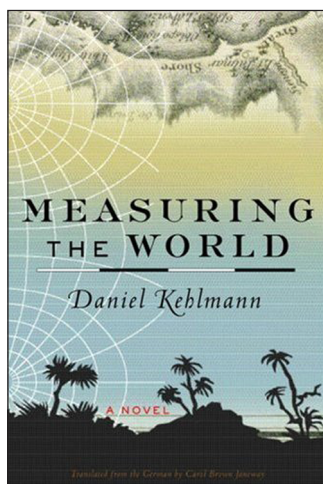


# Measuring the World

*Reviewed by Frans Oort*



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## Measuring the World

Daniel Kehlmann

Translated by Carol Brown Janeway (from the German)

Pantheon Books, New York, 2006

US\$23.00, 272 pages

ISBN 978-0375424465

Vintage (paperback), 2007

US\$14.95, 272 pages

ISBN 978-0307277398

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In my dream I saw a small boy, on wooden shoes, walking towards me, putting his slate on my table. His beautiful piercing blue eyes (as already described by Dedekind) told me who he was. Before he could say anything, I said *ligget se* (there 'tis). And, of course, I did not need to check whether the answer indeed was the correct number 5050.



The young Gauss started to smile, knowing that I recognized him, and remembered this story. Then his face and and figure changed into the beautiful portrait of the young Gauss published in the *Astronomische Nachrichten*, 1828. ([Pict1]) He looked at my desk, and he started to talk to me. "I see that you are reading that

book! What can this man mean, slandering me in this way? Why does he say that I threw my son

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Eugene's book out of the window of the coach that we were traveling in? I would never have done such a thing! Is there any authority where I can lodge a complaint about this injustice?"



Then he looked sideways, enabling me to recognize another portrait: the drawing made by Johann B. Listing in 1832, showing a less young and more worried Gauss. ([Pict2])

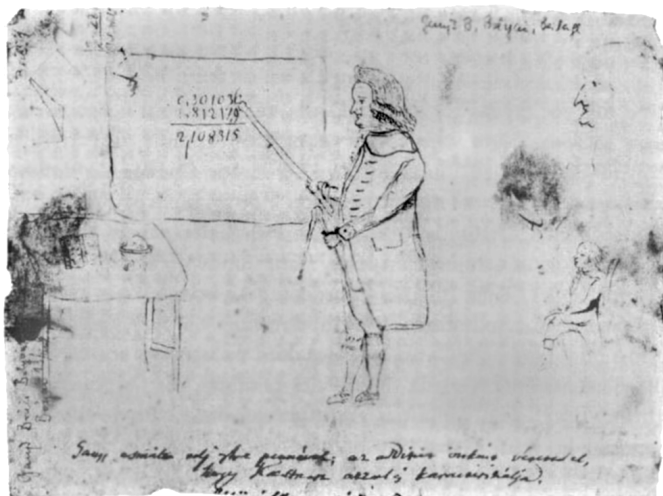
"And, even worse," he went on, "why does this man have so little appreciation for the deep thoughts engendered in the beautiful things that I encountered and enjoyed in my life? Do you know where I can find this Kehlmann, so that I can explain to him the beauty of my ideas, and the reasons why I set out to measure things? Perhaps explain to him the theory of magnetic storms, to use the term coined by my dear friend Alexander Humboldt?"

Again his face changed, this time into the beautiful, sincere portrait by Jensen which hangs in the Pulkovo observatory, showing Gauss in academic gown. ([Pict3]) It is the portrait that we



all know from the last German 10 DM bill. ([Pict4]) He looked at me, and I ventured to say:

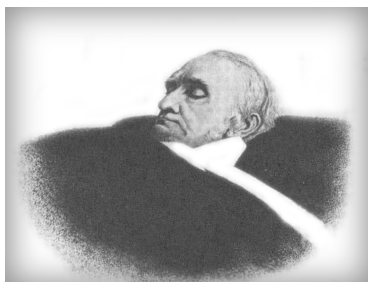
"But, Professor Gauss, you once made a cartoon



of Kästner, so I gather you do not disapprove of making fun every once in a while?” (Pict5) “Well yes, he was my mathematics teacher at the *Gymnasium*. It is difficult to have esteem for someone who cannot teach you much. But spreading slanderous stories about someone is a different matter.”

“And think of people for whom I had great esteem, such as Herr Bühler and Martin Bartels, who were very supportive of me when I was a young boy. The terrible things that this Kehlmann writes about Bühler! Never in my life did I protest when people did me an injustice, although I often found it hard to deal with stupid people. But what this man does is unacceptable.” Before I could try to say anything in favor of the book he continued: “It would not be a bad idea to do what this Kehlmann suggests: to open the window and throw this book out.”

His face changed into the photograph taken in 1855, on his deathbed, an early triumph of the invention of Daguerre and the only photograph of



Gauss known to me. Then his image faded away. (Pict6) No more chance to ask him about all the mathematical ideas that he never published, to tell him about the admiration that we feel for him, and to speak about everything else that was in my mind. To tell him that we still consider him as *Mathematicorum Princeps* (prince of mathematicians). Time was up. There

is nothing I can do about that, but at least I can try to convey some of his justified anger.

A dream is fiction. So let us come to facts. The main characters in this novel are (Friedrich Wilhelm Heinrich) *Alexander von Humboldt* (1769–1859), naturalist, explorer, geologist, and physicist, and *Carl Friedrich Gauss* (Johan Carl Friederich) (1777–1855), the equally famous mathematician, astronomer, geodesicist, and physicist.

Both were brilliant scientists, amazingly productive and rich in ideas, although their methods and approaches were widely different. Various periods in their lives are described in this book, culminating in their meeting in 1828, when Gauss, having been invited to Berlin, took part in a scientific meeting there organized by Humboldt and stayed in Humboldt’s home.

Kehlmann reduces these two highly interesting figures to rather flat and simple-to-understand characters. They have in common that they measure certain objects. Humboldt did this in the course of his travels, while Gauss stayed mainly at home. Humboldt is portrayed as an outgoing person, while Gauss is sketched as a grumpy man, with no compassion for his children and ill at ease in most situations in life. Among the periods of their lives that are described are their meeting in 1828, mentioned above, and the difficulties which Gauss’ son Eugene encountered in Berlin. The book ends with Humboldt’s trip to Russia, and Eugene leaving Germany for the USA. The reader is left in uncertainty about the further lives of Humboldt and of Gauss.

“Brandenbrug’s Humboldt Society has already taken issue with Kehlmann, accusing him of a lack of respect for one of Germany’s most distinguished scientists” (Luke Harding, *The Guardian*, July 19, 2006). Also for Gauss there is little respect and honor. This is what I will focus on in this review.

First there is the question: should the book be classified a historical novel? Strictly speaking “yes”, because recognizable historical figures do appear. The author characterizes this novel by: “It has the tone of a non-fiction book. But it keeps slipping into fiction and mock-historical monography” (quoted in *The Guardian* article). I think this mild description does not accord with the heedless liberties Kehlmann has taken with the historical record.

*Many aspects of the book are plainly wrong in historical context.* The author mentions in an interview “...one year I read only material in connection with this novel. I had to make up a lot, and therefore I had to know the facts.” Why is it that the author “had to make up a lot”? As we will see, historical facts, including all the material that is available about these two towering figures, supplies us with a wealth of information that is much more fascinating than Kehlmann’s fictitious stories. Let us give just a few examples of “historical events” that are presented in an inaccurate, not to say wholly untruthful, manner, or that are not supported by historical evidence.

In the chapter “The Teacher” Kehlmann describes how (after 1791) “Pilâtre de Rozier came to town” and how Gauss asked Pilâtre to take him along on a balloon ride. I have not been able to find historical evidence for Pilâtre’s visit to Göttingen (and it seems rather unlikely). Since Pilâtre died in

1785, it is highly unlikely that Gauss indeed did meet him. In the list of “people known to Gauss” this name does not appear; see Uta C. Merzbach, *Carl Friedrich Gauss: a bibliography*. The novel tells us that Pilâtre was “on his way to Stockholm”. This is plain nonsense: Stockholm had to wait until 1806 to see a manned balloon flight (by Étienne-Gaspard Robert or Étienne Robertson, a name he also used) over Swedish ground.

In the chapter “The Stars”, we read about a trip of Bessel and Gauss to Weimar, made in October 1809. I could not find that this ever took place. Details and circumstances are very unlikely. We are told Gauss saw Goethe, who was already mentally disintegrating at that time. However, Gauss mentions Goethe only as late as 1845. Also at this point in the novel Gauss meets *Wilhelm* (Christian Karl Ferdinand) *von Humboldt* (1767–1835), philosopher, linguist, diplomat, and elder brother of Alexander. The Berlin university founded in 1810 by Wilhelm was named after Wilhelm and Alexander. At the moment of the meeting with Gauss, Wilhelm was not on his way from Rome to Berlin (as stated in the book), because his position in Rome ended in 1808, and from February 1809 on he was “Sektionschef für Kultus und Unterricht” in Berlin. Even more unlikely is the novel’s depiction of Wilhelm as being unaware that Gauss was a mathematician. *Disquisitiones Arithmeticae* was published in 1801. Since then Gauss had been famous, and yet we are supposed to believe the scholar Wilhelm von Humboldt would not even have known he was a mathematician? Wilhelm von Humboldt’s letter to Gauss, written on April 4, 1810, immediately pulls the carpet from under this ridiculous story; see: Kurt-R. Biermann, *Briefwechsel zwischen Alexander von Humboldt und Carl Friedrich Gauss*. Or, compare the style of this letter with the informal language as used by the characters in this book.

A further example: the book describes Daguerre taking pictures of Humboldt and Gauss in 1828. The first experimental photograph was taken in 1826. As far as we know the only “Daguerre-type” photograph of Gauss is from 1855, the one taken on his deathbed and shown on the previous page. Mr. Kehlmann, please document your highly interesting historical findings.

These few examples of the book’s many pseudo-historical facts perhaps suffice to show the author’s concern for the historical context.

Not only has history been twisted, which some people maybe would accept, but, and this is far more serious, *the character of the main protagonists is misrepresented in a most offensive manner*. The blurb text of the novel speaks of “the barely socialized mathematician and astronomer Carl Friedrich Gauss”. Indeed, that is the impression that the novel manages to convey. But how can this be reconciled with the intense and life-long

friendships maintained by Gauss with Wolfgang Bolyai, Bessel, Olbers, Alexander von Humboldt, and many others?

And apart from that, there is ample evidence that the image of Gauss as a “barely socialized” person is unjustified. There is, for instance, the testimony of Ms. Weber. In Berlin, Gauss met *Wilhelm* (Eduard) *Weber* (1804–1891). In 1831, on the recommendation of Gauss, Weber was called to Göttingen as professor of physics. They worked together, e.g., they constructed the first electromagnetic telegraph in 1833. Weber’s sister (who was for some time in charge of Gauss’ household) wrote: “...the great man had learned how to move in society, how to be polite and to be a gentleman. He could talk about all kinds of things and insisted that no scientific problems be discussed in my presence, so much was he a man of the world.” Does this agree with the impression created in the novel?

Then there are the 7,000 letters written by Gauss that we still possess, many of which demonstrate that the impression the book gives of Gauss’ personality is highly unjust and biased. See, for instance, the letter (dated July 12, 1804) in which Gauss proposes to his future wife Johanna Osthoff. This letter is described by Dunnington as “one of the gems of German amatory literature”. Or, from a letter to Bolyai in 1808: “The days go happily by in the uniform course of our domestic life: when the girl gets a new tooth or the boy learns some new words, this is almost as important as the discovery of a new star or of a new truth...”. And there are also Gauss’ letters to Humboldt, full of intensity.

Let us see what the novel has to say about Gauss’ behavior after the death of his beloved wife Johanna. “People were whispering in the hall. Johanna was dead. He pushed back his chair and tried to accustom himself to the thought that he would have to marry again.” Just compare this with the letter Gauss wrote to his dear friend Olbers after Johanna passed away, in which we read: “Yesterday evening at 8 o’clock, I closed her angelic eyes in which I have found heaven for the last five years. Heaven gives me the strength to bear this blow. Give me a few weeks Olbers, to gather new strength in the arms of your friendship...”. Or read the personal reflections Gauss wrote during the two weeks after Johanna’s death: “Lonely, I am moving among the cheerful people who surrounded me here.... You wanted so much to stay with me. That I should not give myself over to my grief were almost your last words.” The pages show traces of his tears. More and more we come to the conclusion that reading letters by Gauss seems much more rewarding than going through this book.

The reason given in the novel for the fact that Eugene, son of Gauss, had to leave for the USA seems to have originated in Kehlmann’s fantasy.

Facts about difficulties between Gauss and this son are well documented, e.g., the gambling debts, and the party Eugene threw for his fellow students, for which Gauss did not want to pay the expenses. Eugene did not leave after the 1828 Berlin conference, as Kehlmann suggests, but in 1830. It is unfair to portray such a historically incorrect and biased string of events. Gauss may not have been the most empathic of fathers, but he did what he could, within reach of his own social and moral limits. In 1830 he tried to find Eugene just before he left, and finally did meet him at Olbers' place in Bremen, where he managed to hand him travel money and a trunk. Again, a story far more moving and intriguing than the fictionalized version we are given in the novel.

Gauss suffered from the blow of losing his first wife Johanna in 1809, and it seems that he was a different person afterwards. In a similar way, Humboldt suffered from the death of his beloved brother Wilhelm in 1835. Describing these complex personalities and how they react to such tragedies probably is beyond the scope of a popular scientific "mock-historical monography".

The reader may get the impression that the 1828 meeting between Gauss and Humboldt was the first, and that it was the climax of their contacts. Reality is far more complicated. Humboldt visited Göttingen in 1826 and in 1837. It has been obvious, also from their correspondence, that feelings between these two impressive and very different personalities did change in the course of their lifetimes. Humboldt, for instance, wrote to Schumacher on October 18, 1828: "I found Gauss charming in day-to-day contact; and he seemed happy. At the beginning, however, and towards strangers, he is cold as a glacier, and does not take part in almost everything which lies outside of the circles he has already touched upon." Of the fifty-two letters between Humboldt and Gauss still extant, only ten date from before that meeting. Again, it is from their correspondence that far more interesting material can be gleaned than from the novel. And let us not forget the letter that Wilhelm Baum (Gauss' medical doctor) wrote to Humboldt right after the death of Gauss: "Ihr letzter Brief erfreut ihn besonders...und liess ihn sich von mir vorlesen...er sagte 'dann tröstet der Gedanken an *meinem* Humboldt'." ("Your last letter especially pleased him ...and he asked me to read the letter to him...and he said 'thinking of my Humboldt consoles me'.")

*Does this book give a correct historical picture of that time?* I can hardly believe people used the kind of language Kehlmann writes. Let me give two of the many examples.

The teacher Büttner says to his pupil "Gott verdamm mich" ("God damn me").

In their visit to a theater Bessel mentions "...that Goethe was in his box today. Gauss asked if that

was the ass [*der Esel*] who considered himself fit to correct Newton's theory of light." What a missed opportunity! The controversy between Goethe and Gauss could have been described far more intricately, and one might wonder what would have happened had they actually met.

There is no reason to suggest that Gauss' behavior would have been as uncouth as it is in the novel, even though it is true that Gauss was not always pleasant to other people, especially not if they claimed results that he already had found himself long ago but had never published. There are documented examples of such exchanges, which may have been hurtful for certain people; interesting material to contemplate, just as it is interesting to savor the reserved and yet also direct style of Gauss, a style very much at odds with the crudely blunt language used in the novel.

Historical documents show us that the personality of Gauss had many facets. He could be friendly and full of feelings, but also, sometimes, "towards strangers, he is cold as a glacier." His personality obviously was complex, and definitely more interesting than what we see in the portrait of Gauss given by Kehlmann.

A "vie romancée" of Gauss, which would bring into focus the pivotal role that he has played in the development of science, depicting his personality and historical context on the basis of sound historical facts, would be very welcome. Kehlmann's novel, however, does not fulfill even the minimal requirements for such an endeavor.

Some people think the book funny. For example, they can laugh at the sadistic pleasure the Büttner character takes in punishing his pupils. I do not find this funny.

Some people tell me that they are glad to have read a book that gives them this much information about Gauss, about whom they knew little before. This is the main problem. Readers take it for granted that the novel is well-researched, so that historical facts are correct, and that psychological portraits are reasonably accurate. Not so in this novel, and I must strongly advise first to check reliable sources before using factual information mentioned in this novel.

Dutch students write on their site describing this book: "...we see an impressive number of facts. This novel is adequate for people who want to boast with useless knowledge at the coffee table." Maybe the author missed the favorite saying of Carl Friedrich Gauss: "*pauca sed matura*" (few, but ripe).