Notices

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The Myth of the Young Mathematician

When I was a budding scholar, my fellow students and I would pore over biographies of the famous mathematicians, imbibing the rules by which the game was played. We learned that mathematics was a young person's game. Some set the limit for one's best research being done by 30 or 35; others, as low as 25. To a young person this was quite intimidating; we all faced several more years of college and graduate school, and it was doubtful that we would be proving real theorems before we were 30. Our best years would be close to over. Such was the daunting edifice of mathematics under which we were (mathematically) raised.

Now, older and with some grey hairs of my own, I know that this tower was erected on false principles. True it is that Galois did his first-rate original work before he died at the age of 20, and Ramanujan made enormous contributions before his death at 32. But while Newton invented the calculus and discovered the theory of gravitation during his early 20s, the English mathematician was in his mid 40s when he fully developed the theory that comprises the *Principia*. Euler, despite the blindness that afflicted him, was prolific to the end of his days. His introduction to analysis appeared during the comparative youth of his early 30s, his tome on differential calculus in his late 30s, and his three volumes on integral calculus when he was in his 60s. Gauss published *Disquistiones Arithmeticae* at 24; at 34 he developed the theory of analytic functions; at 48, the arithmetic of Gaussian integers. In more recent times, Cartan, Poincaré, Carl Ludwig Siegel, Kolmogorov, and Erdős have all provided examples that age need not be a barrier to mathematical creativity.

Nor need mathematical creativity blossom early. Fermat and Weierstrass are examples of mathematicians whose talent first showed when they were well past the bloom of youth. Fermat's initial mathematical work—on tangents, not number theory—appeared when the lawyer was in his late 20s; Fermat's foray into number theory did not occur until several years after that. Similarly, although Weierstrass published a paper in his late 20s, his first important work, on abelian integrals, did not appear till the mathematician was in his late 30s. He was a schoolteacher at the time.

Examples do not prove a theorem, and anecdotes are not the sole evidence that mathematical insight and ability can be part of later life. Nancy Stern studied the relationship between age and mathematical productivity and observed that while mathematicians aged 35–39 were most prolific, they were closely followed by mathematicians 40–44, who edged out the under-35 group.[1] As Stern notes, such simple number counting can mistake quantity for quality, but other measures (including a careful analysis of citation count) indicate that older mathematicians rate well on the quality scale.

The myth of the young mathematician, like those of David and Goliath, and St. George and the Dragon, has appeal, but it also has costs. This myth discourages those whose mathematical ability blossoms late, and it creates a barrier for those whose mathematical careers do not follow the pattern of youthful achievement.

Why does the myth endure? I believe it is because the tale is romantic: the mathematician as young knight on a quest for truth. I think that we as mathematicians should lay the false tale aside and acknowledge that mathematical talent is not a blazing star that burns out at 29 or 39, but functions on a variable scale, and for many endures even to the edge of time.

—Susan Landau

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[1] *Nancy Stern,* Age and Achievement in Mathematics: A Case-Study in the Sociology of Science, *Social Studies of Science, SAGE, London and Beverly Hills, vol. 8, 1978, pp 127–140.*