**Book Review**

**Intersecting Parallels: Humboldt the Great Explorer and Gauss the Prince of Mathematics**

*Shobhana Narasimhan*

*Measuring the World*  
Daniel Kehlmann  
Published by Quercus  
Translated from the German by Carol Brown Janeway  
Pages: 272, 2007, Price: ₹315  
(ISBN-184724114X)  
Or [Kindle Edition], Amazon Digital South Asia Services, Inc.  
Pages: 274, 2010, Price: ₹299.25  
(1046 KB, ASIN: B004EYT4AK)

Do parallel lines sometimes intersect? In Daniel Kehlmann’s novel *Measuring the World* (translated from the original German *Die Vermessung der Welt*), the young Carl Friedrich Gauss, already renowned as a mathematical and scientific genius, chooses to share this revolutionary hypothesis with the famous philosopher Immanuel Kant (and is devastated when the aged and senile Kant replies, bafflingly, to the possibility of non-Euclidean geometry, with “Sausage. Buy sausage”!?) The parallel lines running through this intelligent and slyly subversive prizewinning novel are the lives of Gauss and his slightly older contemporary, the explorer, anthropologist and biogeographer Alexander von Humboldt.

There are not that many novels about scientists, and this one is quite unlike any other that I have read. In choosing to describe in parallel the trajectories of Gauss and Humboldt, Kehlmann has made an inspired choice: their life stories, scientific discoveries, and worldviews are laid out in alternate chapters in a delicate contrapuntal pattern. The closest reading experience I can compare this to is Douglas Hofstadter’s *Gödel, Escher, Bach: an Eternal Golden Braid*, which, despite being non-fiction, is somewhat conceptually analogous.

In Kehlmann’s recounting, Humboldt and Gauss are opposites in many ways, and yet similar in their driving passion for science, numbers, and measurement. Though both are German, their backgrounds are completely different: Humboldt is from an aristocratic background, and his mother arranges for him and his brother Wilhelm (who became a well-known diplomat and linguist, after whom Humboldt University in Berlin is named) to have individually designed educational programmes as an “experiment...the one should be educated to be a man of culture, and the other a man of science”. In contrast, Gauss’ father is a gardener, who must be reluctantly coaxed into letting his brilliant son enroll even in high school. Gauss loves his mother; relationships within the Humboldt family are strained, with the sons hating their mother, and Wilhelm even trying to poison Alexander.

*Vol.26, No.8, DOI: https://doi.org/10.1007/s12045-021-1216-y*
when they are children. Humboldt is capable of great feats of physical endurance; Gauss is frail and a bit of a hypochondriac. Some of the subtle humor in the book arises from Kehlmann presenting the intrepid adventurer Humboldt as a timid, reserved, prim, proper, and punctilious prig who is essentially asexual, whereas Gauss, the virtuoso mathematician who almost never left home, is presented as vain, pompous, scheming and a bit of a ladies’ man. I do not know if these characterizations have any basis in reality: slyly, the author has Gauss bemoan, early in the novel, that “in another two hundred years each and every idiot would be able to make fun of him and invent the most complete nonsense about his character”!

What the two men have in common is an urge to cast the world in terms of numbers and mathematics. Their first jobs are related to practical applications of science: Humboldt’s as a mining engineer, Gauss’ as a land surveyor. Kehlmann suggests that Humboldt’s urge to explore the world and make so many scientific discoveries arises, in a way, from his timidity: “Whenever things were frightening, it was a good idea to measure them”. He is so thrilled when the meter is defined as the unit of length (“It always filled Humboldt with exultation when something was measured.”) that he doesn’t sleep for a week. We are told that he “forcibly imposed a web of numbers over reluctant nature”. Similarly, Gauss is driven by the need to find the formulae describing mathematical and physical phenomena and finds solace in numbers—coping with the tedium of dealing with lesser minds by counting off prime numbers. “Numbers didn’t seduce one away from reality, they brought reality closer, made it clearer and more meaningful in a way it had never been before.” They are both obsessed by their scientific work, in Humboldt’s case to a possibly masochistic extent. He ties his arm behind his back for a week to become accustomed to pain, tries to reproduce Galvani’s experiments (on himself rather than on dead frogs), deliberately gives himself shocks with electric eels, and swallows the deadly poison curare to check whether it is harmful when ingested. During a total solar eclipse, he is so busy carrying out measurements that he misses the once-in-a-lifetime opportunity to actually look at the eclipse itself. Meanwhile, Gauss shows his devotion to science rather differently: scientific inspiration strikes him in the middle of his wedding night, and he interrupts it to write down notes on least-squares analysis and its application to the orbits of heavenly bodies. His bride Johanna (who, according to the novel, first gave him the idea to question Euclidean geometry) is not amused.

Though the novel is written in an unusual style (for example, no quotation marks denote when a character is speaking), it paints a vivid picture of its two protagonists. One can really ‘see’ Humboldt, striding through the Amazonian jungle, dressed in a pristine Prussian uniform, insisting that wine should only be drunk out of wine glasses, yet determined to taste ant paste and what is most probably a cannibalistic meal. He deals calmly with jaguars,
crocodiles, and piranha fish. He carries along weird instruments like a cyanometer (to measure the degree of blueness of the sky). He writes long and detailed letters to his brother Wilhelm, even though their relationship seems cold. The only person or creature he appears attached to is a dog he acquires on his travels. He seems to be scared of women—his response to the women he meets during his travels is to count the lice in their hair (of course for the sake of increasing enumerated knowledge). Many people think he is mad. In fact, the way Humboldt is described, one is tempted to conclude that he lies somewhere on the autism spectrum. In the book, his travel partner Bonpland has another explanation for his strange behavior: he is German! This had me wondering whether the urge to classify, enumerate and measure was characteristic of 19th century Germany and whether this was in part responsible for the many successes of German science in this period. (I think it also tells us something interesting about the Germany of today, that such an eclectic novel, about the lives of two scientists, was a bestseller there.)

Gauss is presented as being prescient when it comes to scientific advances: he envisages a future where people fly around the world, soothe their toothaches with painkillers, and smallpox (and baldness!) are eradicated. Yet in many ways, he is like the stereotype of the clueless mathematician, much to the exasperation of his wife: at his wedding party, he makes a speech about how happiness does not really exist, he manages to remain oblivious of the Napoleonic wars even when they are going on around him, and even forgets that his wife is expecting a child! He hates traveling; even short journeys within Germany make him irritable. And yes, many people think that he too is mad.

The novel has tales, some true, some apocryphal, about Gauss’ brilliance as a young child. There is the story of how the infant Gauss would cry when his father made mathematical errors when counting out his monthly pay. There is the famous incident of how, asked by a teacher (who wanted to keep the class occupied for some time), to add up the numbers from 1 to 100, the precocious Gauss (at the age of 8) realized that the trick was to add up 1 and 100, 2 and 99, 3 and 98, etc., and immediately gave the stunned teacher the answer of $101 \times 50 = 5050$. We learn about their scientific discoveries: Humboldt develops a miner’s lamp, becomes the ‘first’ (European) man to climb Chimborazo, then believed to be the highest peak in the world, realizes that altitude sickness is due to oxygen deprivation, and proves that the primary agent of geological change is heat rather than water. Colonial explorers like Humboldt are, of course, problematic from the perspective of today. When we say, for example, that he ‘discovered’ the channel connecting the Orinoco and the Amazon, do we not mean only that he was the first white man to write about this? These ethical points are touched upon obliquely...native guides who are shackled so that they won’t run away, a slave market in South America, tribes that ‘disappeared’, all do disturb Humboldt. There are also ominous hints of future
US interest in Latin America, as Humboldt is quizzed by Thomas Jefferson, at the time the President of the USA. Meanwhile, we see Gauss show that a regular heptadecagon can be constructed using a compass and straightedge, prove the law of quadratic reciprocity, show how to compute the orbits of dwarf planets, develop the method of least squares, invent the heliotrope, and formulate laws for magnetism.

So, do the parallel lines of Humboldt and Gauss meet in the curved spacetime of this novel? Throughout the book, there are several tantalizing ‘almost meetings’. The young Gauss’ patron, the Duke of Brunswick, compares him to his godson Alexander. Gauss keeps reading newspaper reports of Humboldt’s travels (“Was there any damn place this fellow hadn’t been?”). Humboldt, traveling in ‘New Spain’, hears about how Gauss has calculated the path of the planetoid Ceres. Gauss finds Humboldt impressive but crazy: “as if truth was something you found out there and not here. Or as if you could run away from yourself.” Gauss meets (and insults) Wilhelm von Humboldt at a theater in Weimar. Finally, as ‘old’ men, they meet in Berlin in 1828, at the only scientific conference that Gauss is ever known to have attended. By this time, they have the established reputations and entrenched eccentricities of great men; it comes as a shock to realize that they are only in their fifties at the time. Humboldt wants the meeting to be recorded for posterity in the form of a daguerreotype photograph, but the restless and cranky Gauss is unable to stand still for the requisite fifteen minutes. Humboldt suggests a scientific collaboration. I leave it to the reader to find out how things pan out as they discuss their approaches to life and science, face to face. The end of the novel deals, briefly, with existential questions and themes of aging, and hints at a future where America will become ever more dominant.

This is a very clever and intellectually appealing novel. With its layers of metaphor and artfully understated humor, it is not perhaps an easy read. However, I found it engaging, and it made me curious to learn more about Humboldt and Gauss. Die Vermessung der Welt has also been made into a movie (in German, with English subtitles), which I enjoyed watching.

Shobhana Narasimhan
Jawaharlal Nehru Centre for Advanced Scientific Research
Rachenahalli Lake Rd
Jakkur
Bengaluru, Karnataka 560 064.
Email: shobhana@jncasr.ac.in