

20.

20th

NOVEMBERTAGUNG

*zur Geschichte
der Mathematik*

on the History
of Mathematics

4-8 November 2009
Enschede, The Netherlands

Theme:

How to Put 'History' in the History of Mathematics

Organisation:

Arjen Dijkstra Jantien Dopper Tim Nicolaije

UNIVERSITEIT TWENTE.



Universiteit Utrecht

Supported by:

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Science, Technology, and Policy Studies, Universiteit Twente

NOVEMBERTAGUNG 2009

What?

The Novembertagung is an annual event organized for and by junior researchers (PhD students and post docs) in the history of mathematics. It brings together junior scholars in an informal and friendly atmosphere to discuss issues in the history of mathematics and related fields.

This year's theme is *How to put 'history' in the history of mathematics*. With this theme, we would like focus on methods of writing the history of mathematics. People conducting research in the history of mathematics often have various backgrounds and that may lead to different ways of directing research. We would like to reflect on the different approaches used in the history of mathematics and what insights one can learn from them.

When?

The 20th Novembertagung will be held from the evening of 4 November until lunch on 8 November.

Where?

We will stay at Logica on the campus of the University of Twente, the Netherlands.

Who?

The Novembertagung is organised by Arjen Dijkstra (University of Twente), Jantien Dopper (Utrecht University), and Tim Nicolaije (University of Twente).

PROGRAMME

Wednesday 4 November

19.00 - 20.30: Arrival and registration (Logica, dining room)

20.30 - 21.30: Welcome (Logica, dining room)

Thursday 5 November

07.00 - 09.10: Breakfast (Logica, dining room)

09.10 - 09.20: Walk to De Vrijhof (Logica, main entrance)

09.30 - 10.15: Introduction (De Vrijhof, Kleine zaal)

10.15 - 10.30: Break

SESSION A (De Vrijhof, Kleine zaal)

Chair: Arjen Dijkstra

10.30 - 11.15: **Eva Kaufholz** - Sofja Kowalewskaja. A historic contextualisation

11.15 - 12.00: **Jantien Dopper** - Géométrie and Geometra: the focus of Van Schooten

12.00 - 13.15: Lunch (Drienerburgh, dining room)

13.30 - 15.00: Guest Speaker (De Vrijhof, Kleine zaal)

Moritz Epple - How to find general history in the history of mathematics, and how to find the history of mathematics in general history: Some examples and methodological considerations

15.00 - 15.15: Break

SESSION B (De Vrijhof, Kleine zaal)

Chair: Jantien Dopper

15.15 - 16.00: **Birgit Bergmann** - Richard Courant and the “inner necessity” of mathematics

16.00 - 16.45: **Jeanine Daems** - Determinations of the 32 crystal classes and the comparison of concepts

16.45 - 16.55: Walk to Logica

17.50 - 18.00: Walk to De Stek (Logica, main entrance)

18.00 - 19.30: Dinner (De Stek)

19.30 - 19.40: Walk to Logica

20.00 - 22.00: Workshop (Logica, lecture room)

Friday 6 November

- 07.00 - 09.10: Breakfast (Logica, dining room)
09.10 - 09.20: Walk to De Vrijhof (Logica, main entrance)

SESSION C (De Vrijhof, Kleine zaal)

Chair: Jeanine Daems

- 09.30 - 10.15: **Jan Kotulek** - Who Wants to Be a Millionaire: a Microhistoric Contribution to the History of the Riemann Hypothesis
10.15 - 11.00: **Daniel Mintz** - Mathematics for History's Sake: A New Approach to Ptolemy's Geography
11.00 - 11.15: Break
11.15 - 12.00: **Tim Nicolaije** – A Mathematician's Honour: Conflict among Teachers of Mathematics in Early-Modern Amsterdam

- 12.00 - 13.00: Lunch (Drienerburght, dining room)
13.00 - 13.10: Walk to Logica
13.30 - 14.00: Bus to Hengelo (Logica, main entrance)
14.00 - 17.00: Excursion to the Twents Techniekmuseum HEIM
17.00 - 17.30: Bus to Logica
17.50 - 18.00: Walk to De Stek (Logica, main entrance)
18.00 - 19.30: Dinner (De Stek)
19.30 - 19.40: Walk to Logica
20.00 - 22.00: Movie (Logica, common rooms)

Saturday 7 November

- 07.00 - 09.00: Breakfast (Logica, dining room)
09.00 - 09.15: Walk to Citadel (Logica, main entrance)

SESSION D (Citadel, H327)

Chair: Tim Nicolaije

- 09.30 - 10.15: **Laura Turner** - Roles of Acta Mathematica for Mittag-Leffler, and for Italian mathematicians
10.15 - 11.00: **Andreas Christiansen** - Bernt Michael Holmboe's textbooks and the development of mathematical analysis in the 19th century
11.00 - 11.15: Break
11.15 - 12.00: **Steven Wepster and Liesbeth de Wreede** - Ludolph van Ceulen's and Willebrord Snellius's Arithmetical and Geometrical Foundations

12.00 - 12.10: Walk to Drienerburgh
12.10 - 13.10: Lunch (Drienerburgh, dining room)
13.10 - 13.20: Walk to Citadel (Drienerburgh, main hall)

SESSION E (Citadel, H327)

Chair: Liesbeth de Wreede

13.30 - 14.15: **Arjen Dijkstra** - The Mathematical Connection: Ramist Ideas at Young Universities (ca. 1600)
14.15 - 15.00: **Menolly Lysne** - Laplace's Early Career: Patronage and Scientific Accomplishment

15.00 - 15.15: Break

SESSION F (Citadel, H327)

Chair: Steven Wepster

15.15 - 16.00: **Djoeke van Netten** - Mathematics in Print. The Case of Copernicus (1617)
16.00 - 16.45: **Harald Gropp** - "De onbemindheid der wiskunde". Some parts of math are more popular than others

16.45 - 17.00: Walk to Logica

17.30 - 18.00: Bus to Enschede (Logica, main entrance)
18.00 - 20.00: Evening walk through Enschede
20.00 - 22.00: Conference Dinner (Restaurant De Tropen)
22.00 - Drinks in Enschede

Sunday 8 November

07.00 - 09.30: Breakfast (Logica, dining room)

10.00 - 10.15: Walk to Citadel (Logica, main entrance)

10.30 - 12.00: Closing Discussion (Citadel, H327)

12.00 - 12.15: Walk to Logica

12.15 - 13.30: Lunch (Logica, dining room)

13.30: Check-out (Logica, dining room)
Novembertagung ends

PRACTICAL INFORMATION

Getting to Enschede

For international participants it's easiest to fly to Schiphol Airport (Amsterdam). The airport has its own train station, from which you can take a direct train to Enschede which leaves every hour. Alternatively, you can take the train from Schiphol to Groningen/Leeuwarden and change at Amersfoort to the train to Enschede. If you fly to Munster Airport (Germany) you can use a bus service to get to Munster Railway Station and from there take a direct train to Enschede. From Germany you can reach Enschede by train via Gronau.

Getting to Logica

At Enschede Station, take Bus 1 headed for "Universiteit". Get off at the stop "UT/De Hems". You're now on the south-side of the Calslaan (see map on last page). Take the small path across the street between the football field and the Santar-building (building 61 on the map). Turn left after the small bridge. After about 150 metres (500 feet) you'll find Logica (building 65) on your right hand side. Please note that after 20.30 h Bus 1 follows a slightly different route and doesn't stop at "UT/De Hems" anymore. However, it terminates at a point close to this stop (crossing of Campuslaan and Calslaan) and if you look across the football fields you can see towards the left the greyish-white Santar-building (building 61).

If you're travelling by car, take the A35 in the direction of Enschede. Take Exit 26 ("Enschede-West/Universiteit") and follow the signs that say "Universiteit". You'll enter campus on the Drienerlolaan. Make a left turn to the Campuslaan and following this road you'll find Logica (building 65) on your right hand side (address: Campuslaan 60, Enschede).

Early/Late Arrival

Please contact us if you plan to arrive earlier or later (for contact details see below). Note that it isn't possible to check into your room before the scheduled registration on Wednesday evening.

Conference Fee

The conference fee is 200 euro. This covers room and board for the duration of the Novembertagung and the excursion to the Twents Techniekmuseum HEIM on Thursday. Drinks, snacks, etc. are, however, not included, so make sure to bring enough cash. There are a number of ATMs on campus.

Accommodation

We will stay at Logica on the campus of the University of Twente. Here we will occupy most of two "blocks" of six double rooms each. Unless special arrangements were made you will share a room with another participant. Most of the rooms have their own bathroom. Bed linen and towels will be provided. Each "block" has its own small common room where you can relax after a long conference day. If you bring a computer you can access the Internet via the wireless network at Logica.

Presenting

Presentations are 30 minutes with room for discussion afterwards. You are free to shorten your presentation time to leave more time for discussion as you see fit. If you want to do this, please inform your session chair beforehand. The lecture rooms are equipped with a computer projector (suitable for PowerPoint and PDF-presentations) and a black- (or white)board. If you need more sophisticated software or additional audio-visual equipment, please contact us as soon as possible.

Weather

The Dutch weather is notoriously unreliable, so bring practical clothing for the walks across campus and the excursion to the Twents Techniekmuseum HEIM. Most importantly, don't forget to bring an umbrella!

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ABSTRACTS

Birgit Bergmann (Goethe University Frankfurt)

Richard Courant and the “inner necessity” of mathematics

The focus of my present research is on the establishment of applied mathematics in Germany during the first decades of the 20th century.

My presentation will focus on two articles by Richard Courant. The first one “Bernhard Riemann und die Mathematik der letzten hundert Jahre” was published in the journal “Die Naturwissenschaften” in September 1926, the second “Über die allgemeine Bedeutung des mathematischen Denkens” was published in the same journal in February 1928.

In these articles Courant reflects on the peculiar position of mathematics between the natural sciences and the humanities. He describes how “conceptual diffusion” and “expansion of mathematical contents”, the two main currents he sees at work within mathematical research, influence the development of the discipline. Courant also tries to find patterns for the future progress of mathematics by analysing the “major lines of its historical becoming”.

Courant’s considerations (may) lead to the following questions: Keeping Courant’s understanding of mathematics in mind, what are the consequences for his attitude toward applications? Can a position such as Courant’s fruitfully be interpreted in terms of a modern/counter-modern distinction? My answer to this second question will be skeptical.

Andreas Christiansen (Stord / Haugesund University College)

Bernt Michael Holmboe’s textbooks and the development of mathematical analysis in the 19th century

Bernt Michael Holmboe (1795–1850) was a teacher at Christiania Kathedralskole in Norway, from 1818 till 1826. After that he was lecturer at the University of Christiania until 1834, when he was appointed professor in pure mathematics, a position he held until his death in 1850. Holmboe wrote textbooks in arithmetic, geometry, stereometry and trigonometry for the learned schools in Norway, and one textbook in higher mathematics. Some of them came in several editions, and I will in my talk focus on the first three editions of the textbook in arithmetic, the ones that were published during Holmboe’s life.

In the first half of the 19th century there was a growing demand for rigour in the foundations and methods of mathematical analysis, and this led to a thorough reconceptualisation of the foundations of analysis. Niels Henrik Abel (1802–1829) complained in a letter to Christopher Hansteen (1784–1873) in 1826 that mathematical analysis totally lacked any plan and system, and that very few theorems in the higher analysis had been proved with convincing rigour. The two mathematicians Bernard Bolzano (1781–1848) from Prague and Martin Ohm (1792–1872) from Berlin made important contributions to the definition of real numbers, and their works were known to Abel.

The teaching of mathematics was also an important motivation for this rigourisation, and I will try to demonstrate that the textbooks of Holmboe reflected the contemporary development in mathematical analysis.

Jeanine Daems (Universiteit Leiden)

Determinations of the 32 crystal classes and the comparison of concepts

Geometric crystallography. In the 19th century, several scientists have independently determined the 32 crystal classes. I study their texts and pay particular attention to the concepts they used and developed in their proofs. I compare the concepts of the several authors, and sometimes the concepts of one author in several texts about the same subject.

Arjen Dijkstra (Universiteit Twente)

The Mathematical Connection: Ramist Ideas at Young Universities (ca. 1600)

In 1598 the German university in Herborn drastically changed its program. Mathematics became a central element in the preparatory school (paedagogium) of the university. In the actual Illustrious School disputations in mathematical themes became an important element of the curriculum. This was perhaps not the biggest change the students awaited that year. Henceforth they could get some of their instruction in French rather than Latin.

In that same year 1598 a professor of mathematics was added to the university of Franeker, in the Dutch Republic. This professor immediately set out with an ambitious program, that included the teaching of some of his classes in Dutch.

Both the 'Hohe Schule' in Herborn and the 'Universiteit' in Franeker were supported by members of one and the same noble family: the family of Nassau-Orange. The university of Leiden was yet another academic institution that had found a patron from that same family. In Leiden similar changes were proposed. However the Leiden opposition to keep out vulgarities like this proved to be too strong. There it took two more years and the founding of a completely new institution to make way for the instruction of mathematics in Dutch.

In my paper I will show how these pedagogical developments were deeply rooted in the ideas of the French philosopher Pierre de la Ramée (1515-1572). I will also show what the Nassau-family had to gain with the implementation of these changes. By looking at these episodes in that context I will show how the proposed changes in Franeker, Herborn and Leiden were interconnected. With this approach I want to shed a new light on this episode in which mathematics obtained a new spot in the curriculum of many universities.

Jantien Dopper (Universiteit Utrecht)

Géométrie and Geometria: the focus of Van Schooten

In 1637 the *Géométrie* of Descartes was published as one of the essays of the *Discours de la méthode* in Leiden. The Dutch mathematician Frans van Schooten, attached as professor at the Engineering School of Leiden University, translated the work into Latin and published his translation with additional commentary in 1649. An enlarged and revised version of this Latin version became available in 1659-1661.

In preparing his commentary, Van Schooten had to make choices what to include and what not. By careful reading of the commentary, we learn about the mathematical interests of Frans van Schooten. In this paper I will defend the thesis that Van Schooten was mainly interested in the mathematics itself, and not into the philosophical part of the program of Descartes for the mathematical sciences. I will illustrate this by comparing the content of the first part of the Second book of the *Géométrie* of Descartes with the remarks of Van Schooten.

Harald Gropp (Heidelberg)

"De onbemindheid der wiskunde" - Some parts of math are more popular than others

On September 20, 1926, the rector of the Rijksuniversiteit Groningen, the mathematician J.A. Barrau, gave a lecture called "De onbemindheid der wiskunde". I found a printed version of this speech in Utrecht during the Novembertagung of 1992. It was in Utrecht where Barrau spent most of his academic life as a geometer (1928-1946). Barrau was born in Oisterwijk in 1873. After school he worked in the "Koninklijk Nederlandse Marine" until 1898. Then he studied mathematics in Amsterdam (Ph.D. in 1907). He was professor in Delft and Groningen before 1928 and died in Utrecht in 1953. He seems to be best known in the Netherlands because of his book on geometry. I am mainly interested in his early work on configurations in the field of

combinatorics. His “*academisch proefschrift*” was “*Bijdragen tot de theorie der configuraties*”. My talk will mainly discuss his speech of 1926 in connection with his mathematical work in combinatorics.

Eva Kaufholz (Universität Mainz)

Sofja Kowalewskaja - A historic contextualisation

The Russian mathematician, writer and journalist Sofja Kowalewskaja (1850-1891) was the first woman to obtain a doctorate at a German university with a mathematical thesis and the first to hold a chair at a northern European university. Due to her diversified interests and intellectual achievements she became the subject of various scholarly and belletristic publications already soon after her premature death. Unfortunately, however, even the best recent studies only present a rudimentary contextualisation of the leitmotifs in her life. Thus, my research aims to provide a richer elaboration of the relevant historical background while giving special consideration to three topics that ran through her fascinating life. The first of these themes is her connection with the mathematical school that centred round the mathematician Karl Weierstraß, Kowalewskaja’s personal mentor who helped launch her mathematical career. Afterwards I will focus on the political and social developments that impacted Kowalewskaja’s life, especially Russian nihilism, but also the European socialist movements of her time. These topics will be consolidated in the third part of my study, which deals with contemporary accounts of Kowalewskaja as an unusual woman who was described in various sources by friends and others who knew her. These topics have often been touched upon the existing literature, but many valuable sources, both published and unpublished, have not yet been fully exploited. This historic contextualisation will thus take a vital step toward providing a deeper understanding of how Kowalewskaja’s life was embedded in the political, mathematical and social currents of her time.

Jan Kotulek (VSB-TU Ostrava)

Who Wants to Be a Millionaire: a Microhistoric Contribution to the History of the Riemann Hypothesis

After 150 years, the Riemann Hypothesis remains wrapped in mystery. However, we have observed increasing public attention to the problem recently, even several attempts on the (dis)proof. We tell the (micro-)story of the attempts by Montreal economist J. Breslaw and his dispute with Pilsen physicist L. Motl, who quickly found a mistake in the proof and blamed Breslaw for amateurism and for trying the proof just for money.

By this ‘*exemplum*’, we try to put the methodological concepts of microhistory in the history of mathematics. First, we ask questions on a different scale, a micro-scale. It means that we want to study a small story on the borders, or even behind the borders of the mainstream mathematical research.

Next we describe the methodology. Primarily we try to draw out all sources even the overlooked ones (personal blog, facebook account, etc.) to analyze all documented social relationships and connections of our actors. We try to find their scientific motivations. Other psychological dimensions of the dispute are discussed as well.

Finally, we address the question of recent changes in the culture of mathematical publishing, namely (dis)advantages of publishing on arXiv.org. It is quick, democratic and free of charge. Nevertheless, most of the attempts on the Riemann Hypothesis are pseudo-science and it is published on among the respectable research. Our story tells us, that disputes over the originality of the results change to the disputes over its correctness.

Menolly Lysne (Simon Fraser University)

Laplace's Early Career: Patronage and Scientific Accomplishment

Before the French Revolution, access into the elite echelon of French society, including the academic society, was almost entirely restricted to those of noble birth. Pierre Simon Laplace (1749-1827) was one of the exceptions to this rule; he entered the French scientific community based on his merit as a scientist and his ability to obtain powerful patrons. In this talk I will discuss the influence of one of his patrons, Jean le Rond d'Alembert (1717-1783), on his personal, professional and scholarly life by looking at primary documents.

D'Alembert was able to assist Laplace in obtaining employment at the École Militaire. In a letter addressed to Laplace's teacher at the Université de Caen, d'Alembert discusses not only the position, but also the steps that Laplace must take to accept the position, when to arrive in Paris and what to do once he has arrived.

Laplace was able to repay d'Alembert for his patronage by looking favourably on his mentor's work in his own scholarly output. In looking at one of Laplace's earliest memoirs we can see the undeniable influence of d'Alembert. Through these two very different sources, I will investigate how Laplace's early career was shaped through patronage.

Daniel Mintz (University of St Andrews)

Mathematics for History's Sake: A New Approach to Ptolemy's Geography

Almost two thousand years ago, Claudius Ptolemy created a world map, identifying the names and coordinates of over 8,000 settlements and geographical features. Using the coordinates of those cities and landmarks that have already been identified, a series of best-fit transformations has been applied to several of Ptolemy's regional maps.

The mathematical techniques involved in this process are all modern. However, these techniques must be tempered with history. To think of Ptolemy's data as similar to that collected from a modern random sampling of a population and to apply unbiased statistical methods to it would be erroneous. Ptolemy's data is biased, and the nature of that bias is going to be informed by the history of the data. From where did it come? When did Ptolemy receive it? How old is it? Was it the most up-to-date information? While such techniques as cluster analysis, Procrustes analysis, and multidimensional scaling are called for and can be used to transform Ptolemy's data with minimal errors, the results may be inappropriate. Goodness-of-fit must be sacrificed for historical accuracy. It is only when the history of the mapped region is understood that mathematics may be applied.

Djoeke van Netten (Universiteit van Amsterdam)

Mathematics in Print - The Case of Copernicus (1617)

'How to put "history" in the history of mathematics'. In my talk I will argue that you cannot do without putting a bit – or a bit more – bookhistory in the history of science. As a researcher in the history of mathematics it is almost impossible not to come across printed works. And you should take into account that these works are not transparent objects through which you can directly see the author and his purposes. Books and journals are *made*. And the way they are made, and the way the (mathematical) text is presented, determines the way they are read, used and built upon.

I will present the case of the third edition of Copernicus' famous book *De revolutionibus orbium coelestium*. It was at first published in Nuremberg in 1543, which is traditionally seen as the beginning of the scientific revolution. The debate about the earth revolving around the sun in

reality, however, started only after 1600, when the first and second (1566) editions of Copernicus' work were already sold out. In 1616 *De revolutionibus* was placed on the catholic *Index* of forbidden books. In 1617 the third edition was produced in Amsterdam, which has since that time been seen as an improvement compared with the preceding editions. In my presentation I will have a look at what the improvements really were and how they came into being. I am mostly interested in the people behind the 1617-edition: the editor Nicolaus Mulerius and the publisher Willem Jansz Blaeu.

Tim Nicolaije (Universiteit Twente)

A Mathematician's Honour: Conflict among Teachers of Mathematics in Early-Modern Amsterdam

In the early 1660s the people of Amsterdam were – probably much to their amusement – confronted with a couple of paper battles fought between *rekenmeesters*, teachers of mathematics who had a private school at their homes. Here these *rekenmeesters* taught their pupils the basics of such practical mathematical arts as navigation and bookkeeping. In Amsterdam, a city that was experiencing its Golden Age as centre of world trade, there was a good market for such topics. Still, the competition among these teachers of mathematics was fierce. An instance of the resulting expositions of verbal and mathematical violence was started by a pamphlet issued in 1663 by Cornelis van Leeuwen, who at that time had just taken over the school of his former teacher at the Zeedijk. In his pamphlet he ridiculed some of his colleagues who, according to Van Leeuwen, were loudly proclaiming their own mathematical abilities all over town while their published works merely showed trivialities or things they had stolen from others. This latter point was linked by Van Leeuwen to their skills as mathematicians. Since they presented the textbooks or exercises of others as their own they clearly did not comprehend the material themselves. Van Leeuwen's method of discrediting his rivals shows us the strong link between a man's occupation and his honour that existed in the Dutch Republic, as his accusations of mathematical inability were aimed at dishonouring them and thereby placing them outside the circle of teachers of mathematics and outside civil society. Even though Van Leeuwen's attempt to dishonour some of his competitors on the Amsterdam mathematical market completely backfired, it is nevertheless instructive to see what tactics were used, which in turn shows us how interwoven mathematical practices were with the general culture of that time.

Laura Turner (University of Aarhus)

Roles of Acta Mathematica for Mittag-Leffler, and for Italian mathematicians

The broad focus of my project is the “influence” of Mittag-Leffler on the study and communication of mathematics through his roles as professor, journal editor, and organizer of the Scandinavian Congress of Mathematicians. I am currently studying his correspondence with Italian mathematicians to analyze some of the roles that he (as an editor) and his journal played within that community, as well as various roles the journal played for him and for Swedish mathematics.

Steven Wepster (Universiteit Utrecht) and Liesbeth de Wreede (Universiteit Leiden)

Ludolph van Ceulen's and Willebrord Snellius's Arithmetical and Geometrical Foundations

In 1615, both the Dutch and Latin versions of Ludolph van Ceulen's (1540-1610) Arithmetical and Geometrical Foundations were published. These two books form an underesteemed pair of sources of early-modern arithmetic and geometry. In particular, they show that Van Ceulen was an inventive mathematical problem solver.

Moreover, the Latin edition is much more than a mere translation. Because Willebrord Snellius (1580-1626) adapted the Dutch original in his translation and commented on it, the Latin version can be read as a dialogue between representatives of two different approaches to mathematics in the early-modern period: Snellius's humanist approach and Van Ceulen's practitioner's approach. Our talk will explain how the difference between them was caused, and how it shaped their attitudes toward the use of numbers in geometry.

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