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EDITORIAL

Reflections on an Apology

One of the indices of minor and inconsequential success, in local scientific circles, is the amount of time that a professor spends at airports across the country and, in the case of some, across the globe. There are always symposia to be attended, lectures to be delivered, examinations to be conducted and invariably, committee meetings to be attended, where advice is often proferred to a bureaucracy, which can hardly be derailed from rolling inexorably down a pre-determined path. But, there is a silver lining. Airport lounges provide a time to read and on occasion, airport bookshops can throw up a surprise offering. In aimlessly browsing at the well-stocked shop at Bangalore's otherwise forgettable airport, I came across a beautifully produced little book; a reissue of G. H. Hardy's *A Mathematician's Apology*, with a long preface by C. P. Snow (Cambridge University Press, 1940; Canto edition 1992, reprinted 2000). This was the kind of book that may have been fashionable to read, or at least be seen with a long time ago. But, modernity extracts an inevitable price. There may be few takers for an introspective view of the motivations for the practice of 'pure mathematics' and indeed creative science; and even fewer for Snow's perceptive and at times, strangely moving analysis of the life and times of Hardy in Edwardian England.

Hardy, of course, may be best known to readers as the discoverer of Srinivasa Ramanujan, in the almost impossibly romantic story of the transplantation of genius, from the inhospitable environs of the Madras Port Trust to the intellectual garden of Trinity College, Cambridge. This tale, chronicled with scholarship in Robert Kanigel's biography of Ramanujan (Scribners, 1991; Rupa & Co, 1992), is a tribute to Hardy's wonderful instincts as a mathematician and a human being.

In *Apology*, Hardy sets out to ask: 'Why is it really worthwhile to make a serious study of mathematics? What is the proper justification for a mathematician's life?' But, the aging Hardy wrestles with himself when he says: 'The function of a mathematician is to do something, to prove new theorems, to add to mathematics, and not to talk about what he or other mathematicians have done. ... there is no scorn more profound or on the whole more justifiable than that of the men who make for the men who explain. Exposition, criticism, appreciation is work for second rate minds'. While, the *Apology* may be viewed by many, and indeed it is, in parts, by Hardy himself, as a defence of the practice of pure mathematics, there is more. Graham Greene, arguably one of the finest novelists of the last century, ranks the *Apology* as the 'best account of what it is like to be a creative artist'. In his preface, C. P. Snow, a long time friend of Hardy and chronicler of the intellectual fare of Cambridge, passes judgement: 'There is something else, though, at which he (Hardy) was clearly superior to Einstein or Rutherford or any other great genius: and that is at turning any work of the intellect, major or minor or sheer play, into a work of art. It was that gift above all, I think which made him, almost without realizing it, purvey such intellectual delight.'

Six decades after it was written, Hardy's essay starkly illustrates the case for pure mathematics: 'A mathematician, like a painter or a poet is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas'. For Hardy, 'Greek mathematics is 'permanent', more permanent even than Greek literature. Archimides will be remembered when Aeschylus is forgotten, because languages die and mathematical ideas do not'. This quest for immortality is a subtle undercurrent in Hardy's essay; an unstated fear that the worst that can befall men of genius is to be forgotten after their times. Hardy tells the story of Bertrand Russell recalling a horrible dream. 'He was in the top floor of the University Library, about A.D. 2100. A library assistant was going around the shelves carrying an enormous bucket, taking down book after book, glancing at them, restoring them to the shelves or dumping them into the bucket. At last he came to three large volumes, which Russell could recognize as the last surviving copy of *Principia mathematica*. He took down one of the volumes, turned over a few pages, seemed

puzzled for a moment by the curious symbolism, closed the volume, balanced it in his hand and hesitated...'.

The *Apology* is a wonderfully melancholic essay. Hardy's assessment of himself should be required reading for all of us; it might help assess ourselves in the sheltered corners of our minds. 'It is plain now that my life, for what it is worth, is finished, and that nothing I can do can perceptibly increase or diminish its value. It is very difficult to be dispassionate, but I count it a "success"; I have had more reward and not less than was due to a man of my particular grade of ability.... I have always had plenty of leisure for the researches which have been the one great permanent happiness of my life.... It seems absurd to suppose that I could have "done better". I have no linguistic or artistic ability, and very little interest in experimental science. I might have been a tolerable philosopher, but not of a very original kind. I think I might have made a good lawyer; but journalism is the only profession outside academic life, in which I should have felt really confident of my chances.... The case for my life, then, or for that of any one else who has been a mathematician in the same sense in which I have been one, is this: that I have added something to knowledge, and helped others to add more; and that these somethings have a value which differs in degree only, and not in kind from that of the creations of the great mathematicians, or of any of the other artists, great or small, who have left some kind of memorial behind them.'

In reading a draft of Hardy's *Apology*, C. P. Snow made the point that, 'even if we grant that "Archimides will be remembered when Aeschylus is forgotten" is not mathematical fame a little too "anonymous" to be wholly satisfying'. Hardy has a ready counter, referring to a friend who asked Hardy, while passing the Nelson column in Trafalgar square: 'If I had a statue on a column in London, would I prefer the column to be so high that the statue was invisible, or low enough for the features to be recognizable? I would choose the first alternative, Dr Snow, presumably the second'.

Analysing creativity in science and defining the environmental factors that nurture creative science, has sometimes occupied sociologists. Hardy's essay might be a good starting point for those who attempt to define creativity. Snow's gentle and flowing prose recreates the Cambridge ambience that Hardy enjoyed; an ambience from which the legend of Ramanujan grew. But, we might remember, as Max Perutz remarked in the preface of his book (*I Wish I'd Made You Angry Earlier*, Oxford University Press, 1998): '... creativity in science, as in the arts cannot be organized. It arises spontaneously from individual talent. Well-run laboratories can foster it, but hierarchical organization, inflexible, bureaucratic rules, and mountains of futile paperwork can kill it. Discoveries cannot be planned; they pop up, like Puck, in unexpected corners.'

P. Balaram