-grandson. On his return to the University in 1919 after First World War military service in France, their ancestor had become the Professor of Physics, Head of the (autonomous) Department of Physics, a position he occupied until his death in 1948. On the St. Lucia campus of the university today, a major building fronting the Great Court bears his name; so also does a portion of a composite science and engineering library.

CONNECTIONS

As the sixth Head of the department founded by Parnell, I felt I was truly an 'academic descendant' of his. Fifty years on from when Parnell had taken up his foundation lectureship in physics, I had arrived at UQ as a young lecturer, fresh from the Cavendish Laboratory, which in those days still existed on the site that Parnell had known so well. To my lasting regret, I never had an opportunity to meet him. However, thanks to some felicitous circumstances, I did ensure that in October 2005 Thomas Parnell received enthusiastic applause from an audience of more than a thousand people in Cambridge. This was not actually in Parnell's beloved Cambridge, but in the other Cambridge across the Atlantic—home to the great intellectual powerhouses of Harvard University and MIT. As that event took place fifty-seven years after Parnell's demise, it was The University of Queensland—not its first physics lecturer (later, first Professor of Physics) in person—that would actually reap substantial benefit from his being in the spotlight during a spectacular ceremony in historic Cambridge, Massachusetts.

2. Rudyard Kipling, "If—" in *The Collected Poems of Rudyard Kipling* (Hertfordshire: Wordsworth, 1994), 605.

EVOLVING RESEARCH INTERESTS

Parnell brought to Brisbane from Melbourne a research interest in alternating electric currents, fostered by Professor Lyle. The first research paper from UQ Physics (in 1917) dealt with a high-precision method of measuring inductance,³ using a novel technique which – several decades later – became recognised as ‘phase-sensitive detection.’ The instrument that Parnell used for much of this early research, a Sumpner Electrodynamometer, has been preserved in the Physics Museum. Then, in 1922, he obtained permission from the University to join colleagues from Melbourne in making important total-solar-eclipse observations from Goondiwindi.

In 1927 Parnell initiated an intriguing experiment to allow long-term observation of the behaviour of material known to have an extremely high coefficient of viscosity. Thus began his now famous pitch drop experiment,⁴ which, against all the odds, has been carefully preserved by UQ Physics to this day.

With the dawn of the new millennium, the Guinness World Records people, in an (unsolicited) private communication, intimated their keen interest in the longevity of Parnell’s experiment. After their extensive investigations, this Pitch drop experiment was declared in 2002 to be the ‘longest-running laboratory experiment’ in the world. However, a much greater notoriety was yet to come.

ENTANGLED WITH THE PITCH DROP EXPERIMENT

Parnell’s successor, Professor Hugh Webster, visited Cambridge on a brief sabbatical leave in the spring of 1960. We met when he gave a research seminar in the Cavendish Laboratory. A friendship developed, and I learnt of his proposed plans to expand the UQ Physics academic staff; he seemed quite keen for me to join his team in Brisbane. By January 1961 I had accepted a position as Lecturer, and then met the head of the small team of lecture demonstration staff. Admitting to having an interest in the history of physics, I was shown a curious relic from the distant past, tucked away in a cupboard. From notes that had been compiled by several laboratory assistants, I gathered that in 1927 Parnell had heated a sample of pitch – a complex mixture of hydrocarbons, and ostensibly a *brittle solid* at room temperature – before pouring it, in the molten state, into a glass funnel with the bottom of the stem sealed. Three years later the seal was broken, and thereafter the inherent *fluid* properties of pitch were clearly demonstrable. The behaviour of the pitch imitated that observed with a very slowly dripping tap. Parnell witnessed two drops in his lifetime.

In May 1962 the fourth drop fell. There was no media interest, just some bemused staff including me – and possibly a few students – to note that a significant event had occurred. By contrast, World Expo 1988 in Brisbane marked the beginning of an intense period of interest in the experiment from the world’s mass media; waves of interest are still being triggered quite regularly today. Lately there has been a gratifying swing towards the production of educational material in many different languages, and especially at the top (professional) end of that market. To date, I have observed six drops in their gestation, starting with the fourth.

3. T. Parnell, “An Alternating Current Bridge Method of Comparing Two Fixed Inductances at Commercial Frequencies,” *Proceedings of the Physical Society London* 29 (1917): 259–268.

4. R. Edgeworth, B. J. Dalton and T. Parnell ‘The Pitch Drop Experiment,’ *European Journal of Physics* 5 (1984): 198–200. This paper, suggested by Professor G. W. Series from Reading University, contains detailed calculations of the apparent coefficient of viscosity for the sample of pitch used in Parnell’s experiment.

THOMAS PARNELL HONOURED

Early in 2005 I received a call from Marc Abrahams in Harvard to notify me of the decision by the Ig Nobel Board of Governors to award their 2005 Physics Prize,⁵ to me, the pitch drop's long-term custodian. I stipulated in my reply that my acceptance would be conditional upon Thomas Parnell also being honoured (posthumously) for his role as the originator. Several months passed before that matter was resolved in my favour. All recipients were to be sworn to strict secrecy until a dress rehearsal at Harvard on the evening of 5 October 2005, when the names of the Ig Nobel recipients would be published, shortly after the announcements of the last of the Nobel Prize winners.

Thus it was that on 6 October 2005 I found myself on the stage of the historic Sanders Theatre at Harvard University, surrounded by a group of Nobel Laureates. Around 1200 people attended the gala ceremony that night to witness the presentation of the Ig Nobel Prizes, accompanied by superb Harvard wit. These Ig Nobel awards are intended to 'celebrate the unusual, honor the imaginative, and spur people's interest in science, medicine and technology.' However, the achievements of those so honoured should 'first make people laugh, and then make them think.' It was reported in the press that more than 5,000 nominations had been received for the 2005 Ig Nobel awards.

I was there to receive the Prize for Physics, awarded for my role as the long-term Custodian of the pitch drop experiment, but I was also there to accept the additional Ig Nobel Prize certificate I had requested – the one that is destined to become a Parnell family heirloom – and to join in applause for Thomas Parnell. To my delight, the two certificates were presented to me by Robert Wilson, discoverer of the cosmic background radiation and Nobel Laureate for Physics 1978: my own PhD research project had been in radio-astronomy!

With Harvard having been suitably enlightened, it was then time to honour the name of Thomas Parnell at MIT, in the course of my brief Ig Nobel Lecture there. Mission accomplished, my hope was that, for him, '*Exegi monumentum aere perennius*' – 'I raised a monument more durable than bronze.'⁶

5. John Mainstone "The 2005 Ig Nobel Prize for Physics: an Improbable Journey from Cambridge to Cambridge," *Australian Physics* 42 (2005): 163–166. In this paper from 2005 there is a comprehensive coverage of the history of the UQ Physics pitch drop experiment, and reference is made to involvement of Nobel Laureates in the Ig Nobel Prize ceremony. Professor Sir Michael Berry and Dr. Andre Geim shared the Physics Ig Nobel Prize in 2000: Professor Andre Geim, FRS, has won a Nobel Prize for Physics in 2010.

6. To quote the words of the Roman lyric poet Horace in his *Odes III*, xxx.