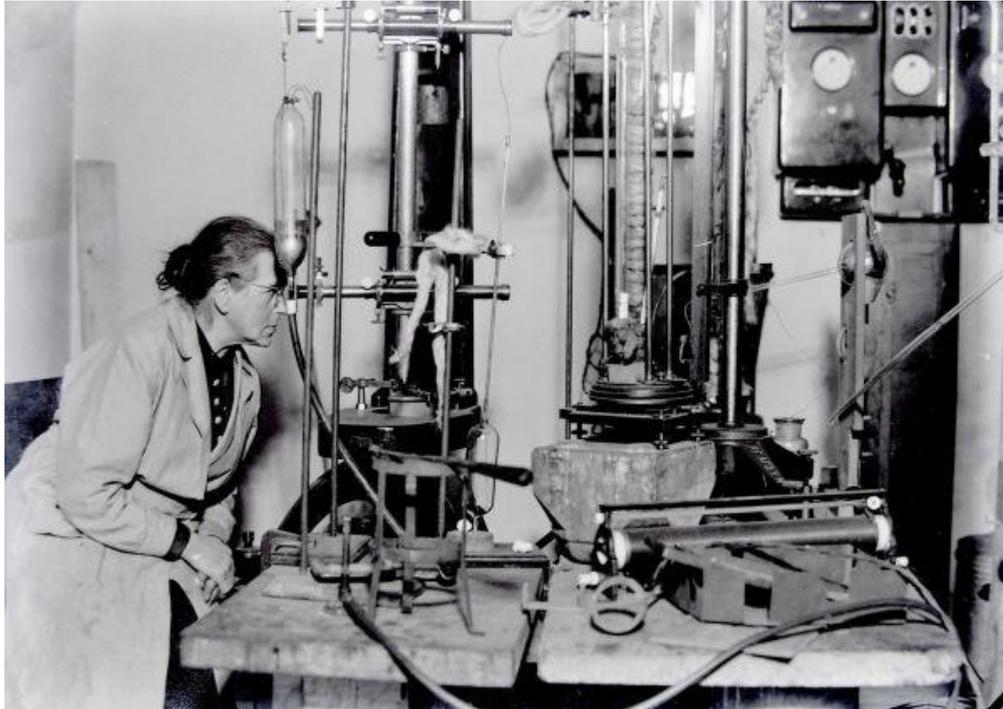


Gewina



Things to know

Material Culture in Scientific Practice

6th Gewina Meeting of Historians of Science in the Low
Countries

Woudschoten Conference Center, Zeist, 19-20 June 2015

6th Gewina Meeting
of historians of science
in the Low Countries
Woudschoten, 19-20 June 2015

Welcome to the conference!

In addition to written texts, historians of science increasingly use material sources in their research, such as paintings and prints, scientific instruments and models, chemicals and other material substances, anatomical and natural history collections, or journals and books, seen as material objects rather than as carriers of textual information. Using such sources often involves drawing on methods and skills of other disciplines – archeology, anthropology, art history – or even manipulating objects and substances.

What does all this mean for the history of science? How can the use of material culture enrich our view of the past, and what, if any, are the limitations of focusing on material objects? How do the trajectories that scientific objects follow across a variety of places of scientific practice affect their identity? What can we learn from reenacting the manual work of manipulating substances, constructing instruments, and performing experiments? Which objects do we need to conserve for the benefit of future historians? How can material objects enrich the teaching of the history of science? We invite you to address questions such as these, as well as any other topic concerning material culture and history of science.

The 'Leiden' organizing committee,

Frans van Lunteren (Leiden University, Free University)

Eric Jorink (Leiden University, Huygens ING)

Dirk van Delft (Museum Boerhaave, Leiden University)

Ad Maas (Museum Boerhaave)

Practical Information

Questions about registration, the program, or other organizational issues:

Ad Maas, admaas@museumboerhaave.nl

06-14753582

Venue

Woudschoten Conferentiecentrum

Woudenbergseweg 54

3707 HX Zeist

Tel. 0343-492492

www.woudschoten.nl

Payment information

Stichting Museum Boerhaave

IBAN NL60 RABO 0180 5370 24

Quoting: W6

Getting there



By public transportation: the nearest NS station is Driebergen-Zeist. You can take a taxi (c. 10 minutes), or rent a bike or OV-fiets (15-20 minutes). You can also take bus 81 from the station; please check the schedule at www.9292ov.nl.

Biking from Utrecht city or station is highly recommended for those who like such things. It will take you 45-60 minutes.

By car: You can follow the signs to the KNVB headquarters which is next to the venue, or follow these instructions:

A28 from Utrecht direction Amersfoort/Zwolle

- On the A28 exit 3 Zeist-Oost/Den Dolder
- 1st traffic light straight on, in the direction of Zeist
- Next traffic light turn left towards Woudenberg, keep following the long road
- At the end of this road, turn left towards Woudenberg,
- Take the second exit on the roundabout

A28 from Zwolle/Amersfoort direction Utrecht

- On the A28 exit 3 Zeist/Den Dolder
- At the end of the exit, turn right, in the direction of Zeist
- Next traffic light turn right
- Next traffic light turn left towards Woudenberg, keep following the long road
- At the end of this road, turn left towards Woudenberg,
- Take the second exit on the roundabout

A12 from Utrecht and Arnhem

- On the A12 take exit 20 Zeist/Driebergen
- At the end of the exit continue in the direction of Zeist
- In Zeist, follow the signs to Woudenberg, for about 3 kilometres
- On your right you will see Hotel Oud London
- Take the second exit on the roundabout

Program

*-activities are further explained below

Friday 19 June

9.30 Arrival, registration, coffee

10:00-11.30

Session 1A History of science & humanities (room A)*

- Rens Bod, *Why Do Scientists Cite Humanities Scholars Millions of Times?*
- Chaokang Tai, Jeroen van Dongen, *Human virtues and the ideal scientist: post-disciplinary perspectives on Einstein and Pannekoek*
- Bart Karstens, *An Audiogram for the Soul? On B.F. Skinner's Verbal Summator and its Successors*

Session 1B: Husbandry and material culture (room B)

Chair: Frans van Lunteren

- Steven van der Laan, *Changing technologies, farms and pigs*
- Floor Haalboom, *Zoonoses as social problems: twentieth-century dealings with infectious diseases shared by humans and livestock in the Netherlands studied using two sociological theories*
- Babke Aarts, Bert Nederbragt, *Milking with the Langreuter*

11:30-11:45 Coffee, tea

11:45-12:30 **Keynote lecture** (plenary room) Sachiko Kusukawa, *the visual and material culture of early modern science*

12:30-14:00 Lunch

12:45-13:45 **Hands-on market** (room A)***

- Corrie van Maris, Engraving or etching?
- Tiemen Cocquyt, Authentic or fake? What can we learn from close inspection of material heritage?

14:00-16:00

Session 2A: Ecology and Conservationism (room A)

Chair: Jeroen van Dongen

- Raf de Bont, *Conservation Science and the Agency of Nature: Negotiating Antelopes, Pygmies and Tourists in Albert National Park, 1920-1950*
- Hans Schouwenburg, *Conservation Experts and the Politics of Sustainable Development*
- Simone Schleper, *Science and politics of nature conservation at the United Nations (Stockholm) Conference for the Human Environment, 1972*
- Jesper Oldenburger, *Science, sheep and breed*

Session 2B Materiality in medicine (room B)**

Chair: Eric Jorink

- Ruben Verwaal, *SWEAT: The Materiality and Fluidity of Perspiration in Eighteenth-Century Medicine*
- Marieke Hendriksen, *The 'Stone' that Stuck: Lapis haematites*
- Jetze Touber, *'In my intestines the marble grows from which my grave is carved': the multiple meanings of body stones in early modern culture*
- Wouter Klein, *How the bark was brought: the study of Peruvian bark as a new approach for research on early modern exotic drugs (c. 1640-1720)*

16:00-16:15 Tea Coffee

16:15-17:15

Session 3A: Fossils (room A)

Chair: David Baneke

- Ilja Nieuwland, *Portraying Extinct Monsters of the Ancient Earth. A journey into the tangled world of paleontological reconstruction*
- Marlise Rijks, *Seeing is Believing. Collected Fossils in early seventeenth-century Antwerp*

Session 3B: Experiments and Material culture (room B)

Chair: Ad Maas

- Katrien Vanagt, *Reconstructing by movie*
- Filip Buyse, *De controversie tussen Spinoza en Robert Boyle omtrent het redintegratio-experiment*

17:15-21:00 Drinks and diner

21:00 – 21:30 **Movie** *In waking hours*, introduced by Katrien Vanagt (room A)****

Saturday 20 June

9:15-11:15

Session 4A: Astronomy and material culture (room A)

Chair: Bert Theunissen

- Martin Weiss, *“Polarstern” not “Polaris”: A research vessel for Antarctic research during the Cold War*
- David Baneke, *Money, Time, and Telescopes*
- J.G. de Swart, *Missing Matters: Theory, Practice, and the History of Dark Matter, 1969-1974*

Session 4B: Instruments (room B)

Chair: Dirk van Delft

- Huib Zuidervaart, , *Jan van den Dam’s Sphaera Perfecta (1738-1756): two 18th-century Dutch planetaria put into context*
- Douglas Anderson, *The Leeuwenhoek microscope: A dead-end design*
- Tiemen Cocquyt, *Discovery and investigation of the oldest Dutch telescope*
- Gerhard Wiesenfeldt, *Teaching Global History of Science via Material Culture: Lessons from Astronomy*

11:15-11:30 Coffee, tea

11:30-12:50 **The great master-thesis pecha cucha show** (room A)*****

Featuring

12:50-14:20 Lunch

13.20-14:20 **Media Market** historians of science and (old and new) media (in Dutch) (room A)*****

Panel members: Dirk van Delft (former science-journalist NRC-Handelsblad), Noortje Jacobs (editor blogsite Shells & Pebbles), Jeroen Dirks (radio

presenter) and Esther van Gelder (historian of science and crowd sourcer).
Moderator: Bart Grob

14:20-16:20

Session 5A: Medicine and material culture (room A)

Chair: t.b.a.

- Hieke Huistra, *How scales shaped our ideas on fatness, weight and health, 1890-1940*
- Noortje Jacobs, *'BUIKHUISEN, STUPID AND EVIL' (and the political discourse of Dutch research ethics governance in the late 1970s)*
- Mienieke te Hennepe, *Mouse in the museum: The material culture of lab animals in biomedicine*

Session 5B: Texts and material culture (room B)

Chair: Bart Kartsens

- Ludovica Marinucci, *Language as an Instrument: a Digital Analysis of the Last Writings of Christiaan Huygens*
- Floris Solleveld, *Texts as material culture: language samples, exotic alphabets and manuscript reproductions around 1800*
- Ivan Flis, *Mapping four decades of psychology's disunity*

16:20-16:35 Coffee, tea

16:35-16:50 **Movie** (in Dutch) *Rijk van Rotzooi*. Exhibition on the history of waste, recycling and chemistry in Museum Boerhaave, introduced by Andreas Weber (room A)

16:50-17:00 Concluding words (room A)

* Star activities

* Thematic panel session

Towards a New Amsterdam Center that Integrates the Histories of Humanities and Sciences

While the humanities and the sciences have a closely connected history, there are no general histories that bring together the two fields on an equal footing. The Amsterdam Center for the History of Humanities and Sciences (*under construction*) focuses exactly on the integration of the histories of humanities and sciences. In this session we will have three talks on this programmatic theme, followed by a general panel discussion.

** Thematic panel session

Materiality in medicine, 1600-1800: bodily fluids, stones and metals

Over the past decades, it has become increasingly clear that the development of knowledge in early modern Europe was bound up with the materiality of objects and substances, and therefore that cultural history and the history of science, philosophy and ideas should be studied together with their material evidence in order to be fully understood.¹ In this panel, Hendriksen, Touber, Verwaal and Klein explore the meaning of the materiality of substances such as bodily fluids, metals, and stones -both calculi like kidney stones and geological stones- in medicine between roughly 1600 and 1800, demonstrating that even in the age of Enlightenment and new chemistry, Hippocratic and alchemical understandings of the human body and the earth and its substances strongly influenced medical and pharmaceutical practices.

***** Hands-on market**

Hands-on demonstrations of practical skills related to the material culture of history of science.

¹ Klein and Lefèvre 2007, Klein and Spary 2010, Jordanova 2012, Smith et al. 2014.

Authentic or fake?

What can we learn from close inspection of material heritage? **Tiemen Cocquyt** will present astronomical and mathematical objects from the collection of Museum Boerhaave, which were for a long time considered to be exceptional pieces from the early modern period. Recently, however, a more complex story has emerged. You are invited to formulate an answer to the question 'whom were these objects made for?' Such an answer, it seems, must not only take into account functional arguments, but aspects as history of collecting and the process of 'historisation' of instruments as well.

Etching or engraving?

By **Corrie van Maris**

**** **Shortmovie *In waking hours***

Introduction: Katrien Vanagt

In 1632, Dr Plempius from Amsterdam conceived an experiment into vision. One sets up a freshly deceased cow's eye in a darkened room and the painting that emerges perfectly depicts all the objects in the outside world. Sarah Vanagt films her niece, historian Katrien Vanagt, meticulously following the master's instructions.

***** **Students' Master-Thesis Show** (in Dutch)

Chair: Ad Maas

HPS Master's students present their research topic with the dynamic pecha kucha-format – history of science in 6 minutes and 40 seconds and in 20 slides. Featuring: **Sebastiaan Broere, Bobby Vos, Michelle Boon, Suzanna Bloem, Pieter Lindenbergh, Marijn Prakke, Lara van Zuilen, Jorrit Smit.**

***** **Media Market** (in Dutch)

Historians of science manage very well to find their way to the specialized journals of their fields. In this panel session, representatives of traditional and new media discuss the ways in which historians of science can reach other, wider audiences with their wonderful stories. Panel members: Dirk van Delft (former science-journalist NRC-Handelsblad),

Noortje Jacobs (editor blogsite Shells & Pebbles), Jeroen Dirks (radio presenter) and Esther van Gelder (Historian of science and crowd sourcer). Moderator: Bart Grob

***** **Movie** *Rijk van Rotzooi*.

Guest-curator **Andreas Weber** will guide you through the Museum Boerhaave-exhibition

Abstracts

Milking with the Langreuter

Babke Aarts (University Museum Utrecht), Bert Nederbragt (Utrecht University)

In the storage of University Museum Utrecht, an orphaned milking machine has been gathering dust for years. The purpose of the project is to bring this machine, which turns out to be very special, to bring to life again. The milking machine, called the *Langreuter*, was designed and improved by the Dane Jens Nielsen between 1891 and 1911: patent applications from this period have been found. As a 'static' museum object, this machine tells little about its place in the development of machine milking and the context within which it was developed. In the history of the milking machine, a competition took place between two types of machines, one type imitating the hand of the milker, the other type imitating the suckling calf. The first type, of which our machine is an example, lost the competition. Preserving the machine as a working object following the guidelines of the Museums and Galleries Commission / Collections Trust would greatly enhance the meaning of this object, and provide more insight in the long period of trial and error that led to successful machine milking

A project group has been created, in which a wide variety of stakeholders takes part: veterinarians, technicians, animal husbandry specialists, historians of veterinary medicine, who will be consulted regularly in the course of the project. First of all, the machine has to be restored using a.o. technical images from the patent applications. Some parts will have to be replaced or added in consultation with a restorer, who documents this process thoroughly. The working machine will first be tested on a fake udder, before a real cow will be milked using the Langreuter. When this turns out successfully, the milking machine will be able to play a role in educational activities and finally tell its important and fascinating story.

The Leeuwenhoek microscope: A dead-end design

Douglas Anderson (Medaille College, Buffalo)

While some work has been done on Leeuwenhoek's lenses (Cittert 1934, Kingma Boltjes 1941, van Zuylen 1981), less has been done on the metal parts (Ford 1983, Shinn 1996). This presentation will explain how Leeuwenhoek constructed the metal parts (not the lenses) and how each part functioned together. It will also demonstrate how the device could be used, including assistance provided the burning glasses and other scientific instruments found in the list of Leeuwenhoek's scientific instruments in his daughter's estate inventory. This analysis will focus on explaining why his was a superior design but a dead-end design, nonetheless.

Money, Time, and Telescopes

David Baneke (Utrecht University)

Large telescopes are central to modern astronomy. To a surprisingly large degree, these instruments determine the structure of the discipline: scientifically, materially, politically, financially, and socially. Observation time on large telescopes is the most sought after commodity in the astronomical community. One of the main ways to obtain it is to invest in the development of the instrument. Choosing which telescope projects to join is therefore a momentous decision for any astronomical community. Many interests play a role, and sometimes conflicting ones.

In this talk, I will look at the Dutch astronomical community in the 1990s. For the first time in decades, this community had to make a choice between several 'big science' projects. Before, large projects had always presented themselves more or less naturally, but not so in the 1990s. This led to fundamental discussions about scientific priorities, political strategy, expectations of technology, and pragmatism. Eventually, a compromise was reached, which was overturned within a few years by yet another large instrument project.

This case study involves the history of LOFAR, ALMA and SKA, three of the major instruments of present-day astronomy (one of which has yet to be built). It provides an opportunity to analyze the inner workings of a modern scientific community.

Why Do Scientists Cite Humanities Scholars Millions of Times?

Rens Bod (University of Amsterdam)

The idea that the sciences and the humanities are, and always have been, separate is as much alive as ever. It structures the entrenched organization of the university; it is taken for granted in academics' everyday thinking. And yet it is wrong. It fails to fit the practice and the organization of scholarship prior to the 1880s, when Wilhelm Dilthey and other leading German thinkers began to call the sciences 'law-establishing' ('nomothetic') as opposed to the allegedly purely 'hermeneutic' humanities. It fails likewise to fit what happened in their own time, and what has happened ever since. The fact is that there have been numerous, well-explored and well-established cases of interaction between 'the sciences' and 'the humanities'. A few days' work on the Web of Science citation index has further shown that between 1981 and 2010 no less than 1.7 million times a scientist has seen fit to cite an article or a book categorized as belonging to the humanities. So there is good reason, and ample empirical ground, for investigating science / humanities interactions in a less haphazard and more systematic, above all comparative manner than so far. In my talk, I will first briefly sketch a number of well-studied 20th-century interactions between certain scientific domains and humanistic disciplines. I will then provide a first analysis of those intriguing 1.7 million citations, showing that they reflect several persistent citation patterns, in particular from (1) computer science to linguistics, (2) from medical and life sciences to ethics and (3) from natural sciences to history. I will conclude my talk by putting these patterns in the wider frame of past and current thinking about the actual as distinct from the conventionally assumed relationship between the humanities and the sciences.

Conservation Science and the Agency of Nature: Negotiating Antelopes, Pygmies and Tourists in Albert National Park, 1920-1950

Raf de Bont (KU Leuven)

The issue of materiality in the history of science is not just a matter of sources. It also concerns the actual role we want to ascribe to the material world in our historical narratives. One of the key questions then becomes whether and how we can give 'agency' to the research objects of past scientists. In my paper, I will explore this question with regard to the activities of conservation scientists in the Albert national Park in Belgian Congo. My question is to which extent we can attribute 'agency' to nature itself in writing the history of this (scientifically run) national park.

The Albert national Park, founded in the 1920s and the first of its kind in Africa, was designed, managed and directed by naturalists. The park can, thus, be seen as a materialization of the scientists' visions and dreams. At the same time, however, nature in the park refused to entirely follow the expectations of the scientists – and forced them to adapt their ideas, behavior and plans. Nature in its physical, material form offered surprises. Antelope numbers could suddenly drop, sleeping sickness unexpectedly occur, or volcanoes erupt. Such natural events both created constraints and offered unexpected opportunities for the conservationists. In this way, nature in the park was not so different from the humans, such as tourists and local inhabitants, with which conservation scientists had to interact. The leaders of the park, I will argue, continuously had to adapt their scientific and managerial strategies to the unexpected input of both humans and non-humans.

De controverse tussen Spinoza en Robert Boyle omtrent het *redintegratio*-experiment

Filip Buyse (Université Paris 1 Panthéon – Sorbonne)

Op 11 oktober 1661, stuurde Henry Oldenburg, de Latijnse vertaling van een net gepubliceerd "boekje" van zijn vriend Robert Boyle naar Spinoza met de uitdrukkelijk vraag naar zijn mening over de proeven met salpeter die hierin worden uiteen gezet (Brief 5). De belangrijkste proef, de zogenaamde "*redintegratio*-proef", zou daarna aanleiding geven tot een zeer pittige filosofische discussie tussen de "vader van de chemie" en de Nederlandse filosoof.

Merkwaardig genoeg ging deze discussie niet over het experiment zelf. Ten eerste, geef ik in mijn presentatie een moderne interpretatie van dit experiment met salpeter. Vervolgens toon ik op basis van een lezing van *De Nitro* aan hoe Boyle dit experiment heeft gebruikt om te bewijzen dat zijn *Mechanical Philosophy* het juiste alternatief was voor de peripatetische filosofie. Trouwens: de co-stichter van de Royal Society geeft in het voorwoord van zijn boek voor het eerst een definitie van de zijn nieuwe filosofie die hij voor de rest van zijn leven zou gaan promoten. (Hunter, 2009) Ten derde analyseren we de reactie van Spinoza op basis van zijn brief 6 en 13.

Wat zijn de punten van controverse tussen Spinoza en Boyle? Volgens AR & M.B. Hall (1964), Macherey (1995) en A. Gabbey (1997) gaat het essentieel over een verschil in epistemologie tussen een empiristische mechanische benadering en een rationalistische. Meer recent, werd deze visie echter verworpen door A. Clericuzio (1990 & 2000) die argumenteert dat het hier in essentie gaat over

controverse tussen een chemische interpretatie van het *redintegratio* experiment en een strikt mechanische. Ik vergelijk beide strekkingen en stel een eigen interpretatie voor.

Discovery and investigation of the oldest Dutch telescope

Tiemen Cocquyt (Museum Boerhaave)

In my talk, I want to discuss the research on the ‘Delft spyglass’ that was discovered last year, which proved to be the oldest telescope from the Netherlands that is preserved worldwide. I will discuss its properties, how it should be situated within the knowledge and heritage that was already known of this period. Finally, I will argue what makes its discovery in Delft so exciting and even introduce a tentative maker of this spyglass. In short, in my talk I want to guide the audience through the adventurous journey that the discovery and research of this artefact proved to be.

Mapping four decades of psychology’s disunity – historical bibliometric analysis

Ivan Flis (Utrecht University)

In 1957 Lee Cronbach, the newly elected President of the American Psychological Association, delivered an inaugural lecture under the title *The Two Disciplines of Scientific Psychology*. He opened his talk with an admonition, a forewarning of sorts: “No man can be acquainted with all of psychology today, as our convention program proves. The scene resembles that of a circus, but a circus grander and more bustling than any Barnum ever envisioned – a veritable week-long diet of excitement and pink lemonade.” The two disciplines Cronbach goes on to describe are correlational and experimental psychology practiced by different communities of scholars all calling themselves psychologists. This vision of disunity is promulgated through the talk of the exponential growth of psychology as a profession and as a science, a topic widely acknowledged and discussed by many psychologists in the prewar period, the interbellum, and especially after World War II. However, most historians of psychology focus on the first part of the 20th century, leaving for a relatively simplistic impression of a large and expanding field of psychology unified around the cognitivist revolutionaries after World War II.

In this presentation, I will explore this topic of postwar psychology’s disunity by taking a look at what is published in the English-language psychological journals in a novel way – by concept mining titles and abstracts of journal articles and mapping those concepts in 2D maps using VOSViewer, a software for bibliometric mapping developed by Nees-Jan van Eck and Ludo Waltman at CWTS in Leiden. Cronbach’s diagnosis of disunity will be followed through the following three decades – from the 1950s to end of the 1980s – and the maps will outline the uncertain fate of Cronbach’s prognosis for mending the schism between the two disciplines of scientific psychology. As the presentation will show, the bibliometric concept maps of psychology quite accurately refract these narratives of disunity – the mass of theories and applications psychologists published in their journals from 1950 to 1989 becoming a mess of colored dots of a concept map mined from digitized psychological journals.

Zoonoses as social problems: twentieth-century dealings with infectious diseases shared by humans and livestock in the Netherlands studied using two sociological theories

Floor Haalboom (Utrecht University)

Infectious diseases shared by humans and animals ('zoonoses') are major present-day public concerns. Ebola, avian flu and Q-fever attract a lot of media attention and how to deal with these diseases is subject of vehement debate. My PhD research project aims to put such present-day concerns and dealings with zoonoses in historical perspective. Zoonoses can be viewed as biological entities crossing socially and culturally defined boundaries between humans and animals, policy domains of public health and agriculture, and medicine and veterinary medicine. I ask how disciplinary and institutional task divisions have influenced dealings with four livestock-associated zoonoses (bovine tuberculosis, animal influenza, salmonellosis, and 'mad cow disease') during the twentieth century in the Netherlands, and what we can learn from this. In this paper I will use two sociological concepts to analyse the social problem of zoonoses: Abram de Swaan's theory of the collectivizing process (heavily indebted to the work of Norbert Elias), and Joseph Gusfield's notion of public problems. The materiality of zoonoses will never be far away from these sociological considerations. This paper features cows, pigs, poultry, milk, meat, eggs, sheds, fodder and 'the entire Dutch environment'; all were carriers of disease.

The 'Stone' that Stuck: *Lapis haematites*

Marieke M.A. Hendriksen (University of Groningen)

Lapis Haematites, vel Sanguineus. Bloedsteen. (...) Deze steen is zeer zamentrekkende, opdrogende, stuit het Bloeden, zo wel innerlyk voor allerlei Bloedvloeden en Loopen, als uiterlyk op Kwetzuuren of Wonden.

Medicina pharmaceutica, of Groote algemeene schatkamer
der drôgbereidende geneeskunst, 1741, p. 160.

Recent work on materiality in early modern medicine and alchemy has shown that associations with the material properties of substances such as colour, structure, and reaction to heat often informed their pharmaceutical application. A new chemical understanding of geological substances such as metals and gemstones meant that Boerhaave and his followers mostly discarded them as pharmaceutical ingredients in the eighteenth century. However, one stone, or actually an iron oxide, *Lapis haematites* or bloodstone, continued to appear in pharmacopeia and medical recipes long after other (gem) stones and metals had been dismissed as medically useless. This paper argues that it were not only the newly analysed chemical properties of the bloodstone and their compatibility with ideas about the effect of iron on the body, but also traditional associations with the colour and structure of the stone that ensured its continued use in medicine.

Mouse in the museum: The material culture of lab animals in biomedicine

Mieneke te Hennepe (Museum Boerhaave)

Biomedical research heavily relies on standardized animal models. Over a course of hundred years, the mouse for example, was turned into a standard laboratory organism, perfectly tuned to needs and

wishes of researchers. While historians of science and medicine have discussed the important role of laboratory animals in research practices, such interest lacks in collection practices in museums for the history of science and medicine. In this paper I analyse and discuss the ways mouse models as material culture of biomedicine can be brought into the museum. So far, in the Netherlands, animal collections are mainly the domain of natural history museums, while the material culture of science and medicine is preserved by the university museums, academic collections and the Boerhaave Museum. As a category, however, laboratory animals have never been collected as such - at least not in Netherlands -, despite their increasingly important position in biomedical research. I argue for active curational practices, seeking out crucial laboratory animals such as important and revolutionary mouse models in cancer research, obesity or other diseases. Curators, actors in the field and historians of science and medicine alike, have the opportunity to actively shape museum collections, working together to work explore ways to represent the role of animal models in biomedicine within a museum context.

How scales shaped our ideas on fatness, weight and health, 1890-1940

Hieke Huistra (Utrecht University)

Nowadays, almost all of us own a bathroom scale and know our body weight, even though we are often reluctant to share it. Things used to be different. In the nineteenth century, weighing oneself was much less common than it is now, and, if it was done, it happened in public spaces rather than in the privacy of one's own home. In the decades around 1900, the amount of scales increased quickly: penny scales at fairs, in department stores, and in pharmacies, but also personal and medical scales in schools, doctors' consulting rooms, offices of life insurance companies' medical examiners, and, from the 1930s onward, people's homes. In this talk, I analyze how the increasing amount and changing type of scales shaped our ideas on body weight, size, and fat — an example of how material objects shape our ideas on health, disease and the body. In particular, I ask how scales contributed to our idea that body weight is a meaningful measurement for both fatness and health. The results I present in this talk are part of my ongoing research project on ideas on health and disease in twentieth-century Dutch society.

'BUIKHUISEN, STUPID AND EVIL' (and the political discourse of Dutch research ethics governance in the late 1970s)

Noortje Jacobs (Maastricht University)

On Wednesday 26 April 1978, 131 Dutch parliament-members were witness to an interpellation-debate that may have been exceptional to Dutch parliamentary history. In the afternoon of that day, both the Minister of Education & the Sciences and the Minister of Justice were summoned to parliament to come and defend the appointment of a professor at the University of Leiden in the field of Criminology and Penology. How so? A little than a month before, criminologist Wouter Buikhuisen had taken up the position of Leiden professor and announced that he was planning to conduct *biosocial* research into causes for criminal behavior. The suggestion that criminality might be nature rather than nurture led to a storm of protest in the Netherlands. Buikhuisen was compared to Lombroso, Mengele and Exner, and labelled a dangerous and evil charlatan by well-known public figures such as Hugo Brandt Corstius. The 'Buikhuisen-affair', as the ordeal came to be famously known, ended the Leiden criminologist's career and made it almost impossible to conduct experimental tests with Dutch prisoners for years to come.

What is less well-known, however, is that it also fuelled growing political interest for the public governance of Dutch science and was one of the main reasons for the instalment of a national committee 'tests upon human beings', which would publish a government advice in 1982 that would become *the* authoritative account in the 1980s and 1990s for the development of a legal framework for Dutch human experimentation practices. In this talk, I will outline how a Leiden professor, without ever conducting a single one of the experiments he became so famous for, catapulted a political discourse convinced that state intervention with Dutch human research practices was urgently needed – not because he had conducted any illegal actions, but because he had illegal ideas.

An Audiogram for the Soul? On B.F. Skinner's Verbal Summator and its Successors

Bart Karstens (University of Amsterdam)

Initially, through the equation of language with thought, investigations in the field of psycholinguistics were of a philosophical kind. Via the concepts of representation and apperception, psycholinguistic research was increasingly drawn into experimental domains. Wilhelm Wundt's contributions to the study of apperception, with empirical measurements of reaction times and attention span, was groundbreaking in this respect. Psychologists from a diversity of brands, e.g. functionalism, structuralism and behaviorism, subsequently sought to gain objective control over *subjective* experiences, thought patterns and linguistic behavior, through experimental research. One of B.F. Skinner's earliest publications, involving the technique of verbal summation, also had this objective: "The advantage of the summator is that it brings the subject into the laboratory, and through better control of the stimulating material improves upon casual observation as a means of discovering the basic laws governing these aspects of behavior." (Skinner 1936). The subjective and the idiographic is to many what defines the humanities and sets it apart from the natural sciences. Empirical research such as Skinner's, therefore casts serious doubts on demarcating the sciences and humanities on such grounds. In Skinner's experiment, subjects were given stimuli of strings of nonsense syllables and had to respond with the English expressions that first occurred to them. Because stimuli had to be offered repeatedly in order to make the experiment work (to summate means to constitute a cumulative effect) Skinner had to meet some technical challenges to make a normal portable phonograph work as a repeating device. His results were encouraging in terms of collective behavioral patterns. Responses matched the only very recently discovered word frequency distribution patterns and Zipf's Law. Next to these results Skinner also suggested that the verbal summator could be used to study individual differences. He postulated that the technique could function like a verbal Rorschach test because overt verbal behavior could be interpreted as a projection of latent or subconscious thought. Auditory 'inkblots' could in this way reveal individual personality traits. This idea was tested in a host of experiments, such as the tautophone test, the Azzageddi test and auditory apperception tests. These tests were mainly performed in psychiatric institutions in order to gain better understanding of what happened inside the minds of the mentally disturbed. Next to Skinner's original experiment, I investigate this follow up research, and seek an explanation why it did not gain prominence as a major projection technique, such as the Rorschach test or the TAT. One of the thought provoking reasons was the difficulty psychologists had in accounting for the extreme individual variability of the response patterns.

How the bark was brought: the study of Peruvian bark as a new approach for research on early modern exotic drugs (c. 1640-1720)

Wouter Klein (Utrecht University)

In the history of pharmacy, it is quite hard to assess the impact of new therapeutic drugs on society. For exotic (i.e. non-European) remedies especially, their introduction on the medical market does not follow clear-cut patterns. What we can observe, however, is that they fit into Harold Cook's notion of "matter of fact": the interplay between trade, science, and culture is vital for our understanding of the chances these remedies had on the medical market in Europe. With that notion in mind, I will try to trace the characteristics of certain exotic remedies as they entered pharmaceutical practice in the Low Countries, during the early modern period.

A particularly useful starting point is Peruvian bark. This drug's introduction in early modern Europe is rife with legend and obscurity. Modern scholarly research on the subject has generally failed to move beyond the questions surrounding the bark's transatlantic crossing, and to clarify the gap of knowledge between introduction and appropriation of the remedy. It has been hailed by medical historians as the first specific remedy (i.e. against malaria), and even as a paradigm for the understanding of exotic drugs in Europe. Focusing on actual pharmaceutical practice, however, the evidence for such claims is thin. There are not so many sources that testify to the use of the bark, nor of the cultural understanding of the drug. Trade accounts are scarce, making it hard to evaluate the importance of availability issues and price fluctuations. And even in scholarly publications, there was hardly ever a consensus about the drug's applicability in terms of indications and dosage. In other words, it is hard to reconstruct the bark's behaviour as "matter of fact".

Using Peruvian bark as a starting point, I will address the implications of analysing one drug for further research on other exotic remedies.

Changing technologies, farms and pigs

Steven van der Laan (Utrecht University)

Since the 1960s, Dutch pig farms have turned from small-scaled, mixed farming operations into highly industrialised production plants. The sector has been profoundly influenced by all kinds of technological innovations. In particular the practice of pig breeding has been changed by the development of technologies such as artificial insemination, halothane-testing and ultrasonic back fat measurements. Also the environment of the pigs has been transformed. Whereas earlier pigs were kept most of their lives in the same stable, pig farms were being redesigned to enable a process in which pigs were shifted through multiple stations on the farm, all in order to maximise their breeding capability. The pig functioned in this transformation as the center-piece cogwheel. Yet at the same time the technology, the breeding techniques and the architecture of pig stables were being moulded to the needs of the pig, the pig itself was also changed. Through selective breeding it was made into an animal that grew faster, had better quality meat, but also an animal that allowed for bio-industrial production. The modern day pig is bred to fit into a production process in which it needs little care and has been made resistant to stress and diseases that would have been lethal to pig breeds of a hundred years ago if they were kept by the thousands on the same farm. In this paper I will investigate how these changes of breeding

technologies, stable-architecture and the pig itself came to be and how they relate both to the breeding practices and the industrialisation of pig farming.

Language as an Instrument: a Digital Analysis of the Last Writings of Christiaan Huygens

Ludovica Marinucci (University of Cagliari)

The aim of my PhD project is to analyze the thought of the Dutch scientist Christiaan Huygens in the last part of his life, in particular regarding epistemology, cosmology and theology. During a period of research at *Leiden University Library*, I collected in a unique database some selected writings of Huygens, published in the vol. XXI of *Oeuvres Complètes* – now also available on the website of the [Digitale Bibliotheek voor de Nederlandse Letteren](#) – and some unpublished manuscripts on related topics that I am going to transcribe in XML/TEI markup language.

My methodology consists of a digital text analysis with computational linguistics software in order to find, list and compare the occurrences of the most important keywords (e.g. nouns and related adjectives) in the last works of Huygens, from 1686 to 1695 and posthumous. The greatest attention will be paid to the keywords related to the themes of *potentia dei*, divine and human intelligence, probabilistic epistemology, natural theology, plurality of worlds etc. In addition, these keywords will be used to select the letters written by Huygens to the most important of his contemporaries such as, Lamothe le Voyer, Spinoza, Leibniz, Newton, Oldenburg, Hobbes, etc., in order to create a secondary and complementary database.

Inspired by Huygens who built his own scientific instrument, my aim is to create a database with a lexicon that provides not only all references to the pieces of the corpus examined, but is also conceptually readable through a system of internal and external references that connect lexicography and critical interpretation.

The challenge will firstly involve demonstrating that his last writings on philosophical and theological reflections on mechanistic philosophy are not an anomaly within Huygens' wider work, and secondly showing that these are indications of Huygens' involvement in a number of theoretical debates in the second half of the Seventeenth-century.

Portraying Extinct Monsters of the Ancient Earth. A journey into the tangled world of paleontological reconstruction

Ilja Nieuwland (Huygens ING KNAW)

Few things were as strange as the bat-like creatures, whose fossils were uncovered from 1782 onwards. These Pterodactyles, as they soon became known, bore similarities to known creatures, but their appearance was so entirely different that most scholars found it difficult to place them in the grand scheme of nature.

Those that did, resorted to often fanciful illustrations of these animals in the flesh, with which they sought to emphasize out their particular view of these animals. This way, pterodactyles were portrayed as swimming animals or as bats, among others. The speculative nature of such reconstructions rendered more scrupulous scientist wary of them. The great Georges Cuvier never published a reconstruction in

his life because he regarded them as overly speculative, and his example was followed by many during most of the nineteenth and early twentieth century.

It was with the advent of mass publications and, particularly, cinema that the reconstruction of past life took off again. Randolph Hearst's 'yellow press' was not averse to creating sensations by depicting oversized dinosaurs that seemed intent upon being a menace to society. Motion pictures such as *The Lost World* (1925) and *King Kong* (1933) showed just what a menace such animals could be, were they a reality. And considering that expeditions were still combing the African and South American jungle for 'lost' dinosaurs – often sponsored by the same newspapers – such images might well become a reality again.

Most often than one might have expected, tropes and stereotypes used in such popular depictions made it into scientific publications from the nineteenth century onwards. As paleontology became more specialized, however, scientists attempted to deal with this problem in several ways. This has not always been straightforward, since the public appeal of paleontology means that scientific literature is often also marketed towards the informed layperson, and popular images have a way of being perpetuated in scientific publications for commercial reasons. Some paleontologists have therefore disavowed the artwork in books they wrote themselves. Others have taken to more schematicized and stylized reconstructions. But recently, a new school developed a different way of reconstructing past life, by embracing rather than battling the element of speculation, which despite everything remains central to paleontology.

My contribution aims to offer an global overview of the reconstruction of the animal life of past geological ages, and tries to arrive at a typology through which we may better understand the various influences that shaped its history.

Science, sheep and breeds

Jesper Oldenburger (Utrecht University)

During the twentieth century the practice of breeding sheep in the Netherlands became heavily structured around the Texel breed. After its creation around 1900, this particular sheep, internationally renowned for its high quality meat, saw a quick rise to fame and completely dominated the Dutch scene directly after the Second World War. Texel sheep were everywhere; they constituted over 80% of the Dutch herd and were considered by most farmers the most profitable option. This specialized focus on just one breed led to a slight panic attack when, during the seventies, the prices of mutton started to drop. The Texel was not known as a particular fertile breed and this suddenly became a problem. This paper discusses one of the answers scientists came up with to increase the output of lambs: structurally crossbreeding the Texel with more fertile foreign breeds. By focusing on how this practice led to three new so-called 'synthetic breeds', and how 'diluting the Texel breed' was considered sacrilege by the Texel breeders and the herdbook, it becomes possible to show how the idea of a breed operates. For some, a breed is a target, a goal to reach, while, for others, a breed is a standardized starting-point for agricultural change. For some, even, a breed is invested with cultural value and should therefore be preserved. It will be argued that these different conceptions of what a breed exactly is and should do is one of the primary reasons of why agricultural scientists and breeders often don't seem to get along.

Seeing is Believing. Collected Fossils in early seventeenth-century Antwerp

Marlise Rijks (Ghent University & Max Planck Institute for the History of Science Berlin)

On a number of early seventeenth-century gallery pictures, the painter Frans II Francken (1581-1642) depicted a remarkable detail: fossilized shark teeth. The famous Antwerp-invented genre of the gallery painting was an idealized immortalization of collections of art and curiosities. The depicted specimen immediately recognizable to us as shark teeth, were in fact not recognized as such by contemporaries. Instead, the specimens were thought to be 'tongue stones' or 'tongues of fishes', because their form reminded collectors of (fish) tongues. That it actually considered fossilized shark teeth, was only suggested later in the century.

Francken's full-color oil paint depictions of tongue stones were the first of their kind. There had been earlier engravings of the tongue stones, one of which was published in a book by the Antwerp-based antiquary, polemist, and collector Richard Verstegan (ca. 1550-1640). The collection of Verstegan and others in Antwerp proudly displayed tongue stones, which were curious collectables of which the origins were unknown. Other fossils, those organic-shaped stony objects, were also collected, depicted, and debated. This paper tells the story of these objects and images in early seventeenth-century Antwerp. The itinerary of tongue stones and other fossils leads us along the shops of apothecaries, the workshops of painters, and the cabinets of collectors. It demonstrates how object-knowledge was translated from one group to another. It provides an insight in Antwerp's culture of collecting and the importance of visual demonstration in early modern knowledge practices. On the one hand, collected or depicted nature established truths through seeing, on the other hand, the same visual demonstration also proved the greatness and mystery of God's Creation. Quite literally, seeing was believing.

Science and politics of nature conservation at the United Nations (Stockholm) Conference for the Human Environment, 1972

Simone Schleper (Maastricht University)

This paper on the UN Stockholm Conference of 1972 looks at the integration of scientific conservation within a novel kind of large-scale international, cross-institutional environmental projects during the time of political conflict and the growth of public activism in the early 1970s. With the establishment of global environmental programmes and the rise of environmental politics, governments and IOs increasingly appealed to the advice of experts. Since the 1960s, international conservation bodies, like the International Union for the Conservation of Nature, had hoped to serve as experts in global environmental problem-solving projects. Instead, they had to witness conservation being swallowed by the multi-disciplinary field of environmental sciences. On the one hand, scientific conservation research was increasingly integrated into broader environmental or ecological programmes within the UN family or the International Union for the Biological Sciences. Conservationists were active in writing background papers for the Stockholm conference. Yet, conservation only marginally featured on the agenda as a topic of its own and was linked to other research on for instance pollution or soil conservation. On the other hand, conservation themes found new niches in projects dealing with several highly political topic areas, such as development and population research, or resource management. Within these new types of projects, conservationists needed to develop skills of environmental

diplomacy: Conservationists' discourses began to take on an inherently anthropocentric tone that was particularly aimed at policy-makers at local and national governing levels. In the repositioning of their expertise, conservationist could draw on the extensive international network they had been building since the early 20th century. In my paper I discuss how this network enabled key figures in conservation to circumvent the manifold political conflicts of the 1970s and at the same time negotiate natural and social science knowledge in conservation and environmental problem-solving discourses of the period.

Conservation Experts and the Politics of Sustainable Development

Hans Schouwenburg (Maastricht University)

An often-heard critique of the idea of sustainable development holds that the concept is extremely ambiguous. Vagueness was already part of the concept when scientists at the International Union for the Conservation of Nature (IUCN) introduced it to global debates about the environment in the 1980s. IUCN's most important publication from that time, the *World Conservation Strategy* (1980), called for "sustainable development", but did not clearly define the concept. As a result, within IUCN two coalitions of experts emerged that pushed forward different definitions of the idea. For one group sustainable development was an ecological concept that could only be put into practice through the establishment of national parks and protected areas – the traditional domain of nature conservation. The other coalition defined sustainable development in economic and social terms and called for a new international economic order, which included gender equity and social justice – issues that far exceeded traditional conservation concerns.

During the 1980s, both coalitions organized a major international conference in order to put their ideas on the radar. The UN Commission on Environment and Development (Brundtland Commission) adopted the ideas of the second coalition and socioeconomic sustainable development became the major theme of the UN Earth Summit in 1992. In this presentation, I will explain why the second coalition succeeded in putting their ideas on the international agenda and how the first group, in turn, searched for other strategies to promote national parks. I will show that sustainable development became incredibly successful as a rhetorical trick, i.e. it could be used as a banner by various groups for various purposes. In practice, however, sustainable development has never been implemented.

Texts as material culture: language samples, exotic alphabets and manuscript reproductions around 1800

Floris Solleveld (Radboud University Nijmegen)

What does 'material culture' mean when applied to the history of linguistics and philology? If you regard 'language' and 'material' as opposites, that question sounds like a paradox. But the study of language has material aspects too, and the circulation and assembly of materials, no less than in the natural sciences, is part of the ways in which information is transformed into knowledge.

In the decades around 1800, knowledge in the West about indigenous languages and ancient texts exploded. Anquetil-Duperron's 1771 translation of the *Zend-Avesta* caused both a sensation and a decades-long debate about its authenticity. A decade later, the Asiatic Society in Calcutta began publishing translations of Sanskrit texts, soon followed by text editions and grammars. Adelung's

Mithridates (1806-1817) gave an overview of 500 languages and dialects in samples of the Lord's Prayer. Champollion deciphered hieroglyphs. *Beowulf* and the *Nibelungenlied* resurfaced. Professor Gatterer's immense historical data collections included a collation of 500 medieval manuscripts and transcripts, the *Gatterer-Apparat*.

Communicating that knowledge posed very material problems. Not least of those were the cost of having special type cut, engravings made, and manuscripts transcribed. Not until the 1820s, with Prussian state funding, were German scholars able to set up their own Sanskrit presses. Champollion's posthumous Egyptian grammar was an immensely expensive folio volume, because all the hieroglyphs needed to be engraved. Champollion could never have made his discoveries, in turn, without the full-size reproduction of the Rosetta stone from the monumental *Description de l'Égypte*.

My presentation is about three kinds of material: reproductions, samples, type. By 'samples' I mean information about unwritten languages, in the form of words lists and grammars that often circulated only in manuscript form, as well as examples of exotic and/or ancient alphabets. Reproductions, samples, and printing type not only posed a problem: they also created new options for re-arrangement and visual presentation, from interlinear translations and comparative tables to literal cut-and-paste work. Focusing on these material aspects of the study of language, one can literally point out visible changes.

Missing Matters: Theory, Practice, and the History of Dark Matter, 1969-1974

J.G. de Swart (Institute of Physics, University of Amsterdam)

Cosmology textbooks tell us that eighty-five percent of the matter content of the universe is missing, and resides in a yet unknown and invisible material component: that of "dark matter". But what textbooks by their nature do not show are the historical idiosyncrasies involved in the development of how this matter got missing. In this paper I set out to understand this moment in the history of cosmology, and elaborate on the establishment of interest in the dark matter problem.

Between 1969 and 1974 a crossing of three different empirical roads led to the gradual acceptance of the idea of missing mass: (1) the rotation curves of galaxies; (2) numerical simulations of galactic discs; and, (3) the velocity dispersions of clusters of galaxies. Instead of focusing on the importance of these observations, I will show how the maturing discipline of physical cosmology, and the theoretical changes it entailed, has played an essential role in *recognizing* the problem of missing matter, *transforming* these three roads into anomalies, and *translating* and *collecting* the different materials into establishing dark matter as a genuine scientific problem. As will appear, the history of dark matter is an ideal environment to evaluate theory and theoretical activity as a scientific practice.

'In my intestines the marble grows from which my grave is carved': the multiple meanings of body stones in early modern culture

Jetze J. Toubert (Utrecht University)

This paper explores how early modern culture gave multiple meanings to the material properties of an omnipresent but little studied affliction: bladder, kidney and gallstones. Body stones were problematic

to explain, having the material qualities of inorganic matter but originating in the human body; and they were impossible to ignore, being excruciatingly painful. Consequently they were variously subject to preservation, explanation, contemplation and veneration. This paper will consider how body stones were marked as divine or natural, organic or inorganic, meaningful or senseless objects between the late sixteenth and late seventeenth centuries, a period of profound changes both in medicine, natural history, and in religion. In that way I intend to show how early modern society reappraised the reciprocal impact of God, astral forces, lifeless nature and physiological processes in the human body.

Reconstructing by movie

Katrien Vanagt (Huygens ING)

SWEAT: The Materiality and Fluidity of Perspiration in Eighteenth-Century Medicine

Ruben E. Verwaal (University of Groningen)

How can a bodily excretion like sweat, often accompanied with a stench or associated with anxiety and distress, enrich our view of the history of science? This paper argues that following the fluid and flow of sweat has in fact particular advantages, because it provides a unique perspective by incorporating medical and chemical history. I will argue that to understand the physiology and pathology of perspiration, early modern physicians increasingly subjected the bodily excretion of sweat to chemical examination. Seventeenth-century experimenters had attempted to measure the amount of moisture a person sweats and anatomists had studied the structure of the sweat gland. Eighteenth-century physicians such as Jerome Gaub increasingly applied chemical experiments to understand sweat. These practices revealed the fluid's chemical properties and its relation to other bodily excreta such as blood and urine. Also the way in which various noxious weather conditions—hot, cold, dry, moist—could affect the pores and perspiration were discussed in chemical terms. In sum, the focus on the materiality and fluidity of sweat provides a unique perspective on the porous boundaries of the body and early modern fields of medical and chemical knowledge.

“Polarstern” not “Polaris”: A research vessel for Antarctic research during the Cold War

Martin Weiss (Deutsches Schiffahrtsmuseum)

In 1978 the West German government decided to establish a costly and comprehensive Antarctic research programme. This programme was a prerequisite for its membership of the international “Scientific Committee on Antarctic Research” (SCAR). Membership of SCAR, in turn, guaranteed West Germany a say in all matters concerning Antarctica. The world's southernmost continent was of particular strategic interest during the Cold War because it promised to hold vast natural resources.

By the early 1980s considerable amounts of money had been funnelled into three major scientific projects: the construction of the Antarctic research station “Georg Neumayer”, the establishment of the

Alfred-Wegener-Institute for Arctic and Antarctic research in Bremerhaven and the construction of the ice breaker and research vessel “Polarstern”.

Presenting findings from a recently initiated research project on the history of research vessels at the German Maritime Museum in Bremerhaven, this paper will focus on the “RV Polarstern” and show how the ship’s history reflects many facets of science during the final phase of the Cold War: with its many well-equipped laboratories and high-tech measuring devices, the “Polarstern” constituted an interdisciplinary research environment; like any research vessel, the ship itself was a scientific instrument in the broadest sense of the term; it incorporated cutting-edge shipbuilding technology; and last but not least it was a political symbol, consciously not christened “Polaris”. Taking the German Maritime Museum’s on-going refurbishment as a point of departure, this paper will also address the issue of how Cold War science – with its unprecedented large-scale technology – can best be presented in a museum setting.

Teaching Global History of Science via Material Culture: Lessons from Astronomy

Gerhard Wiesenfeldt (University of Melbourne)

This presentation will discuss the role of material culture in the delivery of the subject Astronomy in World History that has been taught at the University of Melbourne in different formats since 2008. Its aim is to offer a comparative perspective on the history of astronomy in different civilisations until about 1800. Since 2012, the discussion and use of instruments (including students’ observations) has played a central role in the subject. The scope of used instruments range from high quality replicas of astrolabes and armillary spheres via assessed student built sundials to simple self-made instruments and even the students’ own bodies.

The emphasis on object-based learning has obvious pedagogical advantages, as it enhances both student engagement and their understanding of geometrical issues relevant for astronomical theories. However, the employment of instruments also has an important function in providing a cornerstone in the epistemological framework employed to understand the different astronomies discussed in the subject. While it to some extent relates very closely to the other central narrative of the subject – a narrative on transmission and exchange of knowledge between different cultures – the focus on instruments and their use offers a nuanced perspective on the relation between the global and the local. This perspective offers students a chance to evaluate and critique the narrative of global transmission of knowledge.

Jan van den Dam’s *Sphaera Perfecta* (1738-1756): two 18th-century Dutch planetaria put into context

Huib J. Zuidervaart, Charlotte Rulkens (Huygens ING/ Rijksmuseum Amsterdam)

The Amsterdam art-collection of the renowned family Six contains many important works of art, of which the famous Rembrandt made portrait of Jan Six is probably the best known example. But one of the other objects in this rich collection is a spectacular clock-driven planetarium (a moving model of the solar system), designed in the mid-18th century by the Amsterdam mathematician Jan van den Dam. A second, slightly smaller copy of this scientific instrument is currently part of the collection of the Dutch Maritime Museum, also in Amsterdam. Both instruments have never been studied before in the context

of their time. What was the purpose of these *Sphaera Perfecta*, as they were called? Were these instruments made for astronomical education, theological contemplation, demonstration of skills, or simply to increase the status of the owner?

Unfortunately no documents have been preserved that give testimony of the contemporary use of these instruments. But surprisingly, the biography of the designer unveiled his major engagement in theological anti-deistic discussions, only a few years before he embarked in the construction of these planetariums. Moreover, an examination of the design and gearing of these instruments reveal that they mimic the celestial movements with high precision. So, was the motive for the construction of these instruments mainly theological? Or were other motives also present? After all, during our research it also came to light that Jan van den Dam was one of the leading figures in a group of early Freemasons, who called themselves 'Knights of the Universe'. In short, have we found answers, or are we stuck with only more questions?