

What Became of the Senior Wranglers?

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Wrangler, a word that has something to do with American jeans? Not in this case!

During the 157 years (1753–1909) in which the results of the Cambridge Mathematical Tripos were published in order of merit and divided by class of degree into Wranglers (1st Class), Senior Optimes (2nd Class) and Junior Optimes (3rd Class), great prestige attached to those students who had come out in the top two or three places. The securing of the top position as Senior Wrangler was regarded at the time as the greatest intellectual achievement attainable in Britain, and the Senior Wrangler was feted well beyond Cambridge and accorded pre-eminent status among his peers. Indeed, years in Cambridge were often remembered in terms of who had been Senior Wrangler in that year. It is curious therefore that no systematic study has ever been made, in so far as the author is aware, of what became of these Senior Wranglers in later years after their triumph. This article may shed a little light on the matter.

Until 1850, mathematics in Cambridge was dominant over all other University subjects, so much so that it was obligatory, astonishing as it now seems, for students who were studying for honours in Classics first to have taken the Mathematical Tripos.

Because of the prestige attaching to the position of Senior Wrangler and the college from which the Senior Wrangler came, the students, especially the most promising, were subjected, like thoroughbred racehorses, to the most intense training for the Tripos race. The training was in the hands of private tutors and not the University professors, as often students attended very few lectures and, for example, Charles Babbage gave no lectures in the eleven years, 1828–39, during which he was Lucasian Professor. The best of the tutors, because of their reputation, were able to select the most able students, thus perpetuating their reputation for success.

The most famous private tutor was William Hopkins (1793–1866), who himself had been 7th Wrangler in 1827 and was a person of distinction outside his tutoring activities, being President of the Geological Society 1851–53 and President of the British Association 1853. In 1849 it was said of Hopkins that in the 22 years since his degree he had taught 17 Senior Wranglers, 27 Second or Third Wranglers and 200 Wranglers in total (reference 1). As William Hopkins continued to turn out Wranglers well after that date, his final tally must have been much higher. Hopkins' Wranglers included Clerk Maxwell, Cayley, Thomson (Lord Kelvin), Stokes and Tait. It can be seen with the benefit of hindsight that the greatest of Hopkins' pupils was Clerk Maxwell, but remarkably Hopkins recognised this even when

Maxwell was an undergraduate saying 'he is unquestionably the most extraordinary man I have met with, in the whole range of my experience' (reference 2).

The Mathematical Tripos was a formidable examination taken by students after three years and one term at the University. The best students also sat the papers for the two Smith's prizes. For example, in 1854, the Tripos consisted of sixteen papers, two papers each day for eight days—a total of 44.5 hours in the examination room. The total number of questions set was 211. The best students then went on for a further three days' Smith's prize examinations consisting of 63 even more testing questions. The questions in the early papers contained bookwork in the first part of the question with riders based on that bookwork in the second part of the question. The questions became progressively more difficult in the later papers, particularly in the Smith's prize papers. To solve the more technically difficult problems within the short time available in the examination room, the students had to find the correct approach straight away. Sometimes the approach involved the use of subtle stratagems which the students could not have been expected to think up on the spur of the moment in the examination room. Hence constant practice at solving similar questions, as set in previous years, and familiarity with the right method of tackling the questions was all-important, and students wishing to perform well had to hone their technique, with the help of their tutor, to a fine pitch prior to the examination.

The actual marks were never published, but Sir Francis Galton in his book *Hereditary Genius* (reference 3) refers to having obtained marks in respect of three years (unspecified, but probably around the 1860s). In one of these years, out of a total possible mark of 17,000, the Senior Wrangler obtained 7634 marks, the second Wrangler obtained 4123 marks, the lowest Wrangler obtained around 1500 marks and the lowest candidate receiving an honours degree (Junior Optime) obtained 237 marks. In the second of these years the Senior obtained between 5500 and 6000 marks, the Second obtained between 5000 and 5500 and the lowest Junior Optime received 309 marks. In the third of these years when, according to Galton, the Senior was conspicuously eminent, he obtained 9422 marks and the Second 5642 marks. Galton makes considerable play of the large discrepancy between the marks obtained by the Senior and by the lowest Wrangler.

It can be seen that the Senior Wrangler would typically obtain less than 50% of the marks, the lowest Wrangler less than 10% and the lowest honours candidate less than 2%!