

# Editorial

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*N Mukunda, Chief Editor*

Many months ago – in September 1996 – we had featured the talented nineteenth century Russian mathematician Sonya Kovalevskaya, with a sketch of her life and work written by Mythily Ramaswamy. Now we highlight the twentieth century German mathematician Amalie Emmy Noether, whose remarkably deep insights into many areas of abstract mathematics have been the foundation of a great deal of modern research. Once again we turned to Mythily for a life sketch. In both cases one sees how many practical difficulties and discrimination came in the way of professional recognition and an academic career – the story is the same in essence, only the details differ. As ‘recently’ as during the teens and twenties of this century, it was impossible for a woman to obtain a faculty position at any major German university.



Emmy Noether unfortunately died relatively young, following an operation. Albert Einstein then wrote a letter to the *New York Times* in which he paid a glowing tribute to her work, and also added some wise counsel on the importance and value of scholarship and the intellectual life:

“In the judgement of most competent living mathematicians, Fräulein Noether was the most significant creative mathematical genius (of the female sex) thus far produced ... Beneath the effort directed toward the accumulation of worldly goods lies all too frequently the illusion that this is the most substantial and desirable end to be achieved; but there is, fortunately, a minority composed of those who recognize early in their lives that the most beautiful and satisfying experiences open to human kind are not derived from the outside but are bound up with the individual’s own feeling, thinking and acting .... However inconspicuously the lives of these individuals run their course, nonetheless, the fruits of their endeavours are the most valuable contributions which one generation can make to its successors.”

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Words well worth recalling and reflecting upon even, nay especially, today.

We have for long wanted to present accounts of great experiments in physics done over the years. Now we have found our man – Amit Roy – and he tells us this time about the discovery of the transistor. One has to make a conscious effort to realize the magnitude of the changes that this has led to over the past half century, in practically every sphere of life.

In an article on cognitive psychology, Kamala Mukunda takes us behind the retina to tell us how and where we actually ‘see’ anything in its wholeness; in the Classroom Section we learn of the difficulties of teaching Darwinian evolution. The almost universal tendency to think along Lamarckian lines here reminds us of a parallel situation in physics, where students instinctively think of mechanics in the old Aristotelian manner rather than along Galilean–Newtonian principles. And in Reflections we turn to L J Mordell for a ‘second opinion’ on G H Hardy’s 1940 classic ‘*A Mathematician’s Apology*’.

### **Emmy Noether (1882–1935)**

Amalie Emmy Noether was born in Erlangen, Germany as the first child and only daughter of Max Noether, a professor of mathematics at the University of Erlangen. Hers was an upper middle class German family. Following the trend prevalent in those days, she studied French and English after school and qualified as a language teacher at the age of 18, passing the official examinations of the state of Bavaria. By then, Emmy was more attracted to mathematics and wished to study it seriously. Although born into a mathematical family, (her father was a well known mathematician), she had to rebel against her family in order to pursue her mathematical education.

At that time the University of Erlangen would not admit women students although more liberal minded universities in Germany like Göttingen and also the neighbouring countries like France, England and Italy had already started doing so. Emmy had to take special permission to be admitted as an auditor in the University of Erlangen from 1900 to 1902. This helped her to study and pass the state matriculation

