

„The element of surprise“:

Reviel Netz über seine Arbeit an den Werken des Archimedes

Prof. Dr. Matthias Scherer
Dr. Isabella Wiegand

What have we learned from the Archimedes Palimpsest? – Diese und andere Fragen beantwortete Prof. Reviel Netz (Stanford University) am 7. November 2017 im Rahmen der *ISAM Speakers Series*. Deren Konzept besteht darin, dass Mathematiker von ihren Projekten außerhalb der Academia berichten, oder umgekehrt Wissenschaftler mit anderer fachlicher Provenienz über ihre Forschung an mathematischen Themen erzählen. Prof. Matthias Scherer, Sprecher des Fakultätsgraduiertenzentrums ISAM, und Koordinatorin Dr. Isabella Wiegand hatten Reviel Netz aufgrund ihres gemeinsamen Interesses an seiner Forschung nach Garching eingeladen – mit großer Zustimmung der Doktoranden.



Matthias Scherer

Reviel Netz ist Professor für Classics, für griechische und lateinische Sprache und Literatur. Spezialisiert hat er sich aber auf die Geschichte kognitiver Praktiken, gut zu erfassen z.B. in der Geschichte des Buchs, und ebenso auf die Geschichte der antiken Mathematik. Die Fachwelt kennt ihn als Übersetzer und Kommentator der Werke des Archimedes und als Editor des spektakulären Archimedes-Palimpsests. Beim interessierten Laienpublikum hat er sich v.a. durch sein populärwissenschaftliches Buch „The Archimedes Codex. Revealing the Secrets of the World's Greatest Palimpsest“ (2007) international einen Namen als Wissenschaftshistoriker gemacht.



Isabella Wiegand

Dass er jenseits des angelsächsischen Sprachraums ausgerechnet in Deutschland die größte Fangemeinde zählt, spricht für die hohe Aktualität der (Natur-)Wissenschaftsgeschichte, die bei uns bekanntlich eine lange Tradition hat. Entsprechend voll war der Hörsaal 3 des Fakultätsgebäudes; nicht nur zahlreiche Doktoranden versammelten sich, auch viele Professoren hatten sich den Termin freigehalten; die Mitglieder der Hurwitz-Gesellschaft waren auf die Veranstaltung aufmerksam gemacht worden und erschienen in großer Zahl. Der inoffiziell-kulinarische Teil im Anschluss zog sich bei angeregten Gesprächen bis in die späteren Abendstunden hinein. Wer nun den Vortrag versäumt hat, kann sich aber trösten: Wegen des hohen Interesses wurde die Veranstaltung aufgezeichnet. Das Video kann von den Seiten der ISAM Graduiertenschule abgerufen werden.

Viele Fragen sind – glücklicherweise – noch offen. Um dem abzuhelpen und um ein größeres Publikum zu erreichen, stellte sich Reviel Netz im Nachgang zu seinem Vortrag für ein Interview der Veranstalter zur Verfügung, das als Komplement zum Vortrag und auch für sich genommen spannende Einblicke bietet. Die Neugier bleibt!

What is the origin of your interest in Archimedes?

In a sense it is impossible not to be interested in Archimedes, but my decision to produce a critical edition of the diagrams (which is where my close involvement began) was based on a reading of the list of libraries where the prime manuscripts lay: Paris, Venice, Florence, Rome. I realized this project will call for lots of travel for study of the primary sources and so I decided to take up the challenge.



How did the Archimedean Palimpsest arrive at your desk?

Oh, not on my “desk”, I should say. But I first had a letter (not an Email; a letter) from a professor in Cambridge, alerting me that she was told that the palimpsest is about to be sold; then a phone call on my office landline at MIT. The curator of rare books at the Walters Art Museum, wondering if I’ll be interested in inspecting the manuscript. I was a post-doc and all we were provided were small offices, cubicles almost. I’m afraid my cries of joy were very audible and lasted very long, but people were really nice about it and only one asked me, the day after, if I was offered to look at the Archimedes Palimpsest, as this was the only thing explaining such behavior.

What precisely is a palimpsest?

I guess it may mean lots of things, but in Medieval manuscripts studies we’re talking about books made of the scraped (Greek: psestos) skins of animals; those are fairly robust, but expensive. It may be hard to acquire a new one in which one simply re-scrapes (Greek: palimpsestos) an already written book and writes on it a new, fresh text. This happens quite frequently: we have tens of thousands of Medieval Greek manuscripts in Europe – and about a thousand of these are palimpsests.

In what condition did you receive it and what was required to make it readable?

The Archimedes Palimpsest was read once, briefly, in 1906, and the general view was that it has since deteriorated so badly no more could be read. Indeed, it was nearly perished, mostly due to mold that has set in during the twentieth century. It was not obvious this would even be made safe, let alone readable, not to mention producing new readings. Abigail Quandt, the conservator, did the most heroic work in stabilizing and safekeeping the manuscript. New techniques of digital imaging (since become more commonly used), largely based on multispectral imaging and data processing, created artificial images which are the basis of my reading; almost nothing can be read from the bare page (though even illuminating the bare page with ultraviolet brings up a lot; multispectral imaging and data processing is essentially an extension of the use of ultraviolet light).

What is, briefly, the content of Codex C?

It contains, in incomplete form, some of the most interesting works by Archimedes, in both mathematical physics and pure geometry.

Is there a mathematical proof by Archimedes that you like most?

The one I like best is quite elementary but I am probably not a very sophisticated mathematician! It is in fact not extant but is reported in detail by Pappus (griechischer Mathematiker der Spätantike; Anm. d. Redaktion); it is an indirect way of showing that the area intercepted by a single rotation of a spiral is one third the area of the circle circumscribing it. This is done by producing a correlation between, (i) on the one hand a series of cylinders, encompassing a cone like a series of Hanoi rings, (ii) on the other hand, a series of small sectors of circles, each extending just beyond the spiral area. It is straightforward to show that each Hanoi-ring cylinder is to the segment of the cone it circumscribes, as the small sector of the circle to the segment of the spiral it encompasses; that each Hanoi-ring cylinder is to the segment of the cylinder containing it, as the sector of the circle to the full sector of the circle. All in all, one finds that the cone is to the cylinder (a third, as is well known) as the spiral area is to the circle. This is beautiful, visually and conceptually!



Prof. Dr. Reviel Netz

How did Archimedes influence the history of Mathematics?

The long answer is very long. The short answer is more surprising: by instilling the element of surprise. When mathematicians today feel that a satisfying result has to be surprising, counter-intuitive, I think they continue on a tradition of mathematical creativity that was revived in the 16th and 17th centuries based above all on an Archimedean model.

In retrospective, what do you consider his most valuable achievement(s)?

Easy: the invention of mathematical physics. This ultimately changes world history. But elaborating most of the tools leading to the modern invention of the calculus should definitely get some sort of consolation prize.

Do the lacunae in the extant codex impair the traceability of Archimedes' proofs?

There are unclear details about the conclusion of a couple of propositions in the Method; they are located in pages that were sold separately as forgeries, during World War II.

Did your perception of Archimedes change in the process of your research project?

I should hope so! I wrote a book, called "Ludic Proof", largely based on my new understanding of Archimedes.

You focused a lot on the graphs contained in the manuscript. What do they teach us?

They – I prefer to call them diagrams – fit a larger pattern. Everywhere as we recover Greek mathematical diagrams based on manuscript evidence, perhaps going back to antiquity, we find a systematic tendency: the use of schematic, imprecise, almost topological diagrams. The reason is easy to find: a schematic diagram can be used rigorously, since its pattern of interactions – this, intersecting with that – is a precise instantiation of the definition in the text (which is no longer correct for metrical properties, best left outside of the scope of the intended representation of the diagram).



Is the Palimpsest open to the general public?

Not the physical object, which is kept safe in a library; but all the images are available online, completely accessible and reproducible without charge, check it out:

<http://archimedespalimpsest.net/Data/>

(Dies ist auch die Quelle der in diesen Artikel eingebundenen Bilder, dort sind diese unter der *Creative Commons licenses* veröffentlicht, Anm. d. Redaktion.)

Is there an open question related to Archimedes that you wish to know the answer to?

I would like to have a critical edition of the texts translated into Arabic; this would be very useful for cleaning up everything on the Greek side, as well.

Reviel, we thank you very much for your very interesting visit to Garching!