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The Actuary

Remembering why we enjoy math

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Paul Erdos, or "Uncle Paul" as he was known to his various care-takers, was a homeless wanderer living out of two tattered suitcases, yet he became the most prolific mathematician of the 20th century. A playful and inventive biography, *The Man Who Loved Only Numbers* (Hyperion, 1998) has been written by Paul Hoffman, past editor of *Discover* magazine and publisher of Encyclopedia Britannica.

Hoffman uses Erdos' life and work as a springboard to introduce the reader to a pulsating cast of eccentric geniuses and unsolvable problems. Of more relevance to actuaries, Erdos pioneered techniques for mathematical proofs using probabilistic methods, now known as Monte Carlo methods.

Erdos' work habits were nothing short of amazing. He would appear at friends' homes unannounced and work 19 hours a day, leaving his hosts bewildered and spent after two or three weeks of ferocious collaboration. The typical 6 a.m. greeting began not with "good morning" and small talk, but with "let n be an integer such that…" The same focused intensity was true of his letters, and he was prolific.

Erdos invented his own language, which he developed in his youth in post-World War I Hungary. There, "epsilons" (small increments) were children, God is the SF or "Supreme Facist," and perfect proofs are "straight from The Book," which the SF reveals, one tantalizing page at a time, to the privileged few. People willing to work "open their brain" to him. People who left pure math for applied jobs were, tragically, "dead."

One of Erdos' gifts was his uncanny ability to both identify problems and divine the relative complexity of the solution. He shared this same insight into the abilities of his fellow mathematicians, whom he challenged by putting dollar values on the so-called "Erdos problems." Many budding mathematicians found themselves drawn to their calling by grasping at a mathematical cookie put just beyond their reach by Erdos' long arm.

Throughout the book, we are re-introduced to timeless problems familiar to most actuaries. Each problem is magically animated with its own persona. Some are identified with their conqueror, others with their conjecturer. The most stubborn have littered at their peaks the souls of those who lost everything in the rarified air of the pursuit; mathematicians speak wryly of a "black theorem" which, once revealed, drives the possessor mad.

As a general rule, math is a collaborative effort, and conferences end up being working sessions (more so than other sciences where papers are merely presented). Such conferences were very fertile for Erdos. Even into his 80s, he would gather four or more brilliant mathematicians and "assign" each a separate problem, demanding their full attention to it while he buzzed from mind to open mind. Thus, mathematicians were turned into machines for converting caffeine (or amphetamines) into theorems. You got a sense that a math conference was as much fun as a Star Trek convention to a trekkie, and just as weird.

One exception to this rule was Andrew Wiles, single-handedly responsible for slaying one of the oldest and most well known problems, affectionately known as Fermat's Last Theorem ($xn + yn = zn$ only if $n = 2$). Heretofore unproven, by 1993 it was known that if a counter-example existed, the exponent would have to exceed 4 million. Hoffman's description of the events leading up to the proof, and its presentation, is a mathematical cliffhanger worthy of Tom Clancy.

The book becomes as much a story about Erdos as the arcane world in which he inhabited, aided and abetted by his prime players. It provides the layman a glimpse into the rarefied world of higher math, complete with a supporting cast of characters straight out of an Oliver Sachs patient list, from Pythagoras ("one-tenth genius, nine-tenths sheer fudge") to Graham Nash, who gets insights juggling six balls or turning flips on his trampoline. If you ever enjoyed math, this book will certainly have you remembering why you did.

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