

Scientiae Amsterdam 2020 – abstracts of the accepted individual papers

Luigi Alonzi

The Histoire oeconomique of Charles François Tiphaigne de la Roche

The paper intends to bring to the attention of the scholars a little known book by the French author Charles François Tiphaigne de la Roche, beginning from the characteristic title which contains one of the first occurrences of the term ‘economic history’. As it will be shown, this work adopt a new scientific approach that put together discourses regarding the natural history and the oeconomica with discourses concerning commerce and trade. In his *Essai sur l’histoire oeconomique des mers occidentales de France*, Tiphaigne de la Roche dealt especially with “l’économie des pêches”, providing interesting informations about the fishes that could be found in the English Channel and about the different methods of fishing. The paper will focus on the semantic analysis of the term *histoire oeconomique* and on the necessity to distinguish among the different meanings of the words ‘history’ and ‘economy’ in order to grasp the innovative character of this book. Between seventeenth and eighteenth centuries the word ‘economy’ was often metaphorically used to give the idea of structure-function, and as such it was intended in expressions as ‘animal economy’ or ‘oeconomia naturae’. Some authors began then to apply to the natural resources the discourses on commerce, favouring the semantic transformation of the word ‘economy’. In this vein, the paper highlights the process of semantic change that affected the transition from the pre-disciplinary situation of the natural history to the formation of the discipline of ‘economic history’.

Carlos Alves

The extension of Natural Philosophy in university curricula in Southern Europe. Coimbra and Salamanca in the second half of the 18th century

In the second half of the 18th century, Europe witnessed a wave of university reforms that transformed several universities. This third wave of reforms was most impressive in Southern Europe (but also in Central Europe) and was a remarkable response to the new mindset in which governments took responsibility for educating citizens. Even before this reform we had, in both Universities, the disciplines of natural Philosophy, but with the reforms illustrated the body that encompasses this matter grew exponentially. Thus, it was possible to see components of Natural Philosophy in the faculties of Medicine, Mathematics and Philosophy (or Arts). The more embracing vision of nature itself and its products, had a considerable impact on the choices of the Iberian reformers, greatly influenced by the Catholic Enlightenment. When from 1771 and 1772 the new Study Plans were sent to Salamanca - by the Council of Castile - and to Coimbra - by the Ministry of the Kingdom - we began to have a much wider presence of Natural Philosophy in various courses. Thus, we highlighted subjects such as Natural History, Experimental Physics, Astronomy, Medical Matter - among others - which intended to stimulate the study of new subjects, considered "useful" to improve the commercial, industrial and economic situation of these countries. We intend to make a comparative study of the strategies of adoption of Natural Philosophy in Salamanca and Coimbra, analyzing these two processes in detail, considering the case of other European universities. The documental basis of this work will be the Study Plans of 1771 and 1772, but also books of teachers, correspondence and opinions of various individualities.

Advani Anurag

Madness in Mughal India: The Formation of an Early Modern Medical Culture

This paper will trace the history of madness in South Asia between the early-16th and early-18th centuries. Mughal Persian treatises on Greco-Arabic (Unani) and Ayurvedic medicine hint at the shifting ways in which mental illness was categorized, diagnosed and treated. Texts like the 'Ain al-Hayat (1532), Dastur al-atibba (1590), Ilajat-i Dara Shikohi (1646), and Mizan al-Tibb (c.1700) reflect the increasing sophistication of knowledge about insanity, spirit possession, melancholia, mania, epilepsy, hysteria, delirium, and hallucinations.

At the same time, madness in early modern India was embedded in specific religious cosmologies, political ideologies, and literary conventions. Firstly, within a tradition of Prophetic medicine, philosopher-physicians called hakims worked alongside Sufi saints to devise various treatments for madness, ranging from exorcism and music therapy to bloodletting and ingesting compounds. Secondly, imperial disloyalty and rebellion were often portrayed as madness, since the patronage networks of medical texts were enmeshed in contemporary Mughal politics. And thirdly, the Persian poetic trope of the lovesick madman (majnun) was invoked as either a divinely-inspired ecstatic Sufi, or a mentally ill person suffering from the excess production of black bile (sauda).

Madness in Mughal India cannot be understood using modern disciplinary boxes. Tracking the evolution of this medical culture reveals how political, religious and literary ideas of madness necessarily undergirded and were interwoven with changing conceptions of mental illness. My paper will also outline the formation of a non-European, pre-colonial knowledge system that cannot be explained by the rise of colonial asylums and Western psychiatry in the mid-18th century.

Dina Bacalexi and Mehrnaz Katouzian-Safadi

Scientia aliena: intertextuality, orality and medicine: Antiquity, Middle Ages and Renaissance

Medical authors either seek for innovation through criticism of their predecessors, or regard themselves as perpetuators of a tradition considered to be a foundation of reliable theory and practice. Galen, competing with his fellow physicians and frequently alluding to their work, enriches, unifies and transforms the so-called “Hippocratic” medicine. Medieval and Renaissance physicians pursue this tradition.

Razes (9th cent.), in treatises such as al-Manṣūrī, Smallpox and measles, Doubts about Galen, engages in a permanent and hard-hitting dialogue with his predecessors, including Galen, citing them, calling into question their authority and pointing out that respect for tradition and adaptation to new realities are not contradictory. We can compare his method with Leonhart Fuchs' (16th cent.) attempt in his *Paradoxa medicinae* and his commented editions of Galen, to “resolve” Galen's apparent contradictions.

Razes often seeks advice from oral sources such as travellers or merchants: how can such sources be reliable and contribute to enhancing medical knowledge? How can Razes “reconcile” oral and bookish culture?

Renaissance humanists (Valleriole, Fuchs, Gesner, Vallés, Rogano...) provide numerous references to non-medical texts such as Greek and Latin poetry, tragedy and comedy, history, natural philosophy: to what extent do those references go beyond erudition and rhetoric, highlighting medical issues or fueling medical polemics?

References to religious texts will also be considered: is there an appropriate context for Biblical passages and Christian exegetes? Are they actually useful for medical scholars or paramedical professionals, despite their moral connotations? Although Razes is particularly stingy with Koranic citations, we can find some examples of religious or moral references in his treatises.

Our aim is to study the different ways to insert aliena scientia such as non medical textual and oral sources into medical (including pharmaceutical or paramedical) works stemming from different academic and professional traditions: how is this scientia “embedded” in a medical context? What is its role in the healing process in particular and in advancing knowledge in general?

Justin Begley

John Hill (1716-1775) on ‘Plant Sleep’: Against Natural Continuity

The phenomenon of ‘plant sleep’—whereby vegetables rhythmically open and close their leaves or petals in daily cycles—has been a continual source of fascination for those with botanical interests, from the Portuguese physician Cristóbal Acosta and the Italian naturalist Prospero Alpini in the sixteenth century to Percy Bysshe Shelley and Charles Darwin in the nineteenth. But it was in 1757 that the topic received its earliest systemic treatment on English shores with the prodigious author, botanist, actor, and Royal Society critic John Hill’s *The Sleep of Plants*. As my paper will aim to illustrate, Hill and his respondents used this remarkable behaviour, exhibited by certain plants, as a lens through which to reassess the nature of vegetables, and to address pressing questions of wider natural historical, philosophical, physiological, and anatomical import such as whether similar mechanisms necessarily account for related movements in plants and animals and how much continuity exists between the structures and functions of diverse life forms.

As it stands, historians have done much to shore up Arthur Lovejoy’s claim in his seminal work on the great chain of being that ‘the principle of continuity was reckoned among the first and fundamental truths’ for eighteenth-century naturalists. As I will argue, however, English debates on plant sleep effectively played out as a tussle between philosophically-minded botanists such as Hill who embraced the schematic characterisations of life forms long associated with Aristotle’s *De anima*, and those who latched onto the fuzzier picture afforded in the Stagirite’s natural historical writings.

Jip van Besouw

A flood of efforts: solving a water crisis through books, instruments, and maps

Around 1700, river flooding immediately threatened some of Holland’s major cities. Peat cutting and canal digging had made traditional craft solutions to flooding increasingly insufficient. The ‘water crisis’ that followed forced regional governments to look for new solutions and brought together various types of expert knowledge. I address this coalescence of knowledges by focusing on some imposing material objects that have survived the crisis: books, measuring apparatus, and river maps.

The first of these came from academic involvement with the river crisis. In 1720, the Leiden professor Willem Jacob ’s Gravesande (1688-1742) included a chapter “On rivers” in his bestselling *The mathematical basics of physics*. Using state-of-the-art mechanics, ’s Gravesande tried to elucidate how water flows were distributed over different arms of a river. Over the next decades, ’s Gravesande and his colleague Petrus van Musschenbroek (1692-1761) developed a line of machines that simulated water

flows. They measured relevant ‘forces’, ‘pressures’, and ‘resistances’ to find more pragmatic conceptualisations of flows.

In the late 1720s, the professors started to collaborate with expert craftsmen such as Nicolaas Cruquius (1678-1754), an overseer and cartographer. One of their official reports was accompanied by stunning depth contour map of the Merwede river by Cruquius. By looking in detail how theoretical conceptualisations are applied in this map, we will get a precise idea of how the book, the apparatus, and the map strengthened each other and, together, offered a key to practical solutions.

Benjamin Binstock

Vermeer and the early modern science of painting everyday life

Because early modern knowledge was pre-disciplinary, we can rethink modern attempts to define Dutch paintings of everyday life as a single, monolithic phenomenon. Such accounts began with the eighteenth-century name “genre painting,” which simultaneously acknowledged diverse “categories” [genres] within this conglomeration. Hegel similarly characterized genre as low subject matter made high through the painter’s rendering, shifting the emphasis from content (what) to form (how), echoed in Vermeer studies by Thoré, Gowing, and Alpers, as opposed to Panofsky and De Jongh’s re-assertion of content in symbolic messages. A predisciplinary outlook would acknowledge disparate varieties both among and within genre’s categories, above all its most capacious category, genre scenes with figures.

These encompassed a broad range, diversely combining content and form, from Dou’s symbolic tableau; to artificially staged scenes of everyday life, whether straightforward (De Hooch), ironic (TerBorch), or detached (Carel Fabritius); to Vermeer’s self-conscious depictions of his family members as models in interiors based on furnished rooms of his house. Vermeer’s compositions were neither staged scenes of everyday life as with his peers, nor simply direct transcriptions of what was before him, as claimed by camera obscura literalists, but rather reflections on and in his artistic productions [mise en abyme], as paintings about painting, anticipating modernism. Vermeer further explicitly presented himself in his upstairs studio as an early modern pictorial scientist, developing his own idiosyncratic theory, practice, and objects for knowing the visible and invisible world, akin to his contemporary the natural scientist Leeuwenhoek.

Carlo Bovolo

Between Natural History and Archaeology: Vitaliano Donati and the Sciences in 18th Century Turin

The paper deals with the figure of the Italian naturalist and archaeologist Vitaliano Donati (1717-1762). Donati, after the degree in medicine in Padua in 1739, begun to address his interests to the natural sciences and the archaeology. On behalf of pope Benedict XIV, Donati visited the Dalmatian coast, in order to make naturalistic and archaeological observations and to collect specimens for a planned pontifical museum of natural history; the outcomes of the missions were published in *Della storia naturale marina dell'Adriatico*, translated in many languages: considered an authoritative naturalist, involved in the main scientific debates, he was correspondent with several European naturalists, such as Linnaeus. In 1750 he was appointed by Carlo Emanuele III of Savoy professor of botany and director of the botanical garden at the University of Torino. Donati’s main feature was the multiplicity of interests (botany,

zoology, geology, mineralogy, ethnology, archaeology), and his role in the birth and improvement of museums and collections. Indeed, in 1759 he led a Piedmontese expedition to Egypt, Middle East and East Indies, with scientific, archaeological, and commercial aims, during which he died in 1762 in the Indian Ocean. The mission gave him the chance to collect not only naturalistic specimens, but also archaeological materials, especially Egyptian. Eclectic scientist, considered a pioneer in the natural sciences by his successor at the University of Torino, Donati gave a significant contribution to the scientific knowledge in the 18th century Torino, through observations and collections, able to mix different fields, paving the way for modern disciplines.

Manuela Bragagnolo

Mapping Transformations in Early Modern Law Printed Books.

“Manual for Confessors” by Martín de Azpilcueta and the Instability of Normative Knowledge
After the so called “material turn” scholars have largely focused on books as material objects. Special attention has been given to early modern books, and to the role of different actors and factors involved in the production of books. Manuals and handbooks, in particular, have been recently seen as key tools in knowledge production. This was true also if we look at law.

This paper aims to shed new light on the materiality of legal knowledge production by looking at a normative best-seller: *Manual de Confessores*, written by the Spanish canon law professor Martin de Azpilcueta. First published in Coimbra (Portugal) in 1552, and based on the reworking of an anonymous handbook printed by Azpilcueta in 1549, *Manual de Confessores* was one of the most influential works of moral theology in the late sixteenth and early seventeenth centuries. A condensation of religious normativity, it had a ‘global’ circulation.

The pragmatic nature of the book requested a constant process of update and transformation. For this reason, it had an incredible number of editions and translations during the author’s life, and many of them were viewed as opportunities for rethinking, updating, and managing the legal knowledge within the book in a new way. What historiography has up to now considered “the” Manual was comprised of many different manuals: the erudite 1573 large in quarto Latin *Enchiridion* was very different from the first small 1549 in 8° Portuguese Manual.

Looking at Azpilcueta’s Manual and at its complex editorial history, the paper aims at analysing the instability of early modern normative knowledge and the material conditions of it, by the use of digital tools.

Marius Buning

Crafty thinking in the dialectics of Simon Stevin (1548–1620)

Simon Stevin (1548-1620) is one of the most famous mathematicians of the early modern period. He made fundamental contributions to the science of mechanics and hydrostatics and invented, among other things, a system for decimal fractions. In this essay, I argue that Stevin's insights were unmistakably the product of the culture of the *rederijerskamers* (“chambers of rhetoric”), which were dramatic societies in the Low Countries that were fundamental for the development of a new epistemic culture of arts and crafts (*consten*). I will unravel the entangled relationship between Stevin's rhetorical (and playful) outlook and his theoretical innovations by focusing primarily on his work on dialectic (*Dialectike*, 1585). Giving

special attention to the use of metaphors in Stevin's reading of Aristotle and Epicurus, and after a systematic analysis of the practical examples invoked in the text, I contend that it is only by situating Stevin's work in the wider context of the consten-culture of the Low Countries, that we can begin to understand how and why “crafty thinking” was fundamental for Stevin's understanding of nature.

Filip Buysse

Spinoza: an early modern source of inspiration for “The Father of Contemporary Physiology”

This paper shows the relevance of Spinoza’s philosophy for contemporary sensory physiology. There is much interest in Spinoza’s philosophy among contemporary biologists such as Antonio Damasio, Henri Atlan and Jean Pierre Changeux who argue convincingly that the Dutch philosopher (1632-1677) anticipated modern biological thinking. However, no scholar has yet investigated systematically why “the father of contemporary physiology” quotes - in his immensely influential work - so explicitly from Spinoza’s work rather than from other well-known early modern philosophers such as Descartes or Galileo. Likewise, the name of ‘Spinoza’ is lacking in important biographies of Johannes Müller (1801-1858).

Firstly, the paper examines where and when Müller mentions Spinoza’s work. It will be illustrated that Müller refers not only in his magnum opus, *Handbuch der Physiologie des Menschen* (1837-1840), but also in his early work to Spinoza’s writings. Secondly, it investigates why the German physiologist choose for Spinoza’s philosophy. It will be demonstrated that there are not only epistemological but also historical, ontological and metaphysical reasons which played a role even though the 19th-century physiologist only seems to quote from his epistemology and his theory of emotions, being afraid to be accused of Spinozism. This part explores several elements of Spinoza’s philosophy and claims that especially his innovative ideas on animals, scientific methodology, memory, hallucinations and his views on the affections of the body where an important source of inspiration.

This paper will help not only to clarify the relation between the Copley-medal winner and Spinoza but also that between Müller and the myriad physiologists who were subsequently inspired by his work.

Jan Cizek

Johannes Bayer (1630–1674) and his synthesis of F. Bacon and J. A. Comenius

Johannes Bayer (1630–1674) was a philosopher and theologian based in Prešov (today’s Slovakia) who in his works *Ostium vel Atrium naturae* and *Filum labyrinthi vel Cynosura seu Lux mentium universalis* presented a conception of natural philosophy strongly indebted to Francis Bacon and Johannes Amos Comenius. Concerning the general description of natural philosophy, Bayer refers to Bacon, whom he quotes frequently and often in extenso. The knowledge, in Bayer’s view, should serve not only to plain speculation but also to the practical application – it should be ‘useful and fruitful’. The Baconian induction is, therefore, regarded as the most reliable method leading to this aim; it is the only means how to become the true interpreters of nature. On the other hand, Bayer emphasizes that the natural philosopher has to apply the induction on the three basic sources of all knowledge, i.e. nature, human mind (with its inborn notions), and the Scriptures. This view is based on the ideas of another source of Bayer’s philosophy – J. A. Comenius. In general, Bayer’s natural philosophy represents a highly original attempt to synthesize Baconian and Comenian views which were sometimes in strong opposition. To

give an example, Bayer adopts Bacon's theory of the four idols; in many places, he mirrors the entire paragraphs of *Novum organum*. However, when he deals with 'superstitious philosophy', he surprisingly passes in silence Bacon's objections to the contemporary tendency to base natural philosophy on the Scriptures – and, on the contrary, praises the so-called Mosaic physics that he himself tried to elaborate (following Comenius's example).

Thomas Colbourne

From Moral Cultivation to Medicine: Spinoza and the Care of the Body

Spinoza claims in the *Treatise on the Emendation of the Intellect*, if we are to successfully arrive at a true understanding of Nature, the "whole of Medicine must be worked out."¹ Spinoza insists we understand medicine not because it is simply another domain of knowledge to be explored, but because the proper functioning of our mind depends on the proper functioning of our body. Rather than being an obstacle or impediment to the emendation of the mind, Spinoza conceives of care of the body as vital to our mind's perfection: to perfect the body is to perfect the mind. What is unique about Spinoza's claim is not only does it place the body at the center of our moral and epistemic development, but it makes scientific inquiry subservient to ethics.

In this paper, I argue that we can extrapolate on Spinoza's comments about medicine to arrive at a general theory of how Spinoza understood the relation between ethics and scientific knowledge. While Spinoza contends that the acquisition of knowledge and the acquisition of virtue are one and the same thing, not all types of knowledge are equally worth pursuing: we must give priority to those disciplines that have the most substantial impact on our bodily well-being. That is, science must be placed in service of promoting care for the body.

Alex Collin

Professional Transitions and Practices of Knowledge Formation: Henry Oldenburg as Teacher, Diplomat, and Scientist

In this paper I discuss the correspondence of Henry Oldenburg (c.1617-1677) and what it can reveal about continuities of knowledge formation processes across professional categories in seventeenth-century Europe. Oldenburg served as the secretary of the Royal Society and editor of its journal, *Pilosophical Transactions*, from 1662 until his death in 1677. Consequently historians of science have been very attentive to his influence in establishing norms of scientific knowledge formation during those years. He came to this work, however, a relatively late in life, aged at least forty-two when he became secretary. This paper compares the correspondence he produced as a member of the Royal Society with that which he produced in his earlier life, as a diplomat for the hanseatic city of Bremen during the 1650s, and his work as a private tutor both before and after his diplomatic service. The paper presents a case that while the content of the knowledge to which Oldenburg contributed in his later life was innovative, there were substantial continuities between the knowledge formation practices which the younger Oldenburg deployed at the court of Oliver Cromwell, and sought to inculcate in his students, and the practices in which he engaged as secretary of the Royal Society. In particular the paper will concentrate on the ways in which Oldenburg leveraged social trust to elicit and then contextualize information, and shed light on

both continuities and discontinuities in this practice according to the professional and geographical settings in which Oldenburg found himself.

Hailey Cotter

'Like a Ship Without Ballast': Printed Maritime Law in Early Modern England

In 1921, legal historian William Senior observed that the first book on maritime law printed in England, William Welwood's *An Abridgement of all Sea-Lawes*, did not appear until 1613. Considered within its legal-historical context, this date is rather late in the trajectory of the printing of English law: the first printed book on the common law, Littleton's *Tenures*, appeared in about 1483, and the sixteenth century saw a proliferation of books on the national law of England. Senior offered two main explanations for this discrepancy: first, the practitioners in the English admiralty court constituted a relatively small professional body, and most of the writings that they required in their legal capacities could be easily circulated via manuscript; and second, any works on substantive maritime law had already been printed on the Continent and imported.

My paper, which lies at the intersection of legal history and history of the book, returns to Senior's principle observation. I consider works of printed maritime law that postdate Welwood's *Abridgement*, making note of the unique niche that the law of the sea occupies in early modern England's legal landscape. Ultimately, my paper argues that the printed maritime law of the period represents a fundamental disruption of the common law's authority, and that books and treatises on the topic, such as Alberico Genitli's *Hispanicae advocacionis libri duo* (1613), Edward Coke's *The Fourth Part of the Institutes of the Laws of England* (1644), and John Exton's *The maritime dicæologie, or, Sea-jurisdiction of England* (1664), usefully illustrate the contours of this jurisprudential disruption.

Julie Davies

Conceptions of Melancholy and Ways of Knowing in August Pfeiffer's 'Antimelancholicus'

This paper examines August Pfeiffer's understanding of the nature of melancholy as depicted primarily in his *Antimelancholicus* (1684), a work currently most famous for its influence on Johann Sebastian Bach. Pfeiffer (1640-1690) was the Superintendent of Lübeck, Professor of Hebrew at the University of Leipzig, an orientalist and a vocal orthodox Lutheran who was influential and well respected, if controversial at times. *Antimelancholicus* provides advice on overcoming melancholy in various circumstances be it when experiencing mockery and ridicule in schools or enduring the last throws of death. This paper gives particular attention to how Pfeiffer's concept of melancholy related to his theology, the study of nature, and the management of emotions. It explores the practical recommendations he makes throughout the text and what these can tell us about how his religious beliefs related to his view of early modern science and ways of knowing. It also considers Pfeiffer's ideas and approach in within the context of changing attitudes to and ideas about melancholy which accompanied the decline of Galenic medicine and the emergence of the concept of mental health. This paper was produced with the support of the Centre of Excellence for the History of Emotions and the Herzog August Bibliothek, Germany.

Margaret DeLacy

“Reasons for Classing of Diseases, Medicine and Physicians:” John Bellers (1654-1725), Quakerism and medical reform

Since Robert Owen and Karl Marx revived the nearly forgotten works of the Quaker merchant John Bellers, historians have focused on the economic and political views expressed in his *Proposals for Raising a Colledge of Industry* (1695). They have given less attention to *An Essay Towards the Improvement of Physick* (1714) which contained many innovative ideas for reforming both medical knowledge and medical practice. His suggestions included: founding specialized hospitals, providing clinical medical education, offering government grants for medical research, creating opportunities for medical communication, developing patient registers, and analyzing these registers to improve medical practice. All these steps relied on his belief that medicine could and should be transformed through empirical research.

This paper will argue that Bellers’s views on etiology and therapy reveal his debt to the Belgian chemist Joan Baptista Van Helmont, whose theories were popular with many Quakers. Moreover, it was the underlying Helmontian belief that diseases were entities, not imbalances or absences, that led Bellers to call for different hospitals for different diseases and to believe that clinical trials could generate reliable evidence about more effective remedies. His Quaker ethics and epistemology dovetailed with his Helmontian natural philosophy to produce a coherent vision for medical knowledge production and medical care.

Lucia Delaini

The Art of War and the art of citizenship: Acquiring civic virtues through physical training in 16th century Italy

In his overlooked *The Art of War* (1521), Niccolò Machiavelli illustrated in detail the necessity of a citizen army, an idea he had promoted in his every other political work. This book however, the only one he decided to disseminate through the printing press, not only states this necessity, but describes in detail the ways in which this army was to be realized –from selections to strategies. Echoing a series of authorities from Aristotle to Savonarola, habit is here key to establishing the smooth functioning of the troops.

Machiavelli’s soldier, however, is not just a soldier: rather, he is the prototype of the virtuous citizen. The training envisioned for the army, in fact, not only enables citizens to take arms against their oppressors or invaders, but it also introduces and habituates them to the civic virtues of solidarity, unity, and courage. This passage from a mostly physical training to an ideal content was, I contend, an important component of Machiavelli’s political idea. I will describe how, in the *Art of War*, bodily training could become mind-training, and compare Machiavelli’s take on collective learning of virtue with the time’s beliefs on human cognition. I will connect the *Art of War* with 16th century conceptions of the relationship between body, mind, and habit, as they appear in other types of texts (philosophical and medical treatises, but also manuals for memorization, fencing, and dancing). Through this analysis, I hope to engage a dialogue on the political reverberations of pre-Cartesian theories of cognition.

Valentine Delrue

Corrupter of bodies? An analysis of the Verhandelingen of the Batavian Society of Arts and Sciences (1778-1794) on managing the health of the citizens of Batavia

During the early modern period, fears about the impact of the environment on the body incited colonial settlers to adopt strategies to prevent disease by managing their surroundings. This paper will investigate these practices in Dutch Batavia. The Batavian Society of Arts and Sciences, which was founded in 1778, published six volumes of *Verhandelingen* (Treatises) from 1779 until 1794. These *Verhandelingen* contain contributions on how to improve the dire health of the population in Batavia by relying on solutions such as cleaning out canals, ventilating homes, and keeping to a moderate diet. Interestingly, the advice in the *Verhandelingen* contrasts with earlier reports written in the context of government investigations that focused on large-scale interventions in the environment such as draining swamps and deviating rivers.

How can this shift in therapeutics from large-scale interventions in the environment to smaller-scale ones based on the non-naturals be explained? I will argue that the members of the Batavian Society directed their efforts toward a scale they deemed manageable. By focusing on new measures, they could keep up a health discourse that sustained the colonial project. First, I will look at the impasses the settlers faced with the great-scale interventions and their pessimism about “fighting nature”. Second, I will investigate how the different professional backgrounds and skills of the members of the Batavian Society converged in an interdisciplinary “medicine of the environment” that brought new health solutions.

Theodore R. Delwiche

Alchemical Unease: Urian Oakes, John Leverett, and the State of Alchemy in Early New England

Though once regarded as a degenerate and distant relative of science, alchemy has reclaimed its place in scholarship as a legitimate form of scientific inquiry. Recent historians like William Newman have shown how alchemical research flourished in the early modern world, even on the margins of empire. While much has been done to uncover the intercontinental reputations of certain alchemists, much still remains when it comes to the actual attitudes about alchemy in the early colonies. Focusing on a corpus of roughly a dozen unpublished, untranslated, and all but entirely unexamined Latin orations (c. 200 pages) composed by Harvard College’s presidents and students in the late-seventeenth and early-eighteenth century, I argue that these new sources reveal the ambivalent, occasionally antagonistic attitude that educated New England men had towards the art of alchemy. While appreciating what they regarded as some selfless, Christian efforts to cure diseases, these Harvard elite speakers worried that alongside pious investigators had cropped up a cadre of self-serving charlatans, those who cared not for the communal promises of the art, but only the base financial reward. Harvard presidents thus strove to map out the proper practices of alchemy and keep them closely associated with the nascent university. This paper would represent an original contribution to the often overlooked history of science in the new world, bringing to light a set of never before examined sources.

Kevin Donnelly

From Mechanical Philosophy to Social Mathematics: Making the Artificial Man Safe for the Quantitative Social Sciences

In this paper, I explore the creation and legacy of what Denis Diderot derisively labeled the “artificial man.” Though Diderot came to this conclusion in his eighteenth-century critique of modern painting, *The Salon of 1765*, his criticism drew from over a century of discontent with the new forms of physics, metaphysics, and theology that had evolved after the introduction of mechanical philosophy in England and, later, France. Indeed, scholars like Dennis Des Chene have argued that the ideas of Descartes, Gassendi, and Newton marked the rare moment in Western when scientific, philosophic, and theological discourse were united. Ironically, however, the unification also brought about new divisions, as mechanists, philosophes, and theologians each took mechanical philosophy in new directions, creating enduring divisions that disturbed early modern thinkers.

While the paper notes many of the most famous later French arguments against the entailments of mechanical philosophy – from Diderot to Rousseau’s *First Discourse* – it also examines earlier criticisms in England, where mechanical philosophy arguably had its greatest success. In examining the theologically-inspired critiques of Richard Baxter, Matthew Hale, and others, it becomes clear that many of what are often taken as the extremes of mechanical philosophy – La Mettrie’s *Machine-Man* and the materialism of Helvétius – were in fact embedded in the program from the beginning. In doing so, I suggest that the creation of the “artificial man” made eighteenth-century Social Mathematics possible, connecting the philosophical revolution of the seventeenth century to the birth of the quantitative social sciences 200 years later.

Paul Dover

Pragmatic numeracy in pre-Cartesian European military treatises

“Therefore it is necessary for the Captain to know geometry, arithmetic, and mathematics, or, not knowing them, honor those who are experts in these disciplines; for without such knowledge of them, one cannot easily perfect the things required of the Captain...”

Aurelio Cicuta, *Disciplina militare* (Venice, 1572)

It has been suggested that the modern world, a world of “triumphant rationality”, was born in a dream by René Descartes in 1619, one that clarified his vision of unifying the cosmos according to his “universal mathematics”, a regime that would order and classify all knowledge by numbers. A European society that had been inundated with new information now had a language, a mathematical one, with which to encompass it. This new capacity for numerical abstraction after 1700, the story goes, was an essential prerequisite of Western modernity.

My current project seeks to recast this narrative of the history of Europe, by emphasizing the presence of pre-Cartesian pragmatic and quotidian numeracy in Renaissance Europe. In this paper I consider one area where this early recourse to numeracy is especially evident: the astonishing profusion of treatises on the military art (especially in the years after 1500). Many of their authors were practical men seeking to digest the profound changes they were witnessing in the experience of war. When they cited exempla to elucidate the nature of “modern” warfare, they used the same verbiage of observations that was regularly employed in natural philosophy to describe empirically gathered data. Their treatises often quantized war, boasting geometric diagrams of fortresses and projectile trajectories, calculations of infantry formations, and mathematical formulae of various sorts. Numeracy and geometry firmly established itself in the arsenal of the Renaissance military captain, as he joined merchants, natural philosophers, and an

increasing number of statesmen who deployed numbers to attribute value, compare dissimilar items with common quanta, and describe their subjects.

Steffen Ducheyne

Adriaen Verwer (1654/5–1717) and the first edition of Isaac Newton's Principia

The Amsterdam-based mercator sapiens and mathematics enthusiast Adriaen Verwer (1654/5–1717), who has been described by one of his contemporaries as one of Newton's "most valiant soldiers," was one of the few in the Dutch Republic to respond to the first edition of Newton's *Principia* (1687). Based on a close study of his published work, his correspondence with the Scottish mathematician and astronomer David Gregory (1659–1708), and his annotations in his own copy of the first edition of the *Principia*, I shall scrutinize the impact of Newton's ideas on Verwer's thinking. Most importantly, it will be argued that Verwer never compared Newton's mathematical method to Spinoza's. More specifically, he never used arguments grounded in the nature of Newton's physico-mathematics qua mathematics in order to refute Spinoza's *Ethica*. In his posthumously published *Gronden der zekerheid* (Foundations of Certitude), the Purmerend-based physician, local politician and experimental philosophy and mathematics enthusiast Nieuwentijt argued for the superiority of Newton's mixed-mathematical method over Spinoza's hypothetical pure-mathematical method, but this was not an argument of the kind ever put in writing by Verwer. To claim otherwise is to read Verwer's contribution in the light of later developments. The proposed analysis, which will add nuance to earlier findings (such as the pivotal studies of Rienk H. Vermij and Erik Jorink and Huub Zuidervaart), has broader implications for our understanding of the gradual introduction of Newton's ideas in the Dutch Republic.

Karine Durin

Mobility of Religious Frontiers in the Republic of Letters: Interconfessional Communication of Knowledge between Spanish Catholic Natural Philosophers and their Protestant Counterparts in the Sixteenth Century

The subject of this paper is the interaction between the Catholic and Protestant scientific networks dedicated to the study of Natural Philosophy in early modern Europe. The concept of the "Republic of Letters" illustrates the development of natural knowledge within communities of learning which, despite the intensity of religious conflict between the Spanish monarchy and its Protestant rivals, engaged in profound intellectual interaction, making an important contribution to the ongoing "Scientific Revolution". The phenomenon of travelling scholars was fostered by Iberian transatlantic exploration and the subsequent generation of an innovative corpus of natural knowledge derived from the study of the New World. In this context, we aim to propose a comparative analysis of European commentaries produced about Pliny the Elder's *Natural History* (Book II) by different communities of scholars throughout Europe, especially those made by the Spanish mathematician and Hebraist Jerónimo Muñoz between 1568 and 1570. This will allow to question the limits of a strictly scientific erudition, and to understand the impact that the opposing confessions had on the interpretation of Natural Philosophy. Also, this paper will examine the extent in which the study of Pliny could be seen as a "neutral ground", in which philosophers and scientists from the opposing faiths could interact.

George Elliott

Alchemy and Architecture: The Place of Gershom Bulkeley's Seventeenth-Century Laboratory in his New England Home

This paper examines the place of Gershom Bulkeley's alchemical laboratory within his seventeenth-century Connecticut home. This minister, physician, and alchemist's household laboratory can be understood not just through the notebooks he left behind but also by the surviving room-by-room inventories for his saltbox home and laboratory, and his many medical account books. These sources place his alchemical and medical work within a domestic economy and social spaces, and further emphasize his laboratory's embeddedness within the structure of the New England saltbox. Rather than existing as a wholly separate space, Bulkeley's laboratory functioned as part of a socioeconomic structure familiar to most New England households. It produced for a public-facing parlor where he sold alchemical medicines to his patients. It drew from either the household back storage room, garden, or cellar. It depended on the help and support of family spending time in the hall, kitchen, and lean-to attic. In short, Bulkeley's laboratory was not an internalized feature of his chamber but a single piece within the larger social fabric of his colonial Connecticut household. The example of Bulkeley's household laboratory affirms and also develops the insights of such scholars as the sociologist of science, Steven Shapin, and the more recent work of the historian of science, Elaine Leong. It further illustrates the blending of the category of laboratory with the household within colonial New England while also highlighting Leong's argument for an everyday science in the seventeenth-century household.

Georges Farbat

The best physician is also a better architect

The French physician and naturalist Louis Savot (ca. 1579-1640) is mostly known among art historians as a dilettante who wrote *L'architecture françoise des bastiments particuliers* (1624). The treatise was deemed worthy of no less than one reprint (1640) and two annotated editions (1673 and 1685) by François Blondel, director of the Académie royale d'architecture. But its prestigious endorsement also confined its historiography within narrow disciplinary boundaries. Indeed, apart from highlighting some of the physician's hygienic remarks (on siting, ventilation, or baths), very little is inferred from his training. His Galenist perspective on Vitruvianism goes unnoticed. To move beyond such limitations, this paper considers *L'architecture* alongside Savot's other scholarly pursuits in a variety of seemingly unrelated fields. It shows how his books on bloodletting (1603), colors (1609), statuary (1614), and numismatics (1627) are equally significant to his technical approach to architecture within shifting institutional frameworks and material knowledge systems.

James D. Fleming

Talking text: Early modern shorthand as disruptive information technology

Verbatim shorthand note-taking—known to antiquity, but lost in the medieval period—was re-invented in late-sixteenth-century England. Multiple systems of the art were soon published. And this generated a paradox. By definition, each shorthand system was a bespoke set of manuscript glyphs. How could, or should these be rendered by the press—the informational breakthrough of the preceding century, based precisely on reiterative arrangements of standardized type? Customized typeface was one answer;

engraved plates, another. Yet in surviving copies of early modern shorthand manuals, we also find that the actual characters of the art (as opposed to the surrounding instructions, commentary, etc.) were quite commonly excluded from printing altogether. Instead, they were entered into the books by pen and ink, producing the shorthand manual as a hybrid print-MS artifact. To some extent, this was probably (if surprisingly) a practical expedient. Custom type and engraving were both expensive, and tricky. Hand-inking, though laborious, was effective, simple, and cheap. Nonetheless, in this paper I will argue that the MS publishing of early modern shorthand characters is an episode of more than merely bibliographic interest. Shorthand offered, and was perceived to offer, a challenge to the informational dominance of print. The ephemeral word, liberated from the noisy channels and rigid structures of the press, could now be captured *tel quel*—textualized instantly by the pen of the skilled short-writer. The art, in sum, constituted a radical intervention in the early modern phenomenology of information. It got published by hand because it was hand-publishing.

Matteo Fornasier

Medical and Pharmaceutical Practices in Early Modern Paris: The Jardin du Roi and the Jardin des Apothicaires

The Jardin du Roi and the Jardin des apothicaires are two of the most interesting, albeit understudied, early modern French scientific institutions. This paper studies medical and pharmaceutical practices in Paris through the early history of its jardins, insisting on the importance of the autonomy of research, and the openness toward the public.

The first section (Fornasier) focuses on the Jardin du Roi, and on the medical practices conducted therein. At the Sorbonne's medical faculty, physicians were instructed in an old-fashioned way: notions not included in Galen's and Hippocrates's texts were in fact banished. Physicians rejected from the faculty found protection at the King's court, and eventually obtained the creation of the Jardin as a space to carry out research autonomously. Here, iatrochemistry could be freely studied and, most importantly, experimentally tested. Medical knowledge could also be shared with a larger public through free classes delivered in French. Remarkably, the public could also benefit from free medical assistance.

The second section (Storni) explores the history of pharmaceutical teaching at the Jardin des apothicaires. Here, a laboratory was established at the outset of the eighteenth century, where public classes on pharmacy were delivered. The structure of these classes is analysed through the example of Rouelle, stressing the importance of practical notions in his courses. Apothecary training, however, also took place in private apothecaries' laboratories. Classes were here reserved to a restricted audience, and focused on technical skills. The paper briefly compares teaching at the Jardin and in private venues.

Cecilia Forselles

Gardening as an academic topic in Finland in the 18th century

The 18th century is regarded as the century of gardening. Natural history mixed with utilitarian and economical aspirations produced knowledge during the early modern period in Finland that indeed was predisciplinary. One interesting group of academic publications in this field, mostly dissertations, concerned gardening or growing useful plants or fruits. My paper aim to present these publications and in which ways gardening was presented or what kind of theories or ideas can be noticed in these publications.

A further aim is to analyze in which respect they present a specific Finnish or Northern aspect of gardening or growing plants. Are weather conditions, geographical distances, local gardening methods, social conditions of the people, local habits or other things noticed in the publications?

The publications are often presentations of simply growing some kind of plant or developing better methods of growing specific kinds of plants or introductions of new plants for gardening. Some are written as merely guides but some include also aspirations to develop gardening as a tool for utilitarian purposes or the development of the society's economic growth.

Common for all of them was, however, the aim of increasing the scholarly and society's knowledge of gardening, plants and circumstances that affected gardening. In this respect they fulfil an early scholarly aim of increasing knowledge and producing new knowledge. In an age when the interest in natural history was growing and gardening became an interesting topic among scholars and aristocrats everywhere in Europe there was however local variations in the focus and a connection to local plants and gardening that can be scrutinized through these publications. We can gather information about which local plants, growing methods or questions in connection to them were presented as important or interesting in a local context.

Emily Friedman

Art and Alchemy along the rue Mercière

I will argue that the close quarters of the rue Mercière, the unofficial headquarters of the artistic, scientific, and literary communities of sixteenth-century Lyon, gave rise to a collaborative climate whose shared intellectual conceits were given visible form by the artists who lived there. Home to the two artists at the center of this paper, Jean Perréal and the Master JG, the rue

Mercière was a locus for exchange, especially between artists and scientists. By taking these connections seriously, we can see that many of the prints and paintings produced in this milieu were complex images for thought and must be analyzed historically. Among these points of contact, alchemy was the most prevalent, which pointed to an underlying fascination with process and the instability of matter. Entangled in contemporary debates about the distinction

between art and Nature, alchemy became especially important for artists in Lyon, many of whom were goldsmiths—a craft often likened to alchemy. In an intellectual environment marked increasingly by flux and confusion, transformative technologies were at the crux of Lyonnaise artistic practice, a self-reflexive endeavor that explored questions central to the operations of

representation. Interested in the blending of the alchemical and the artistic worlds, this paper will explore the tension between representation and mimesis that was symptomatic of larger intellectual concerns of sixteenth century Lyon, where artists were interested in challenging the epistemological parameters that had previously structured their environment: the boundaries between art and nature, and the distinction between the knowable and the unknowable.

Reese Fulgenzi

Visions of Natural History in Petrine Russia

Peter the Great's Kunstkamera, opened in 1718 to the public, is infamous for its

anatomical collections and natural oddities. The characterization of Peter the Great's Kunstkamera as merely a collection of curiosities and anomalies belies the value and diversity of the collections, and has been complicated by recent scholarship. However, the overemphasis on the ethnographic and anthropological collections similarly underplays the role of natural history at the founding of the Kunstkamera. Thousands of preserved animal and botanical specimens as well as minerals and fossils from France, Germany, England, North America, and Africa are all represented in the early 18th century collections of the Kunstkamera. Over ten thousand texts and hundreds of scientific equipment augment the natural history collection and reinforce the scientific significance of the Kunstkamera in the 18th-century.

This paper addresses transnational science in Early Modern Russia through the geological collections of the Kunstkamera, highlighting the geological and paleontological specimens in the collection, largely now housed in the Fersman Mineralogical Museum. Peter the Great purchased the original collection from the physician Jan Krzysztof Gottwald in Danzig, while other Dutch, French, Baltic German, and English geological contributions to the Kunstkamera exemplify the transnational science of Petrine Russia as well as the diversity and scientific value of the institution. The cataloguing of the collection in the 1740s by Mikhail Lomonosov is a high water mark of 18th-century Russian natural history, characterizing the cosmopolitan scientific community in Saint Petersburg and Moscow throughout the 18th century.

Corinna Gannon

The Horoscope of Rudolf II. A Miniature on the Crossroads of Astrology, Alchemy, Magic and Kabbalah

The so-called "Horoscope of Emperor Rudolf II" is a little-known watercolor drawing, today in the Austrian National Library in Vienna, ascribed to the circle of the Flemish artist Joris Hoefnagel. The emperor's nativity is being presented by two angels in a mirror-like object surrounded by an abundant fauna. However, this miniature is far from being a conventional horoscope. The positions of the planets and the divisions of the houses seem to be astrological nonsense. Yet, it is by no means merely an arbitrary reproduction of the planetary constellations due to a lack of knowledge by the artist. The unknown maker has brilliantly and subtly merged the manifold intellectual currents that were circulating at the imperial court in Prague and has thus created a visual panegyric manifesto. The "German Hermes Trismegistos" or "Bohemian Solomon", as Rudolf II. was called, is particularly known for his patronage of the "occult" sciences such as astrology, alchemy, magic and kabbalah. All these sciences condense in the mysterious watercolor. Thus, the horoscope serves a useful cross section to reconstruct the intellectual environment in Prague around 1600. This paper intends to analyze the miniature's iconography from an art historical point of view and then contextualize the image in the Rudolfine scientific culture by presenting contemporary source material on divinatory practices, (Paracelsian) alchemy and Christian kabbalah.

David Gentilcore

The art and science of waters: knowledge, identity and practice in the work of Giovanni Antonio Nigrone (fl. 1555-1595)

Maybe I've been reading too much 'Scandi-noir' of late, but when I came across the figure of Giovanni Antonio Nigrone, who in the early 1550s discovered a series of mutilated corpses down in Naples's vast underground water system, I was immediately intrigued. Nigrone labelled himself a *fontanaro et ingegniero de acqua*, a 'fountaineer and water engineer'. Over a long career, he helped to maintain the fountains and underground water supply of Italy's largest city and designed elaborate fountains and water features for the elites in both Naples and beyond. He left behind a richly illustrated but rather rambling collection of essays (c. 1595), which has never been systematically studied.

What did it mean to be a 'water engineer' in the second half of the sixteenth century? The emergence of an early modern 'art and science' of waters—where the former referred to technical and practical skill and the latter theoretical knowledge—brought together a range of occupations. Engineers and architects took on public roles requiring knowledge of water provision, management and consumption, relying on technical expertise in hydraulics, transportation and practical mechanics, as well as mathematics. This was linked to a broader understanding of water and health, as well as natural history, including the origins of springs, the flow of rivers and the power of earthquakes and volcanoes. Practitioners mixed the possession of knowledge with entrepreneurial *savoir-faire*.

All of this is evident in Nigrone's manuscript. My paper will explore Nigrone's professional identity and the circulation and application of hydrological knowledge and expertise, at a time of great professional flux.

Christopher Gilson

Theology, Astrology, and Meteorology: A Framework for Understanding Climate in Early Modern Europe

In the sixteenth century, geographers and natural philosophers understood "climate" to describe a portion of the earth between two parallels of the equator. Defined by landmarks and length-of-day, "climate" did not change. History, philosophy, and observation, however, provided abundant evidence that the earth's surface and atmosphere were subject to alteration. This was particularly evident during the Little Ice Age (1550-1850), when average temperatures in much of the Northern Hemisphere fell by more than 1°C. Flooding and stormy weather devastated many communities in northwestern Europe, and great frosts turned rivers like the Thames into memorable sheets of ice. To explain such changes, many turned to some combination of theology, natural astrology, and Aristotelian meteorology. These interpretive methods comprised the framework through which natural philosophers and other writers wrestled with the mechanics of environmental change. The bitter weather of the Little Ice Age challenged such methods, though, providing an opportunity for discerning new explanations. This presentation relies on examination of pamphlets, prayers, and other publications to define the characteristics and limitations of this framework. It also reveals that early modern climate change was not only unexpected but, in the context of sixteenth century European thought, rather unexplainable.

Gianamar Giovanetti-Singh

Philology, Astronomy, or Archaeology? The interaction of different disciplines in the discovery of distant Chinese antiquity

In 1658, as the Jesuit missionary Martino Martini (1614-1661) was making his second journey to China, his “history of the great Empire,” *Sinicae Historiae Decas Prima*, was published in Munich. In this work, just a few pages after reassuring his European readers that “[o]ne can have full faith in Chinese chronology,” Martini claimed that through his erudite study of Chinese historical annals he became “convinced that this extreme part of Asia [...] was populated before the Flood.” Martini’s work generated lively debate amongst European scholars of different disciplinary backgrounds over how one could establish the credibility of distant antiquity. Some, following the approaches of Athanasius Kircher, searched for ancient Chinese material “monuments”. Others attempted to figuratively interpret the *Yijing*, equating its contents to narratives from the Old Testament. However, the most popular way by which Jesuits attempted to convince other Europeans of the verity of events from distant Chinese antiquity was by using records of ancient Chinese astronomical observations as an ostensibly culture-independent marker of historical events. By examining these three different methods used between the mid-seventeenth and mid-eighteenth centuries to establish historical facts, and their interactions with one another, this paper re-evaluates what Alexander Statman has recently called the “first global turn” of history. It argues that the supposedly secular nature of Enlightenment world histories such as Voltaire’s *Essai sur les moeurs* (1756) was largely contingent on the outcome of this three-way controversy.

Andrea Gondos

Magic as Living Practice: Women, Sexuality, and Amulets in Early Modern Jewish Manuscripts

This paper will explore the construction of knowledge regarding women’s bodies, attitudes toward sexuality, and gender differences in relation to family life, as expounded in early modern magical recipes written by Jews in Ashkenazi lands that belong to the genre of practical Kabbalah (Kabbalah hama’asit). More specifically, I will focus on a number of magical anthologies preserved in manuscripts, which have only recently received sustained scholarly attention, that nevertheless provide a unique window into daily concerns surrounding the body and its management. These texts, delineate a cultural-religious space in which knowledge concerning the properties of the natural world combined with familiarity with angelic names and magical formulas enabled the Jewish magician or Magus (Ba’alei Shem) to manipulate the physical and the spiritual world. Hebrew letters, magical amulets, and geometric figures coalesce in these sources to affect a desired practical goal, which was frequently directed toward healing and a general improvement of physical conditions.

My analysis will pay particular attention to the gendered aspects of these sources, written by men, in order to uncover male conceptualizations of the female body, whereby as Rachel Biale has incisively noted, “the male sexual experience of heterosexual intercourse is the standard of defining what is a sexual act” (Biale 1996, p. 51).

Furthermore, I will interrogate these texts to uncover social and medical issues that related specifically toward women’s health and medical concerns in this period. Lastly, as these works intersect with both medicine and magic, I will theorize that these two disciplines were regarded by the authors of these texts as more complementary rather than contradictory in the Jewish communities of early modern Ashkenaz.

Cassie Gorman

The Neoplatonic Cosmology and Poetry of Anne Southwell (1574-1636)

For Man, to heauen, hath throwne a waxen ball,
In which hee thinks h'hath gott, true formes of all...

From 'An Elegie written by the Lady A: S: to the Countesse of London Derrye'

In the early seventeenth century, Anne Southwell compiled numerous original poems into a notebook. Southwell's work is, in turn, witty, devout, provocative and occasionally angry: her poems move swiftly from striking proto-feminist moments to harsh social commentary; from personal elegy to cautionary reflections on Christian morals and mortality. Jean Klene's 1997 edition of the manuscript has inspired some scholarship on Southwell's challenges of gender and her theological principles.

What has remained unstudied, however, is the depth of philosophical and physiological knowledge exhibited by her poems. In this paper, I explore the substantial presence of Platonic dialogue and Neoplatonic theories of cosmology in shaping the texts of her manuscript. One of Southwell's primary concerns is the subject of wit and its relation to the overarching cosmos. In her mock-elegy to the Countess of Londonderry, she externalises the 'waxen ball' of the human mind, as imagined in Theaetetus, to analogise the fallibility and limitations of creativity – an issue which, in turn, connects with the suspicions of poetic activity explored in Ion. Poetry, Southwell argues, is a hazardous form, capable of great deceit but also profound illumination. According to her verse letter to the Bishop of Limerick, the imagination 'should fixe to tell the Soule, of Gods intention'. It is of immense importance that poetry harmonises with its surroundings and finds its place in the Neoplatonic cosmos.

This paper addresses the details of Southwell's cosmology and the place of poetry within it. I reflect moreover on what can be gleaned of Southwell's reading practices, and situate her work within a wider context of early modern philosophical poetry and women's writing.

Marianne Groep-Foncke

Demand and Supply? Interactions between inventors and their audience

In 1630 some residents of The Hague, Holland, sent a petition to the city's magistrates that was twice exceptional. In the first place, they told the authorities in uncommonly strong words that they were tired of waiting for measures against the stench in their neighbourhood. Secondly, they explicitly mentioned an invention by carpenter Cornelis Proot (†1641) from nearby Delft as the preferred solution. Moreover, they made a detailed suggestion for its implementation. This raises the question to what extent inventors interacted with their public.

There are clues that sixteenth- and seventeenth-century Dutch inventors had their feet firmly planted in the community. They invited people of repute to their demonstrations and subsequently recorded testimonies of the spectators, in support of their patent applies. Once a patent was granted, inventors printed promotional leaflets and wrote to regional authorities, offering their services. Inhabitants and governors, in their turn, were on the lookout for solutions to their problems.

Veronica Grossi

Epistemology in an Early Modern Manuscript: Enigmas by Sor Juana Inés de la Cruz

The manuscript titled *Enigmas ofrecidos a la discreta inteligencia de la soberana Asamblea de la Casa del Placer* (Lisboa, 1695) by the Mexican savant Sor Juana Inés de la Cruz was composed in collaboration with aristocratic nuns belonging to various convents of Portugal, the Countess of Paredes, formerly

vicereine of New Spain (Mexico), living in Madrid, Spain, and the Duchess of Aveiro of Portugal. *Enigmas*, with a title page and introductory poems of praise and approval by various nuns and two women of the European court, written both in Spanish and Portuguese, mimics or rather parodies the format of the early modern printed book. This manuscript is clearly a materialized transatlantic collaboration among writers and intellectuals from the court and the cloister. My paper titled “Epistemology in an Early Modern Manuscript: Sor Juana’s *Enigmas*” brings to light the importance of this oeuvre constituted in a spirit of intellectual dialogue, proposing that such a mode of creation, reception and circulation can illuminate early modern literary /intellectual production and exchanges, beyond disciplinary boundaries. My analysis approaches the highly conceptual, baroque style of the book within its European context of production to unveil in it a hitherto unnoticed epistemological dimension present in other of the Mexican nun’s pieces, including her Petrarchan lyric and her long metaphysical poem *First Dream*, an allegory for the search of knowledge from a diversity of spaces, including the sleeping body, philosophical methodologies (Neoplatonism and Aristotelian Scholasticism) and areas of knowledge such as astronomy, jurisprudence, rhetoric, medicine and theology.

Stefano Gulizia

Mechanizing the *Kunstammer*: Astronomical automata and the legitimation of early modern knowledge through a translation across media

This paper takes a fresh look at the production and exchange of demonstration models between 1570 and the 1640s, by taking as a reference point the *Kunstammer* collections from Central Europe and their scholarly role within the republic of letters. It is not a study of artisanal epistemology in a specific court, nor a mere invitation to discover the anamorphic marvel of these cyberspaces, although both of these elements are present. Rather, the aim is simply to suggest that astronomical automata should be evaluated as a special ‘epistemic genre’ in the history of science, both as teaching tools and display objects. Three aspects are of particular interest here, and will be treated in turn. First, Tycho’s globes and automata operated a translation across different media within the late Renaissance astronomical community; and indeed, they were materially enabled by paper projections. This point is made by the case study of an instrument-maker, Jost Bürgi. Second, they played a significant part in the intellectual communication of astronomy, a feature illustrated by epistolary disturbances in Tycho Brahe’s career, the Baltic exchange between Comenius and Hevelius, and renewed attention to a patronage-broker active in a variety of fields, Heinrich Rantzau, the governor for the Danish crown in Schleswig-Holstein. Third, their ability to represent a world-system mechanically foreground persuasion and the kind of ludic mathematical knowledge advocated by Reviel Netz. This final part of my argument invokes Peter Ramus’s call for an astronomy without hypotheses and Kepler’s appeal to practical geometry in his 1611 treatise on the six-cornered snowflake. By linking automata to 3D models and to such figures as Tycho, Rantzau, Ramus and Kepler, this paper presses on the necessity to study early modern astronomy via a history of communication that emphasizes paper technology and essentially textual phenomena like humor and metaphors.

Leonie Hannan

Apprenticeship, Almanacs and Astronomy: the tale of two young Dubliners in the mid eighteenth century

This paper explores the correspondence of two mid-eighteenth century Dublin apprentices: Robert Jackson and Thomas Chandlee, who took an interest in astronomy in their spare time. Jackson was apprenticed to his father, the printer and publisher Isaac Jackson of Meath Street, Dublin and he wrote to fellow star-watcher and apprentice to a linen draper, Chandlee. Their time was dominated by the demands of their respective apprenticeships but despite these hindrances, Jackson and Chandlee found room for their favourite occupation. Jackson's professional knowledge of almanacs facilitated their access to relevant information from across the globe.

Jackson lived in his father's premises alongside several other apprentices, where he had commandeered a small study space that he referred to as the 'Hygrometer closet' on account of its containing such an instrument. To gain a better view of the 'Western side', he would crane out of a 'back Garrett window', which he described as 'my best Uraniburg' in reference to the sixteenth-century Danish observatory of that name. It was in these compromised conditions that Jackson enthusiastically observed the heavens and discussed his ideas with Chandlee.

This paper will illuminate the ways in which eighteenth-century investigators of modest means used their homes flexibly, pushing their spatial and material affordances to accommodate a wide range of activity, even when other members of their household had different designs on the space. It will also consider how this 'intellectual history from below' – involving unusual and largely ignored intellectual actors – changes our understandings of this era of 'Enlightenment'.

Vojtech Hladký

The use of Hermetic writings in Patrizi's Nova de universis philosophia

The influence of Hermetic writings on Renaissance thought and the scientific revolution has been amply discussed in scholarly literature ever since the publication of Francis A. Yates's *Giordano Bruno and the Hermetic Tradition* in 1964. According to the so-called 'Yates thesis', Ficino's famous translation contributed to the fact that Hermetic writings and especially natural magic played a highly significant role in the formation of the Renaissance worldview of which Giordano Bruno is the chief representative.

Francesco Patrizi, Bruno's older contemporary, usually receives much less attention, although his philosophical summa, the *Nova de universis philosophia* (1591), includes an extensive edition of Hermetic writings and the text of the massive treatise is full of quotations from these works. It seems therefore that, as some previous studies have shown (see especially the collection of papers in Mulsow 2002), Patrizi is an important witness to how Hermetic texts were regarded and used in late sixteenth century.

The aim of my contribution is to provide a detailed overview of the role of Hermetic writings in Patrizi's *Nova de universis philosophia*. The presentation will be structured according to main parts of the treatise and follow their main features and claims: this approach proved itself useful an earlier text of mine, which investigated the role of the Chaldean Oracles (Hladký 2019). The current contribution will pay special attention to Patrizi's notion that some ancient texts contain metaphysics and natural philosophy which was at his time regarded as 'new' and unambiguously progressive.

Kentaro Inagaki

Bridging Hebrew and Arabic: Albert Schultens and the Development of Biblical Philology

In this paper I shed new light on the hitherto neglected controversy around Albert Schultens (1686–1750), one of the most celebrated biblical scholars and Arabists during the eighteenth-century. I place his treatises in this controversy among Dutch scholars on methods of Bible exegesis. This paper argues that by bridging Arabic and Hebrew Schultens relativized the sacrosanct status of Hebrew.

From the seventeenth century onwards, scholars recognized grammatical similarities between Hebrew and Arabic. Although they tentatively attempted to utilize Arabic to decipher Hebrew, it was Schultens who set a theoretical framework to use Arabic for interpreting the Old Testament more systematically. Historians of Arabic studies in Europe, however, rarely appreciated his achievement, mostly due to a widespread assumption that Schultens merely abused the knowledge of Arabic for biblical scholarship. Yet, such assumption is based solely on the analysis of his first treatise. Upon closer inspection, his subsequent writings turn out to be more important for his comparative method of biblical philology than hitherto recognized.

This paper explores how Schultens sought to rebut such scholars as Antonius Driessen and Taco Hajo van den Honert who doubted that Arabic solves ambiguous places of the Old Testament. Schultens successively published treatises in which he strongly defended the usefulness of Arabic. Drawing on an interpretation of biblical narrative and Arabic sources, Schultens even claimed that Hebrew and Arabic were twin sisters. This paper, furthermore, implies that his comparative method is an important step in the history of biblical scholarship.

Lydia Janssen

‘Church antiquities’ and Catholic religious identity in the Protestant Dutch Republic. The role of religious antiquarianism in the creation of Dutch Catholic identity and church politics in the Dutch Mission (1583-1727)

The Dutch Mission (1583-1727) is best known for its efforts to maintain and strengthen the Catholic presence in the nominally Protestant Dutch Republic. However, its clergy also had a fundamental part in creating a new Dutch Catholic identity and in asserting the Dutch Mission’s position as successor to the Archdiocese of Utrecht. In these ventures, religious antiquarianism came to play a key role, not only figuring prominently in the work of the Dutch Mission’s historiographers, like the renowned Hugo van Heussen, but also finding its way into administrative documents, such as the apostolic vicars’ regular reports to the Roman curia. Drawing on contemporary antiquarian approaches to religious and national history, the Dutch Catholic clergy turned the antiquaries’ new more ‘scientific’ methods of historical reconstruction into powerful tools of community building and church politics.

In this paper, I will firstly explore the role of religious antiquarianism and the new historiographical methods introduced under the influence of antiquarianism in creating a Dutch Catholic identity and in fortifying the Dutch Mission’s legal position. Secondly, I aim to elucidate how the historiographical reconstructions of Dutch Catholic clerics tied in with contemporary efforts of antiquaries to place national history on a more solid ‘scientific’ basis, drawing a comparison to secular works of history by scholars like William Camden. Finally, I will show how they combined historical with legal studies to

further strengthen their position vis-à-vis Rome, culminating in their creation of an independent church that would become the Old Catholic church of the Netherlands.

Matthijs Jonker

Copper vs wood: illustrating Mexican crops and medicinal plants in the seventeenth century

In 1651, the Roman Accademia dei Lincei published its long-awaited encyclopedia of the natural history of Mexico, known as the *Tesoro messicano*. Based on material that was collected in the 1570s in Mexico by the Spanish royal physician Francisco Hernández with the participation of indigenous informants, it contains substantial additions by the Lincei, such as commentaries, annotations, and more than eight hundred woodcut illustrations. Whereas the Lincei's writings have received extensive scholarly attention, the illustrations of the Mexican plants and animals remain an understudied aspect of this important book for the early modern understanding of nature. This holds even more for the small number of (up to five) copper engravings of some of the plants, such as the Coanepilli (Passionflower) and the Hoaxacan (Holywood) that were inserted post-printing in some of the surviving copies of the *Tesoro messicano* (e.g. Biblioteca Nazionale Naples, John Carter Brown Library, Biblioteca Casanatense, Rome).

These inserted copper engravings are the main focus of this paper. What were the aesthetic, economic, and especially epistemic reasons for including these larger and more detailed representations of plants that were already described and depicted in the book? I will answer this question by considering, first, the relative merits of the woodcut versus copper engraving techniques in terms of their epistemic functions (facilitating recognition in the field, complementing the argument in the accompanying text), second the role of the represented plants in the transatlantic trade of *materia medica*, and third, the practical usefulness of the book for doctors and naturalists.

Jacques Joseph

The Role of Light in Henry More's Works

Light is traditionally a prominent topic for Platonic philosophers. During the Renaissance, it even became a key element in the works of such thinkers as Marsilio Ficino or Francesco Patrizi. In their philosophical systems, rightfully described as "light metaphysics", light plays a crucial part: as an intermediary entity between the material and immaterial, it is similar (if not identical) to spirit and helps bind the universe together. It is also actually (not only metaphorically) involved in their theories of knowledge, which makes it even more an object worthy of attention in its own right. Although in the works of Cambridge Platonist Henry More we still find many references to light, its role has clearly changed. Optical theories don't get much attention in themselves and light, no longer a metaphysical principle per se, now mostly serves only as an explanatory device to allow the reader to picture more easily the existence of incorporeal substances. Quite interestingly, this explanatory use of light subsists throughout More's career, even as his theory of spiritual substances undergoes a significant transformation (from what he called "holenmerism" to his later theory of spiritual extension). In my paper, I propose to give a more detailed analysis of the role of light in Henry More's philosophy. My attention will focus mostly on the possible metaphysical implications of his metaphors – do they presuppose some deeper connection between light and soul, like in Ficino or Patrizi, or not?

Mateusz Kapustka

Embedded View. Geocentric Readings in the Baroque Library

The paper investigates the geocentric imagery in Baroque libraries and works with the intersections of religious iconography, astronomical demonstration, and cosmographical speculation. The focus is set on mutual media interactions between fresco decorations, archived textual and iconic resources, globes, and instruments in chosen college and cloister libraries of the 17th-18th c. from the Habsburg Empire. Starting with the famous new Court Library (Hofbibliothek) in Vienna of 1723-1726, the paper concentrates on relatively less known examples in the Archduchies of Austria and the lands of the Bohemian crown and examines the very dispositives of accumulation and regeneration of knowledge under geocentric auspices (e.g. the Benedictine library hall of St. Paul in Lavantthal of 1683 with its monumental depiction of the Western hemisphere, or, the Mathematical Halls of the Jesuit Clementinum in Prague of 1747-60). The Baroque library with its idiosyncratic taxonomies is often subsumed merely in terms of time-specific piety and pre-enlightened science. Scholastic in its core, it introduced, however, the holistic, global approach to the idea of networked empirical exercise, scientific correspondence, demonstrative illustration, and theoretical speculation. The paper examines how physical observation and visual evidence—both matched with metaphysical speculation and postulated divine, primordial sources of science, as well as with the geocentric discourse of Creation—were reflected in the library buildings a.o. in monumental frescoes of Sapiientia divina, heavenly constellations, or, of biblical study and global expulsion of ‘heretic’ volumina. Those complex interferences pre-determined especially the reading of treatises on geosciences and astronomy, which aimed at truthful reconstruction of the global or astral ratio as embedded in the transcendent divine supremacy upon the geocentrically organized universe.

Marianne Klemun

Mountains, Glaciers and Raging Waterfalls. Movement and Dynamics as Expressions of Changing Concepts of Nature

The eighteenth century has seen an abundance of visualisations of waterfalls as a symbol of elemental earth forces both in the context of fine arts and as popular props in literature and science. In this paper I will examine which constructs of nature and which contexts scientific literature used for the depiction and visualisation of waterfalls. From the seventeenth century onwards, waterfalls experienced a stellar rise as a motif not only in paintings but also in special magazines on the Alps and in travel literature. The broad spectrum of depictions included representations as gentle and foaming streams, as cataracts either above- or underground and as rapids high up in the mountains. They were based on different concepts of the earth’s water resources, water supply, the circulation of water, hydrology and physico-theology as well as a changing relevance of the categories altitude and depths.

According to their Alpine approaches, travelogues devoted to scientifically comprehending and appropriating those hardly defined mountain regions and glaciers changed the meaning of waterfalls. As a result they created pivotal mental connections between mountains and glaciers, between the inhabited, known and cultivated (“third”) nature and the uninhabited, wild “first” nature, as I will argue in this paper. Apart from visual realisations that were intended to serve as evidence in scientific publications the

contribution will analyse different varieties of sensory perception and ambient noise by analogy with body concepts.

In elite courtly gardens waterfalls were staged as quasi secular, homogeneous streams representing the taming of society. Up in the mountains, however, their sublimity was celebrated with wonder and fear. The dynamic of the water was increasingly seen as a sign of the earth's radical change by analogy with society and its past and future (revolution), namely as historicisation of nature or geognosy.

Bernd Kulamnik

Inventing the disciplines to cross their borders: Interdisciplinarity in the Roman Accademia de lo Studio de l'Architettura (1535–1555)

Around 1535 in Rome, a fastly growing group with 'antiquarian' interests headed by Marcello Cervini (1555 pope Marcellus II) established a new network in the footsteps of Leto's Accademia Romana, founded in 1464 and perished in the Sacco di Roma in 1527. They developed a detailed program to regain all theoretical and practical knowledge about ancient Roman (and partly:

modern) architecture and its social, religious, political and functional contexts. Its aim was to give architects and patrons a guide for the best future architecture. In 1542, Claudio Tolomei described this program in a letter (published in 1547) but it has always been regarded as unrealised and even

unrealisable. Instead, by creating a network of specialised 'disciplinary' groups, the academicians — presumably for the first time — clearly separated what later should become all those humanities dealing with the past and its remains: urbanistics, archaeology, numismatics, epigraphy, history of religion, art, architecture and decoration, etc. These groups of mostly temporary participants worked in a well-coordinated way over two decades. While they did not manage to print all their results in the planned 24 books, most of the important books published during the next decades were largely based on results of this earliest example of methodologically systematic interdisciplinary research. Their methods even influenced other emerging disciplines — maybe

even the starting natural sciences. But the forgotten academy and its project was also successful in its own terms, because the architectural theory (and history) developed in its circles dominated Western architecture for more than four centuries.

Martins Laizans

Lycanthropes, monsters and satanists: the production of Livonian image in 16th and 17th century Neo-Latin texts.

Since the apparition of Sebastian Münster's *Cosmographia* (1544 in German, 1550 in Latin), the image of Livonian peoples among the participants of *Respublica Litteraria* of Early modernity had been maintained mostly by unfounded misconceptions. In Münster's text the most remarkable characteristic of the locals that drew the attention of scholars at the time was the excessive lycanthropic presence in Livonia. Neo-Latin texts produced later by humanist writers that were at some point active in Riga and Livonia describe apparent nonsense regarding the customs of the locals. For example, In *Encomium Rigae* (1641 *Rigae*) by Christophorus Schallerus (17th century) Livonians are depicted as satanic idolaters with strange rituals (along that also the first example of a Latvian burial folk-song in Latin rendition is recorded). In *De Monstroso Partu* (1596 *Rigae*) by Daniel Hermann (1543–1601) the birth of a

malformed child serves as a pretext to describe the pagan customs of the locals that had caused such misbirth in the first place.

With a detailed exploration of these two texts along other humanist poems (Encomium Rigae (1595) by Basilius Plinius and Aulacum Dunaidum (1564) by Augustinus Eucaedius), where ethnographical material is abundant, I want to show how the ethnographic image of Livonian peoples was produced and kept alive in the scholarly imagination until Enlightenment when authors reinvented the image of local peoples in a more benevolent light (e.g. G. F. Stender 1714–1796).

Per Landgren

The role of natural history for demonstrative induction according to Jacobus Zabarella

In his unsurpassed account of early modern logic *Die Logik der Neuzeit* ((1964), Wilhelm Risse characterizes the Padua philosopher Jacobus Zabarella (1533-89) as "einer der scharfsinnigsten und klarsten Logiker aller Zeiten". In modern research although, the importance of Zabarella is often questioned and debated. The focus has been on two demonstrative syllogisms, *demonstratio quia* and *demonstratio propter quid* and on a combination of the two, *Regressus*, but not on how new true propositions were thought to be produced. In modern eyes, Zabarella has often been perceived to be an Aristotelian but an academic one in the sense of a logician and a writing-desk-natural philosopher, disconnected from real nature.

However, in the natural philosophy/physics of Zabarella, the relation between demonstrative induction and *historia naturalis* could shed some light on his methodology and also on the general methodological background to Bacons empirical program and his large-scale restoration of the disciplines. Since induction was not viewed upon as a part of Aristotelian logic, and since theoretical disciplines such as natural philosophy, according to Zabarella, was applied logic (*logica applicata* or *logica utens*), modern research in history of science has paid little notice on the relation between natural history and demonstrative induction in the whole epistemological chain from single facts to a deductive conclusion in a demonstrative syllogism. Therefore, the empiricism of the natural philosophy of Zabarella has been misinterpreted or, on the whole, ignored.

My goal in this lecture is to flesh out the view of Zabarella, which is, I will suggest, a self-evident epistemological chain in physics, which chronologically contains natural history, induction, demonstrative induction, true proposition and demonstrative syllogism.

Yaakov Lattes

The fantastic world of a 16th century Italian Jew

This paper purpose is to analyze the inner world of an well known intellectual Jew lived in central Italy during the late Renaissance, in second half of 16th Century. Ghedalia Ibn Yachia, was a prolific as well as wide knowledge write, and in his most famous work he accurately described natural and cosmic phenomena. In fact, this book is a summary of the knowledge and of the science of his time. The author's purpose was certainly not to deal with a world of fantasy, but rather he described not only the science of his time, but the whole system of beliefs and common knowledge widespread during the Renaissance. Namely, the world of Ibn Yachia is crowded with monsters, ghosts and other imaginary creatures. As consequence, the finding of this analysis of Ibn Yachia writings is this kind of science, typical of the pre-

industrial period, was not empirical and experimental, like that of our days, but in fact was fantastic and imaginary.

Andrea E. van Leerdam

Astrology and Religion in 'Calendars of Shepherds': Forms and Functions of Popular Knowledge in Transnational Perspective

'Calendars of shepherds' were among the popular bestsellers in the early age of print, with dozens of editions in French (*Calendrier et Compost des Bergiers*), English (*Kalender of Sheperdes*), Dutch (*Der Scaepherders Kalengier*) and German (*Der Schapherders Kalender*). This paper focuses on the intended functions and audiences of these almanac-like works through a comparison of the content and mise-en-page of four editions, in French (1493), English (c. 1518), Dutch (c. 1514), and German (1523).

Promising to instruct the reader on how to live a long life, the 'calendars of shepherds' incorporate a variety of content related to the microcosm of the human body and the macrocosm of the heavens. Across all four languages, they share a body of medical-astrological and astronomical content. However, the English and French editions differ sharply from the Dutch and German in the extent to which they also include religious subject matter. I will argue that the Dutch and German editions must have functioned differently than those in French and English.

With respect to illustrations and layout, too, a shared 'core' can be identified throughout editions in all languages, while other visual elements are more particular to the tradition in a specific language. The differences in contents and layouts may point not just to different target audiences, but also to different modes of reading. A transnational perspective on the 'calendars of shepherds' offers insight into early modern conceptions of knowledge domains and into the role of material text in processes of knowledge transmission.

Alexandru Liciu

Robert Hooke's Lectures for Improving Navigation and Astronomy: "practical Geometry", "mechanical Algebra" and the Search for Longitude

In the past decades, there have been a series of attempts to integrate Robert Hooke's interest for mathematical practices in the larger framework of his natural philosophy (Simpson 1989, Bennet 1989, Bertoloni Meli 2006). Thus, in this talk I want to discuss a facet of Hooke's use of mathematics, namely his involvement in solving practical mathematical puzzles with major natural philosophical impact, such as the problem of longitude. My approach will be twofold. Firstly, I will show that Hooke inscribed himself in the tradition of practical mathematics. In his *Lectures for Improving Navigation and Astronomy* (Waller 1705), Hooke reviewed several possible ways of solving the issue of longitude, from the "astronomical method" to the "magnetical" one, in the end arguing for a more enigmatic "hodometrical" procedure. What Hooke emphasizes is that the "practical navigators" calculating the longitude using rhumb-lines did not achieve the desired degree of precision. My working hypothesis is that Hooke's attempt at devising a more precise method led him towards the reformulation of the domain of practical geometry, thus arguing for the translation of the 'Pythagorick Tetraetys' from the traditional

Euclidian geometry in rather radical terms, giving physical dimensions to magnitudes. Secondly, I will show that another enigmatical mixed discipline enters the scene: Hooke proposed a “mechanical Algebra”, which should be the “Art of Invention” that will lead to the discovery of longitude. Such a discipline would allow for, for example, “the use of Springs instead of Gravity for the making of a Body vibrate in any Posture”, probably a reference for a timekeeper that would work at sea (and thus helping at calculating the longitude).

Benjamin van der Linde

‘Colours and Collectors’ Reflections on the material culture of Early Modern maps by analyzing their colouration

Studying Early Modern maps is a big challenge: Often it is not clear where collectors acquired their maps and how collections were assembled. Today some maps exist bound in publisher’s atlases, even less in collector’s atlases, but most of them are kept as single sheets due to the fact that libraries often disassembled atlases. Important information, especially about their provenance, was lost. But if we take a closer look at their colouration and compare it to written sources it is possible to access more information about the maps.

The investigation of their colours (including dyes and pigments) and the specific conception of using colours help us to determine their provenance and provide new insights into the intellectual field of Early Modern cartography. It can show where maps came from, where collectors bought single map-sheets for their atlases, but also in which way collections were limited due to the local access to maps. In my presentation I will focus on the collections of the Syndicus Johann Klefeker and the judge Abraham August Abendroth who were collecting maps in 18th century Hamburg. Both collectors’ atlases were acquired by the Library of Commerce in Hamburg later and are still kept in their original order. These collections are very important for the understanding of Early Modern colouring and the history of geographical knowledge as Hamburg was a center of map distribution in the late 17th and early 18th century.

Christa Lundberg

Division in the Disciplines: Logic and Pedagogy from Lefèvre d’Étaples to Ramus

One type of diagram is especially central to the history of knowledge in the sixteenth century: the tree-like summarizing tables associated with Petrus Ramus (1515–1572). These so-called Ramist tables were frequently used in textbooks and encyclopaedic works to present knowledge for convenient absorption. This paper is concerned with the origin of such diagrams in the first half of the sixteenth century. According to Walter Ong’s *Ramus, Method, and the Decay of Dialogue* (1958), Ramus’ dichotomous diagrams were influenced by the spatial metaphors of place logic, which Rudolph Agricola had revived for a humanist audience. This paper offers an alternative, simpler explanation of the centrality of dichotomies in Ramus’ textbook by examining the theme of division in logic textbooks of the preceding decades. Division played a crucial role in ancient works on dialectic—for example both Plato and Aristotle emphasized its role in establishing and refuting definitions. In the early sixth century, Boethius supplied *On division: an introduction to four kinds of division relevant to syllogisms*. After a brief look at division in works by thirteenth-century realists, the

paper focuses on logic textbooks from 1500–1540. It especially examines the works of Jacques Lefèvre d'Étaples (c. 1455–1536), whose popular introductions to logic instructed students to practice division. Beyond teaching division through precepts, the textbooks themselves divided their subject matter and presented them in diagrams. In this way they made a logical concept into a pedagogical strategy that could be applied to any discipline.

Magdalena Luszczynska

In search for Eutopia. Michael Sendivogius's Aenigma Philosophicum

Michael Sendivogius's *Aenigma Philosophicum* (1604) is a symbolic alchemical narrative that draws upon popular early-modern literary motifs: the allegory of travel and the utopian theme. As an alchemical text, it had been typically read as an encoded recipe that could yield the philosophers' stone. Yet, as I will show in the first part of my paper, upon a closer examination the narrative presents itself as a more nuanced allegory that references Sendivogian conception of nature as well as the courtly scientific discourse of the time. The Aristotelian/Avicennian understanding of the processes of metallic growth, the ancient idea of life-giving substance that animates nature, the Paracelsian motif of Archeus—an anthropomorphised force responsible for unobservable or occult natural processes, and the chiliastic expectations of the era when the universal knowledge should reign—all these themes are present in the narrative, and can be unlocked by the metaphors of the journey and eutopia.

However, soon after the first publication, two versions of the text circulated in print—one of which 'corrected' the essential Eutopia to read Europa thus effectively disabling the power of the authorial metaphor. The second part of my paper will discuss the issue of this discrepancy tracing efforts of printers who defended the metaphor.

Pamela Mackenzie

Cures and Curiosities: Visualizing the "Stone Disease"

Among the collection of visual material resulting from the many detailed observations of the natural world that were carried out and compiled by members of the early Royal Society are a surprising abundance of drawings of a particular sort of stone. It would not, of course, be unexpected to find an interest in stones or minerals of geological significance in an archive replete with natural history observations; illustrations of stones taken from the earth are certainly also present in the collections. More remarkable, though, are the sometimes meticulous and often visually striking depictions of stones that were extracted from the human body. These unusual illustrations, completed in the late seventeenth and early eighteenth century, are fairly marginal items within the collections and have not received much attention in scholarship on the early Royal Society. Although the numerous drawings of bladder stones are relatively well-known among users of the archives, they are not often remarked upon except as being delightfully strange and maybe even a bit obscene. However, the question is worth asking: why were these interior stones such objects of fascination that not only were they frequently discussed within the letters and meetings of the Society, but were also considered worthy of commissioning carefully rendered, three-dimensional illustrations?

My paper will discuss the significance of drawings of bladder stones as visual objects participating in the tradition of natural history illustrations. I will demonstrate that the process of visualizing these stones

within the context of the early Royal Society pushed forward both epistemological and concrete surgical agendas in addition to their more straightforward role in documenting exceptional cases of medical anomalies.

V.E. Mandrij

The technique of butterfly impression through the centuries: a practice between art and natural history

In the 17th century, naturalists highlighted the epistemological value of naturalistic images to identify, record, and describe Nature. The Dutch artist and naturalist Otto Marseus van Schrieck (1621-1678) was an adept of naturalism. He depicted specimens with details so accurate and minute that they allow species' identification. He specialized in the genre of sottobosco painting representing plants and animals such as insects and reptiles in dark forests. Marseus went a step further in the imitation of Nature: he sometimes transferred butterfly scales onto the canvas instead of depicting them through paint. Marseus' highly naturalistic style and artistic practice relate to a pursuit of natural historical knowledge. The butterfly impressions were instrumental in natural historical fields from the 18th century onwards. Called lepidochromy, the technique was used to preserve specimens in albums and to help in identifying species. Amateurs and specialists published recipes in several languages describing the technical process. This contribution will shed light on a technique that is understudied in history of art and science, but that enlightens the attitude of early modern scholars and artists towards Nature. This paper will present an overview of the technique's evolution by investigating 17th-19th-centuries sources and recipes. Moreover, it will elaborate on the epistemological and aesthetic functions as well as the technical limits of the butterfly impressions in comparison to representations of butterflies through paint. The presentation will include a demonstration of the technique following 18th-century recipes.

Juan Carlos G. Mantilla

New Maps, Old Books, Older Bones: Practices of Reading in the New World

In the late sixteenth century, friar Miguel Cabello Balboa served as a missionary in the most distant edges of Spanish Peru. During those years, he also wrote *Miscelánea Antártica*, a thesaurus-styled treatise on the antiquities of Perú. Merging the tradition of antiquarian writing with a new place of geopolitical imagination was a challenging task. It required explaining simultaneously the history of the New World through antiquarianism, and the Antiquity through the New World. In his book, Cabello Balboa sustains an ophirian hypothesis: ancient Peruvians are descendants of Ophir, a member of Noah's progeny. The ophirian hypothesis is broad and ambitious, but actual steps on proofing each of its arguments are very subtle intellectual processes based on comparative, critical and innovative interpretations of very different sources. One of its main arguments is the existence of an ancient land bridge between the southernmost part of South America and the easternmost part of South Asia. Through it, ophirians would have reached Peru. For sustaining this argument, Cabello Balboa interprets an old Persian Book, fossils of giant beasts and coral reefs, a native Peruvian narrative, and a modern world map. In this paper, I will offer an introduction to the dynamics and polemics of Spanish Peruvian intellectual field of Historical Cosmography. Then, I will analyze how one of its agents reads these various sources through a single

methodology. Finally, I will suggest a theory of reading as developed by New World Early Modern intellectuals that opens onto a historical and cosmographical interpretation of sources and territories.

Tatiana A. Matasova

Miracles from around the world at the court of Zoe (Sophia) Palaiologina

The paper is devoted to the analysis of expressive evidences about various curiosities (objects perceived as wonderful or miraculous) at the Muscovite court at the last quarter of the 15th - the early 16th centuries. It was the time of the Grand Duke of Moscow Ivan III (1462-1505). He was married to the niece of the last Byzantine emperor, Zoe Palaiologina (in Moscow from 1472 to 1503). The very presence of Zoe in Moscow attracted attention of Europeans, and in particular contributed to the appearance of a plenty of European objects, some of them were considered as exotic. European culture itself, in turn, discovered the wonderful lands of South-East Asia and America. The wonders from there also appeared in Moscow. (Some aspects of this phenomenon were presented by the author at Scientiae-2019 in Belfast). Furthermore, Ivan III extended the boundaries of his state, annexing and exploring the distant lands of the North and North-East (I mean the White Sea coast and the forests of Jugra - the modern Republic of Komi). Amazing northern commodities (various furs, and walrus or mammoth tusk production made by the northern peoples) also appeared at the Muscovite court. Various material evidences of the world miraculous diversity coming from all over the oecumene seriously transformed the picture of the world of Russian intellectuals, made it more complicated. All this posed completely new questions in their mind. They solved these questions in a complex, pre-disciplinary manner, but first of all it was based on medieval methods of cognition, headed by theology. How exactly functioned this epistemological strategy? This is the first problem of my paper. The second problem is related to Zoe. What was the role of this woman in the process of introducing Russian culture to these unknown worlds? I will offer my solutions, based on various types of sources.

Margaret Maurer

Papermaking as Everyday Alchemy in the Early Modern Period

At the end of Margaret Baker's receipt book (Folger V.a.619), after over a hundred pages of recipes for medicines and cakes, there is a passage copied from Thomas Tymme's translation of Joseph Du Chesne's *The practice of chymicall, and hermeticall physicke, for the preseruacion of health* (1605). The passage defines transmutation as when a substance is "so changed, that it is utterly unlike to his former substance..." before offering "As for example, when linnen rags are turned into paper." Tymme, Du Chesne, and other early modern alchemists – including Paracelsus, Otto Tachenius, and pseudo-Basilus Valentinus – imagine papermaking as a transformative process that is not only analogous but demonstrative of alchemy. Through examining these texts, I argue that the "everyday alchemy" of papermaking is used rhetorically as a means to reframe alchemical transformation as not only possible but utterly commonplace. According to this logic, alchemy's detractors fail to see the dynamic transformations that occur all around them. Papermaking is used as an example of alchemical transformation in order to construct an alchemical worldview, often to justify the pursuit of transforming metals. However, by imagining papermaking and other craft practices as alchemical, these writers also

reframe the material book as an alchemical object, infusing the quotidian with speculative possibility. As a result, Baker's receipt book offers an opportunity to explore everyday alchemical objects and practices.

Nicholas Mithen

Repositioning scholarship and theology in the Italy of Lodovico Antonio Muratori (1675-1750)

In seventeenth century Catholic Europe, the polemicization of theological debate was a prime factor informing the growth and reform of critical historical research: credible reference to ecclesiastical history promised to resolve theological and ecclesiological disagreement. This paper traces the process whereby, in the early eighteenth century, the methodologies and principles of critical history were at once detached from theological discourse and institutionalised within communities of scholars. This played a dual function. It safeguarded the credibility of critical scholarship by disassociating it from theological speculation and church authorities. At the same time, it insulated theology from the critical scepticism which flourished among erudite scholars, chronologists and antiquarians. While motivated by piety more than irreligion, the result was nonetheless the relative secularisation of much of the scholarly realm.

While much of the 'heavy lifting' of this intellectual reorganisation took place in France – with the 'Port-Royal' nexus as a prime arena – this paper looks at its reception, ripples and ramifications on the Italian peninsula. It focusses on the 'defence' of criticism by a network of scholars in cities across Italy, for whom the Modena-based scholar-priest Lodovico Antonio Muratori (1675-1750) was the key architect. The intellectual reformulation presented here has typically been viewed through the lens of church history and, more recently, the history of scholarship. Approaches from the history of knowledge, informed by the history, sociology and philosophy of science, shed light upon the historicity of, and interactions between, disciplines of learning at the dawn of the modern world.

José Maria Moreno

To reach or not to reach. Setting a transoceanic route as a technical and scientific task

Early modern European empires were built upon a network of maritime commercial routes. Scholars have studied in detail the emergence and maintenance of these maritime empires, yet the basic structural element, that is, the route, has been almost neglected by historians and historians of science in particular. Establishing a long-distance oceanic route from point A to point B was a complex technical procedure. It was based on the experience of pilots and other seamen, on the opinion of cosmographers and mathematicians, on the judgement of court officials, merchants, and military officers, and sometimes on local native knowledge. Setting a route was therefore the result of intricate practical and administrative interactions between many different actors. Needless to say, establishing the route correctly was a vital issue to ensure the success of transoceanic voyages. The proposal for a new route, a suggestion to change an old one, or the need to produce a new rutter for a whole unknown route were considered a matter of the first order in the political structure of the Early modern European overseas empires. As such, the production, alteration and maintenance of the rutters were controlled by a strict corpus of laws and royal decrees that involved from the lowest level officials to the sovereign himself. This presentation is part of a long-term research project in the History of scientific knowledge. The objective is to bring to light the great importance of the route as a key element for the maritime empires of the Modern Age, highlighting

the scientific and administrative apparatus needed for its creation and preservation, in order to put this forgotten element in the place it deserves.

Jennifer Mori

The social history of experiments. English household knowledge, 1600-1800

This paper traces the popularization of early modern experiments like George Starkey's alchemical tree through the publication and dissemination of seventeenth and eighteenth-century English self-help manuals. These dealt with mundane subjects from cookery to gardening, and were published in increasing numbers for an increasingly diverse audience from 1600 to 1800. Some originated within the ostensibly artisanal "books of secrets" tradition. Others were products of a Tudor and Stuart popular humanism that recovered ancient Greek lore for unlearned audiences. Grammar school - but not university - educated Thomas Hill (c. 1528-1574) and Thomas Johnson (c. 1570-1644) were two translator-authors of this kind. Their melanges of classical maxims, empiricism, natural magic and folklore found a wide audience, and survived to inform popular household manuals up to 1900. Traces of this "knowledge" still exist in English oral culture.

Such literature illustrates what Peter Burke and Roger Chartier call an ongoing work of mediation between elite and popular culture and the continuing centrality of Aristotelian and Plinian natural philosophy to everyday English notions of perception, causation, truth and knowledge. The survival of these beliefs into an age of "Enlightenment" (and beyond) should not be dismissed as intellectual primitivism. Old knowledge always undergoes updates for new times by syncretism with new ideas and influences. Despite its allegiance to older epistemologies, popular science kept pace with its elite counterpart by gradually emphasizing the desirability of greater human control over all aspects of the environment. Elements of what came to be called superstition and magic nonetheless kept their legitimacy in popular culture as strategies for dealing with the vagaries of nature.

Andrew Matthew Alistair Morris

'The joint labours of ingenious men': the role of knowledge networks in the construction of the Eddystone lighthouse

John Smeaton (1724-1792) is most well-known for his work on the Eddystone lighthouse (1756-1759). However, he relied on a wide network of collaborators with whom he met, corresponded, or came into contact at the Royal Society. This paper will focus on the scientific and social status of the different people Smeaton was in contact with, what they contributed to the Eddystone project, and what this kind of collective work meant for the knowledge-making practices of the period, especially in the context of the artisan-scholar distinction.

The collaborations I discuss are the following: (1) William Cookworthy (1705-1780) taught Smeaton chemical analysis for his study of rock types; (2) Smeaton relied on correspondence with other members of the Royal Society to help him source the appropriate types of stone for his cement; (3) weather was a big issue for the lighthouse, and Smeaton contacted local meteorologists who provided insight into weather conditions; (4) to reduce the risk of lightning, Smeaton installed a version of Benjamin Franklin's recently-invented lightning rod on the lighthouse.

Studying these different collaborations will permit us to draw some more general conclusions about the collaborative - rather than solitary - nature of early engineering, the inadequacy of scholarly 'book' learning for such innovative projects, the hybrid nature of most members of Smeaton's knowledge network (many of whom possessed valuable hands-on know-how in addition to their theoretical knowledge), and the importance of interdisciplinarity in Smeaton's work.

Meera Muralidaran

Hortus Malabaricus: The production of natural history knowledge, 1678-1693

The south-western coast of India, known as the Malabar Coast, already familiar to Europeans, was subject to the process of intense botanical transfers under successive European trading companies from the sixteenth century. The Dutch East India Company established itself as a major trading company in the Indian Ocean after capturing the city of Cochin in Malabar from the Portuguese in 1663. Of the many Dutch Governors who served for VOC in Malabar, Adriaan van Rheedee is best known for the legacy of Hortus Malabaricus, a botanical treatise he compiled on the flora of Malabar. The work was published in Amsterdam as a 12-volume series from 1678 to 1693 over fifteen years. It contained information on 725 plants and has 791 illustrations of the flora. Rheedee was assisted by a team of physicians, scholars, botanists and engravers in the compiling this multi volume project. Native physicians helped with collecting specimens, identifying the plants and properties based on their knowledge of native materia medica manuscripts. The intricate relationship between European expansionism in Asia and botanical knowledge transfers in the early modern period has been garnering attention since the last two decades. Building on this impressive body of knowledge, this paper is an attempt to locate Hortus Malabaricus in the growing literature of botanical knowledge networks of early modern period to analyse how indigenous knowledge was collected, documented and transferred into European botanical and scientific networks from Kerala, South India. Keywords: Dutch East India Company, Malabar, Hortus Malabaricus, early modern knowledge, botanical knowledge networks.

Mia Nakayama

Dutch Learning and the re-examination of pre-modern Japan's traditional Confucian ideology

Protestant Netherlands became one of the obvious trading partners to Edo Japan during its isolation period after Jesuit Catholicism became a potential threat to Tokugawa rule. Trading activity with the Dutch allowed Japan to continue interacting with and flourishing under the application of Western technology and culture which it had inherited from the Jesuits especially in anatomy and pharmaceuticals after the first hospital in Kyushu was established in 1557 by Luis de Almeida.

While systematic Dutch Learning was formed by Japanese physicians, however they were not the only benefiter. Tokugawa shogunate profited significantly from the trading exchanges. Unfortunately, under the traditional Confucian idea which emphasized agriculture and suppressed trade, encouraging the trading exchange was forbidden. In 1716, Kyōhō Reforms was introduced by the shogunate which aimed to improve Japan's economic, political and social environment. This was the first time traditional Confucian Physiocracy ideas were openly challenged by Western mercantilism through state reform. This reform cost many classical Confucian scholars' their governmental positions, and ultimately resulted in the revolutionary transformation of the philological tradition of Japan.

This paper will demonstrate how Dutch Learning transcended scientific knowledge to become an influential element in the re-examination of pre-modern Japan's traditional Confucian ideology. Later this ideological shift led to the development of crucial economic and political ideas directed at the concept of expansion.

Sergio Orozco Echev

The order of nature and the divine will: laws of motion and laws of nature in the configuration of the Scottish Newtonianism (1690-1720)

The name of Newton has been historically associated to laws of nature (LoN). The idea that Newton's 'laws of motion' were in some way LoN was current in early Newtonian circles. However, Newton did not identify his laws of motion as LoN. It may appear trivial that Newton evaded the expression and preferred the more restrictive term 'laws of motion'. Following other English natural philosophers and mathematicians of the Restoration, Newton considered that 'LoN' were part of a cosmology and a way of practising natural philosophy that he rejected as mistaken and harmful; the idea of 'LoN' was embedded within a network of connections with determinism and necessity leading to atheism, idolatry and a false understanding of nature. However, the appropriation of Newton's ideas in the early Scottish Enlightenment heavily relied on the implicit equation of 'laws of motion' to LoN, setting Newton's claims in different metaphysical and theological scenarios. The Scottish mathematician John Keill presented Newton's laws under the heading 'De legibus naturæ', explaining that these laws were such 'as it is necessary that all natural bodies do obey', as causes of Kepler's laws. The transformation of Newton's laws of motion into LoN in the hands of the Scottish Newtonians reconciled Newtonian natural philosophy with the local trends that Robert Sibbald and his virtuosi had circulated in Scotland; but more importantly, this gambit was central to the promotion of religious toleration that Presbyterians and Episcopalians sought and that shaped the moderate character of the Scottish Enlightenment.

Michelle Pfeffer

Historical Critique and the 'Marginalisation' of Astrology in the Seventeenth Century

Once a rich scholarly field and a vibrant social practice, astrology lost intellectual legitimacy in the second half of the seventeenth century due to reasons that largely still elude historians. While positivist historians assumed science alone was responsible, this is an insufficient explanation: astrology had survived scientific critiques for centuries, and early modern astrologers largely accepted new science. Moreover, many Fellows of the Royal Society remained committed to astrology. In this paper I will re-evaluate astrology's decline by drawing attention instead to a surprising contributor: early modern historical scholarship.

When Pierre Bayle vilified astrology in the 1680s he branded it not only as pseudoscience, but also as the product of specifically eastern forms of superstition. While astrologers had previously presented their craft as a divine science that had been practised by the biblical patriarchs, this paper will show that behind Bayle's critique lay a wave of historical discoveries that had led to wider cultural acceptance of astrology's origins in eastern idolatry. I suggest that critical scholarship directed at astrology's historical origins challenged the mythical genealogy accepted by astrologers, jettisoning its association with Eastern

wisdom and rebranding it an occult superstition. I will trace how this presented a fundamental challenge to astrology and gave rise to the ‘modern’ denigration of astrology.

Vincent Roy di Piazza

‘Ghosts from other planets’: travels beyond death and space in Emanuel Swedenborg’s De Telluribus in mundo nostro solari (1758)

In 1758 in London, Swedish civil servant, natural philosopher and mystic theologian Emanuel Swedenborg published *De Telluribus in mundo nostro solari* (Earths in our solar system) a small treatise engaging with the themes of plurality of worlds and life on other planets. During the seventeenth and eighteenth centuries, debates on these issues took the form of a heterogeneous literary genre which encompassed theology, astronomy, philosophy and satire. By exploring new worlds and engaging in anthropomorphic speculations about the nature of extra-terrestrials, theologians and natural philosophers often criticized society and questioned the place of mankind in God’s astronomical creation. In this context, Swedenborg’s *De Telluribus* presented eleven detailed accounts about planets in the solar system and beyond, reportedly gathered in the afterlife by the author through conversations with deceased extra-terrestrial spirits. *De Telluribus* has long been labelled as one of Swedenborg’s strangest works. The book has received little scholarly attention due to its initially negative reception, a complex argumentative structure and its debated status among Swedenborg’s religious followers. The paper will place *De Telluribus* within Swedenborg’s career and show how the treatise was both in line and original in the context of the plurality of worlds debates in the 17th and 18th century. By doing so, the paper will present new evidence about wider underrated interactions between plurality of worlds, mysticism and literary satire in the Scandinavian and Germanic Protestant worlds.

Michael Pickering

Magic and the Powers of Spirit in a Braunschweig Physician’s Opus: Johann Nikolaus Martius’ Unterricht von der Magia Naturali (1717)

This paper considers the intellectual currents within an under-examined text by the Braunschweig physician, Johann Nikolaus Martius. Ostensibly a medical text about the ways in which sympathetic magic could be marshalled to provide remedies for common ailments, I suggest that we might also read the document as a cosmological treatise that positions its author within a religiously heterodox milieu. Research to date has not yet considered the central importance of Christian Thomasius’s pneumatology for Martius’s theory of matter, his understanding of spirit and his anthropology. Indeed, when Martius’s text is considered in this context, what emerges is a worldview in which *magia naturalis* represents the outer layer of a deeper, spirit core of nature. While this inner divine light embedded within all things in nature is for Martius, I argue, vitally important for unlocking the spirit potential buried within the individual – to bring about spiritual rebirth, and through this, to develop a form of *magia divina* allowing one to control and manipulate nature through the will alone – its awakening does not represent the chief aim of the medicus. Indeed, for Martius, such an ideal is counter-balanced by a pragmatic awareness of the post-Lapsarian context in which people live and suffer. The chief aim of the physician should therefore be to manipulate, however manually and imperfectly, those hidden properties of nature, both studied and revealed, to provide succour to one’s fellow men and women.

Sean Pollock

Russian Empire and the Academy of Sciences Expeditions to the Caucasus in 1768-74

My current research focuses on the territorialization of space and political subjectification of people in the context of Russian empire-building in the Caucasus in the age of Catherine the Great (r. 1762-96). An important dimension of the research concerns efforts by Russia's ruling elite to produce new knowledge about the Caucasus and its peoples by establishing an academy of sciences and sponsoring academic expeditions to survey, map, and describe the region in the eighteenth century. The proposed paper addresses the history of Russian Academy of Sciences expeditions to the Caucasus in the eighteenth century, and the expeditions led by Johann Anton GÜldenstädt and Samuel Gottlieb Gmelin in 1768-74 in particular. Specifically, the paper focuses on the expedition leaders' ways of knowing, grounded in natural history and historical comparative linguistics, which facilitated the emergence of ethnography as a science in the Russia Empire, its birthplace. The paper also explores the relationship between Russia's ruling elite, on one hand, and members of its scientific community, on the other, in order to understand the roles played by both groups in building Russian empire in the Caucasus. The paper ultimately aims to contribute to the study of the history of science in Russia and of Russian empire in the Caucasus, while addressing the question of the applicability of Saidian Orientalism to the Russian case. Its central concerns, in other words, dovetail nicely with the major premise of the Scientiae Conference.

Richard Raiswell

Bodin's Evidence

It has long been argued that in terms of demonic activity in the physical world, Jean Bodin seems to discard the methodologically rigorous approach to evidence he developed in his 1566 *Methodus ad facilem historiarum cognitionem*. Thus, in his 1580 *De la démonomanie des sorciers*, he seems to have little difficulty in treating a variety of legal and literary evidence for transvection, lycanthropy and other forms of transmutation at face value, despite the fact that both the tenets of natural philosophy and canon law suggested that as a created being the devil could act neither contrary to nature nor his own nature.

However, as I will argue in this paper, Bodin's conception of the devil and his operation in the *Démonomanie* owes much to the *Methodus*. In the first place, he situates the study of the devil as falling under the rubric of divine history—not natural or human history. As such the mode of causation appropriate to his study must be that of the supernatural. But in the same way that Bodin argues in the *Methodus* that the plausibility of evidence about a particular people must be evaluated according to what can be deduced about their essential nature from the premises of geography and cosmography, so he allows in the *Démonomanie* that specific evidence attesting to the devil's current actions must be assessed according to what can be deduced about his essential character from temporally and spatially diverse sources. In evaluating particular charges of demonic activity against such an essential devil in this way, Bodin makes the devil consistent with himself across not just time but across space as well—the result is a ubiquitous, transhistorical devil.

Julia Reed

The Forensics of Incorruption in Early Modern Medicine: the Empirical Aristotelianism of Paolo Zacchia

The oft-cited father of forensic medicine, the seventeenth-century papal physician and lawyer Paolo Zacchia, defended the superior expertise of the medical professional who, by “incessantly pursu[ing] the works of nature,” was able to discern what “deviates” from the normal operations of nature and what exceeds its operations. In this paper I offer a close reading of Book IV, Question 10 of Zacchia’s masterwork, *Quaestiones medico-legales*, on the determination of incorruptible cadavers, and specifically Zacchia’s guidance in distinguishing “false” incorruption from the “proper” incorruption that marked the medical miracle of supernatural preservation. According to Zacchia, the physician had to take particular care to eliminate all the natural operations that might delay corruption, which ranged from embalming to the unique temperament, medical history, and cause of death of the deceased, in which case the body could appear incorrupt to the untrained observer. I will argue that Zacchia’s definition of true or proper incorruption was a key development in the “empirical Aristotelianism” of the commentary tradition on the fourth book of Aristotle’s *Meteorology*, which been associated with alchemy and an “alternative” Aristotelianism based in experiment and observation since the Latin translations of Aristotle in the twelfth century. In the mid-sixteenth century, in fact, commentaries on *Meteorology* 4 increasingly read it as medical text that could unite Aristotelian natural philosophy’s investigation of causes with a program of practical medicine. Drawing on the careful work of William Newman, Craig Martin, and Gianna Pomata, I will focus on Zacchia’s reading and critique of *Meteorology* 4, and show that while Zacchia builds on this particular commentary tradition, he also champions the philosophical and empirical expertise of the physician as the most theologically and ecclesiastically useful skeptic. Since the physician was uniquely capable, through observation, of eliminating all possible natural causes of corruption that would disprove the miracle of incorruption, Zacchia’s well-trained Christian physician became indispensable to the work of distinguishing true from false miracles—a crucial consolidation of ecclesiastical power during the Catholic Reformation-- and possessed a peculiar kind of knowledge that involved observational diligence, practical medical experience, philosophical training, and eschatological discernment of perfected nature.

Ryan Roark

Cells, Walls, Selves: Enclosure in Early Modern England

By the beginning of the Enlightenment, it was an accepted fact that life, at both the micro and macro scales, required fairly solid boundaries to keep at bay the forces that would undermine it—so much so that scientists at the time believed they saw cell membranes even before microscopy was sufficiently powerful. However, before the eighteenth century, the understanding of the division between interior and exterior—again, at both scales—was much more fluid.

Mary Crane has argued that the birth of interiority—an experience often located in the early modern period—would be better called “exteriority” or even “outdooriority” because privacy was not yet associated with the interior. Instead, it was often found in liminal spaces like the garden, which was open to the elements but considered the heart of the home—in many ways its innermost point. As Crane points out, the early modern humoral body was also fluid, semipermeable, and easily influenced by the external world. For this reason, when cells were first discovered in the mid-seventeenth century, many

scientists argued that they could not possibly be bounded because of their interaction with their environment, and because of the movement of the very organisms they composed.

My paper will explore changing conceptions of boundaries between interior and exterior in early modern London, from the fifteenth through the eighteenth century, at the scale of the house and other buildings, as well as in biological models at the scale of the body and of the cell or microscopic unit.

Ivan Rybko

'Make me a mandrake', or The Pharmacopoetics of Mandrakes before Modernity

If pharmacopoetics as a discipline exists, mandrakes have more rights to be part of it than many other plants. Discussed already in the Bible and by antique authors, *Mandragora officinarum* has spurred a number of beliefs, legends and practices that had been driving literary imagination through the centuries to produce fruits in which the actual properties of the plant are mingled with the weirdly unreal ones. Charles Thompson (1934) and more recently Anthony Carter (2003) and Michael Lee (2006) have investigated the plant's cultural history, yet there is a lot of room left for an inquiry into the mandrake's so-called critical legacy. Freely moving across a choice of late Renaissance texts, I intend to explore the plant's nexus with literary theory arguing that mandrakes played their role in the framing of the period's poetics. The plant was clearly given a mimetic reading as Barabas in Marlowe's *The Jew of Malta* (1590) 'drank of... cold mandrake juice' (5.1.80) to imitate his death, thus making use of the mandrake's anaesthetic qualities. Shakespearean Juliet in *Romeo and Juliet* (1594–6) could have well done the same, although in her quasi-dying speech the plant appears on a different occasion. An allusion to the mandrake's legendary screams, 'Shrieks like mandrakes' torn out of the earth' (4.3.47) could be presumably heard in the Capulets' vault causing Juliet's madness and so linking the speech to an evocation of Renaissance furors and *furor poeticus* among them. In what is probably the most famous literary portrayal of mandrakes, Machiavelli's comedy *La mandragola* (1518), the mandrake is again presented imitatively, but this time with a rich paint of pharmaceutical trickery and ridiculous mocking as if to address accusations in poetic lying debated among others by Sidney in *The Defence of Poesy* (about 1582). Machiavelli's rendering was adopted a little later by Pietro Aretino in his comedy *Il marescalco* (1526–7). Finally, 'Make me a mandrake', asks the narrator in Donne's *Twickenham Garden* (after 1607) to defend mandrakes and maybe poesy. The poet himself becomes the plant, – perhaps the poetical triumph of herbal pharmacy much desired.

Kees-Jan Schilt

Close encounter of the third kind. Abraham Rogerius and the study of South-Indian Hinduism

A young Calvinist missionary to the East-India, Leiden educated Abraham Rogerius (ca. 1609-1649) arrived in Batavia on the 5th of June 1631. He served the budding Reformed Churches in Batavia and the Indian south coast with great zeal, introduced services in Portuguese, and even translated psalms, catechism lecture and the entire New Testament into Portuguese. Most importantly, upon his return to the Netherlands he brought with him a manuscript of what would become *De Open-Deure tot het Verborgene Heydendom* (*The Open Door to the Hidden World of the Gentiles*), published posthumously in 1651. The *Open-Deure* provided a detailed description of the most visible actors of the Hindu religion, the Brahmins, and in fact of the entire religious spectrum Rogers encountered in the Indonesian

archipelago, through the eyes of a Dutch Calvinist. It is one of the earliest anthropological works of its kind, providing a wealth of information in particular to those early modern pioneers of what we call today the comparative study of religion. It was translated into German and French, and was by the end of the nineteenth century still considered the most complete account on South-Indian Hinduism. In this paper I argue that part of De Open-Deure's success story may be attributed to its surprising objectivity: Rogerius describes his encounters with a strange religion in great detail yet refrains from applying the sort of criticism one might expect from a strict Calvinist. This is more than can be said from the lavish annotations added by the text's editor, the mysterious 'A. W.', who does provide an excellent counterbalance to juxtapose Rogerius' prose.

Philippe Schmid

Cataloguing the Republic of Letters: Antiquarians and their Memory in Early Modern Germany

This paper studies cataloguing as a practice of antiquarian scholarship in early modern Germany. Learned catalogues have received increasing attention by scholars, and their set-up, classification and reception has been analysed in some detail. Yet cataloguing can be studied as a technique too. Already in 1950, Arnaldo Momigliano drew a picture of antiquarianism as a set of critical methods, which endorsed a style of writing that was heavily dominated by lists, catalogues and bibliographies. Antiquarians catalogued collections of coins, manuscripts and books, documenting the past which they tried to recapture by listing and describing each item accurately. At the same time, the former owners of the collection received public memorials in the form of catalogues, which confirmed their prestige as serious scholar-collectors. When the antiquarian scholar Johann Albert Fabricius (1668–1736) passed away, his son-in-law, Hermann Samuel Reimarus, produced a magnificent catalogue of his collection of books and manuscripts in 1738. Its frontispiece shows Fabricius in a gown, and both the dedicatory poem and the preface of the catalogue celebrate Fabricius as a classical scholar.

The catalogue for the collection of coins of Johann Heinrich Burckhard (1676–1738), published in 1745, reveals that the social and cultural contexts of cataloguing were the same across different types of material objects – be it coins, printed books or manuscripts. By exploring the catalogues of these material traces of the past, I argue that the antiquarian technique of cataloguing not only produced lists of knowledge about antiquity, but also led to the memorialisation of the scholar-collectors.

Camille Serchuk

Essential or Excessive?: The rhetoric of visual authority in French local cartography, 1400-1600

Of the many hundreds of local and regional maps produced in France between 1300 and 1600, the vast majority were produced to settle territorial disputes, primarily between landowners or municipalities. Many, if not most, of these were produced not by surveyors but by painters, who were the professionals of choice for the production of maps that meticulously documented the natural world and served as the basis on which legal judgement was to be made.

These maps exist in a wide variety of formats and media, some sumptuous, others schematic. And yet even the simplest images often include elements inessential to the resolution of the conflict. This paper will consider how and why local maps made for lawsuits expand beyond the bounds of necessity.

Plausible explanations abound: expanding the scope of the map could aid the argument of one or the other party. Such features added luster and value to an expensive image. Perhaps these additions enabled the painter to showcase his talents to potential patrons, the feuding local landowners who would study the map with care.

But evidence suggests that mapmakers added “unnecessary” elements to their maps in order to enhance their persuasive rhetoric. Capturing every detail of the landscape reassured viewers that nothing was omitted and that the map therefore provided the most accurate and reliable depiction of the terrain. Thus, the extraneous features were in fact essential to the legal map’s visual authority, even though they were not under dispute.

Reetta Sippola

Making sense of Captain Cook’s arctic explorations 1778–79

This paper examines the role that sensory and embodied processing of ‘new’ knowledge had on Captain James Cook’s third voyage. I suggest, that a complex mixture of embodied and material practices was used in making sense of the extreme spaces in the Arctic region when Cook’s ships spent two tedious yet eventful and consuming summers above the North circle in the 1778 and 1779. They tried to locate a philosopher-geographer-proposed route, the North-West Passage, that would allow an easier transport between the oceans. While the officers and artists onboard reported the events according to their professional perspectives, including natural philosophical inquiries, astronomy, geography, cartography, and navigation, their writings simultaneously tell about the sensory practices involved in the formation of knowledge.

On Cook’s voyages they had many state-of-the-art instruments which alone were not sufficient for making reliable results: the user needed to know their profession and even how to repair the probable cracking of the equipment. By consulting various travel journals from the voyage, I explore how these practices relied on embodied knowledge. The pre-disciplinary experimentation and analyses of the new knowledge have created a strong foundation for later disciplinary separation of ‘sciences’ where human body and senses were a natural part of the process to be considered.

This work continues the recent Cook scholarship that has opened interest for the practical process of exploration and which considers that the wellbeing of the body is not separable from the mental work of the voyage.

Daniel Spelda

Methodological differences between French philosophers and astronomers of the second half of the 17th century

In my contribution, I want to deal with the methodological aspects of astronomy in the second half of the 17th century. My contribution will briefly compare the methodological views of Cartesian philosophers of the second half of the 17th century (J. Rohault, P.-S. Régis, C. Gaudroys) with those of professional astronomers (J.-D. Cassini, J. Picard, A. Auzout). Cartesian natural philosophy was based on three key concepts: system, certainty, and hypotheses. Cartesian natural philosophers wanted to deductively infer a system of nature from several underlying principles. Partial explanations of the system, however, were explicitly hypothetical.

Professional astronomers disagreed with the Cartesian philosophers. The basic features of their approach were a rejection of the system, empiricism and collectivity. Astronomers did not seek to create a cosmological or astronomical system, but deliberately pursued concrete and specific tasks (e. g. measuring the size of the Earth). Furthermore, astronomers refused deductive and abstract reasoning and emphasized the role of measurements and facts. Finally, unlike philosophers, astronomers considered themselves to be a collaborative community that conducts research collectively and can rely on specialized institutions.

By comparing these two attitudes, I would like to show that a) French science of the second half of the 17th century was far from to be only Cartesian, b) that there was a similar “culture of fact” among French professional astronomers as in the Royal Society in London.

Joneath Spicer

Connecting the Dots: The Role of Objects as Sites of Knowledge and the Late Renaissance Kunst und Wunderkammer

An overarching task in the field of particle physics today is the refinement of “the standard model,” a comprehensive theory of everything. Some of the basic questions behind this age-old quest—how to organize and pursue knowledge and understanding as well as an acknowledgment (or rejection) of the importance of doing so—take on a particular character in the late sixteenth and seventeenth centuries. The pursuit of comprehensive systems in this period appears to be the only time frame for which the organization and practical engagement with physical objects per se—in some variation of a *Kunst und Wunderkammer*—was a significant manifestation, objects not simply as markers in a memory theater or illustrations of a “cosmographia” but as generative sites or coordinates of knowledge. My creation of a full-scale (1100 objects), multi-space early 17th-century style “chamber of wonders” in the Walters Art Museum has, over time, prompted a rethinking of the traditional deductive approach to interpreting this type of assemblage, shifting toward one privileging the objects themselves. Modern conceptual approaches as “thing” or “network” theory are provocative and useful but my sense of how such collections could foster the connecting of dots has been deeply informed by looking for discernible patterns within groups of these objects: remarkably often they define the porous edge of the known or knowledge, not the center. The shift from the epistemological approach of fifteenth century humanism toward the encyclopedic or comprehensive could hardly be more dramatic and more suited to an age of exploration.

Karin Stolley

“The earth shook:” natural disasters and enlightened lessons in Rafael de Landívar’s Rusticatio Mexicana (1782)

Born in Guatemala and schooled in Mexico, Rafael de Landívar resettled in Bologna after the 1767 expulsion of the Jesuits from all Spanish territories. There, fueled by nostalgia and a nascent criollo patriotism, he composed the *Rusticatio Mexicana*, a natural history and poetic treatise in the Georgic tradition on the geography, flora and fauna, mining and agriculture of his homeland. Written in hexameter verse in Latin (the lingua franca for Jesuits and the medium used for many educational and ecclesiastical documents in Spain and Spanish America at the time), the *Rusticatio* was published in 1781, again in a

slightly expanded version in 1782, and shortly thereafter translated into Spanish (there is an excellent English translation by Andrew Laird, which includes extensive introductory materials and notes). Like Virgil, Landívar celebrates a life connected to the land, and his description of a New World economy organized around agriculture -- cochineal dye, sugar cane, cattle-raising -- and mining becomes a narrative of criollo agency in which the poet emphasizes the value of indigenous practices while highlighting the enlightened knowledge that enables criollos to assert authority over their lived environment. Landívar also acknowledges that the moments -- like the violent eruption of the Jorullo volcano in 1759 -- when American nature resists all human efforts to control or understand it, when the natural environment imposes its own terrible ecological pedagogy. Landívar's description of the eruption serves as a cautionary reminder to his readers of the degree to which natural disasters and human responses are linked in a knowledge ecosystem that transcends both an Old World/New World binary and a modern focus on disciplinary borders, and a reminder that the Americas were a laboratory where early modern knowledge was contested, expanded, and negotiated on the ground.

Malgorzata Taborska

Realism, simplifications or symbolism, the iconography of the constellation Ceteus from the historic globes

Animal images are a common motif used in art. While the themes of the constellations have always been fixed, their interpretation was the result of the artist's invention. The artists depicted animals in real terms, but more often they used simplifications and stylization procedures, sometimes up to the symbol stage. The constellation Ceteus (Cet) appears over Europe in the fall. It is included in the southern constellations. In Greek tradition, it is associated with the myth of Andromeda, as the mythical Ketos. Three iconographic types can be distinguished:

- large toothed fish, with a wide body, bearded dewlap and flat tail;
- a creature with the head and paws of a dangerous dog and the back of the "sea" body;
- an animal with the outline of a marine mammal, most reproducing the true whale.

Iconography Ceteus belongs to the conventions of sea monsters. It combined various mythical and real elements derived from sailors' accounts as well as from myths or legends. For some artists, the mapping faithfully depicted the animal's species, its characteristics. Albrecht Durer's drawings even show movement or pattern emotions.

It is important, if you can specify the species, that is the prototype of the image, and from which species of animal individual body elements were borrowed.

Assaf Tamari

Medicalizing Ethics and Magic: Re-reading the Practical Aspects of Lurianic Kabbalah and Their Contexts

Lurianic Kabbalah, the epitome of early modern Kabbalistic literature, has traditionally been analyzed in scholarship as the apex of Jewish "myth", a perspective that prevented scholars from appreciating the profound effect of contemporaneous scientific discourses in shaping this highly influential form of Kabbalah. The proposed paper will explore the rich intersection of early modern medical, magical and ethical discourses as they manifest in the Lurianic Kabbalah's highly intricate and technical practice. I

shall suggest a new framework to the analysis of the Lurianic preoccupation with practice, to its uniqueness and innovation, by reading this Kabbalah as a medical discourse. I shall focus as a test case on Lurianic “Tikkunei ‘Avonot”, formulae for amendment of sins, and show in what ways the magical and ethical traditions taking part in their formulation undergo a deep medicalization. I will then suggest that the medical perspective may allow us to account for the logic of R. Hayyim Vital’s compilation of the Lurianic Kabbalah in its entirety, by pointing out its similarity to the medical epistemological and generic principals and literary models, especially in regard with the relation between the theoretical and the practical. Finally, I shall suggest some of the implications of such a reading of Lurianic Kabbalah, especially regarding its conception of action and agency, so crucial for our appraisal of early Modernity as a whole.

Luca Tonetti

Blood, Saliva, and Bile Matters: Anatomizing Body Fluids in Giorgio Baglivi’s Medicine

A very common view describes iatromechanics, i.e. that approach to medicine that tries to explain any bodily process, even pathology, according to the laws of physics, as opposed to iatrochemistry, which indeed seeks to understand medicine through the lens of chemistry. A supporter of a mechanistic and “solidistic” view, Giorgio Baglivi (1668-1707) shows how much this strict (and maybe naive) distinction is instead misleading.

While disapproving the chemical medicine of his time—particularly Helmontianism—Baglivi dealt with numerous and differing chemical issues, strictly related to the role of body fluids, on which he performed rigorous and vetted testing and experiments.

Since *De praxi medica* (1696), he realized that, unlike solids, “the minima, or least particles of any humour of the Body whether natural or sickly, lie beyond the reach of all Art and Speculation”. Surprisingly enough, Baglivi devoted most of his efforts to investigate not only the nature of fluids, but also their interactions throughout the body, particularly with solids. At the same time, since these aspects would be unnoticed by pure dissections, he favored the use of testing them “in vivo” by performing infusions or inducing dozens of chemical reactions. Such “anatomy of fluids” plays an indispensable part in ensuring not only the explanation of diseases and the search for new remedies, but also the knowledge of the body itself. The aim of my paper is threefold: 1) retracing Baglivi’s interest in body fluids, through a reconstruction of his experiments on blood, saliva, and bile; 2) debating the role of chemistry in his medicine; 3) finally, questioning the distinction between iatromechanics and iatrochemistry.

Piotr Urbanowicz

Making public (electric). Performance of electricity in establishing science in Poland.

My paper concentrates on tracking entanglements between the social and the scientific in the project of making science public that had been undertaken in Poland in 1780’s. I claim that electricity, society and science were bound together and worked in order to create a new kind of community at a time of political crisis (so called The Partitions of Poland). Making science public in that time should be considered as implementing laboratory-like practices in the social field (Golinski, 1992). In order to success, science, considered as a politics of nature (Latour, 1999), extended the visibility of particular actors and set of practices that actors was entangled in. I want to describe one of the first public lecture conducted in 1786

in Cracow and the role played by electricity. The purpose of such lectures was to connect many social interests by associating actors – an electricity, an air, a machine, King of Poland, God – in order to rebuild society around science as its vital axis. Tracing controversies around that specific public lecture, treating it as hybrid forum (Venturini, 2010), I want to pick up particular uses of electricity that helped establish laboratory-like space in the common imagination. Even in the eyes of critics of religious references, atmosphere full of hidden agencies (light, heat and electricity – all concerned as material fluids) that actively conditions human body and psyche had a status of fact. For that reason science could acquire authority, whereas electricity played as matrix of the imagination for the national and social bounds.

Rienk H. Vermij

The overseas world and the secularization of knowledge

In this paper, I will discuss some seventeenth-century reports by European travellers of earthquakes and volcanic eruptions in the East Indies and the Azores. The theological interpretation of such events that had become standard in Europe, did not automatically impose itself on the sailors and merchants who were confronted with them overseas. They tended to describe earthquakes and eruptions in terms of profit and loss, not of divine judgements. This gave rise to a genre of travel narratives that stood apart from theological preoccupations. In this way, reports on overseas events changed the perception of the world of early modern Europeans and contributed to a more secular outlook.

Carla Vieira

John de Sequeyra's notes on diseases of Virginia: a case of circulation of medical knowledge through Atlantic Sephardic networks

During 50 years, John de Sequeyra (Lisbon, 1712 – Williamsburg, 1795) practised Medicine in Williamsburg, Virginia. He was graduated at the University of Leyden, where he studied under Hermann Boerhaave. Since his arrival to America by the year 1745, he began to catalogue the most common diseases in Virginia, as well as the therapies for each of them. The manuscript resulted from these annotations is conserved in Swem Library at the College of William and Mary (Williamsburg), and it was transcribed and published by Sarah C. McEntee in 1997.

In this presentation, I aim to analyse the contents of Sequeyra's "Notes on diseases" in the light of the author's personal journey and family network. Son of Abraham de Sequeira Machado (Rio de Janeiro c. 1666 – London after 1747), a Jewish physician from the Sephardic community of London, brother of Jerónimo Henriques Sequeira, chief physician of the Vice Regent of Goa, and uncle of Isaac Henriques Sequeira, physician of the Portuguese embassy in London, I argue that Sequeyra's contacts into transnational Sephardic networks of circulation of goods, capitals and knowledge profoundly influenced his work and medical practice. To demonstrate my view, I propose to compare Sequeyra's manuscript with the medical works of two Portuguese physicians with similar backgrounds and with whom he was related: Jacob de Castro Sarmiento and António Nunes Ribeiro Sanches. Both were Jewish/Converso physicians from Boerhaave's school who worked as agents, such as Sequeyra, for the dissemination of medical knowledge from scientific centers (London and Paris) to scientific peripheries.

Nais Virenque

Alchemical Tree Diagrams from the 13th to the 16th century Forms, Figuration and Operativity

In the Middle Ages and the Renaissance, diagrammatic trees are frequent to optimize the transmission of knowledge by promoting mental assimilation of contents through a mnemonic structure. Their forms, their figuration and their operativity vary according to the fields of knowledge, in particular when it comes to alchemy, whose theory and practice are incompatible with the possibility of a tree-like heuristic process. This paper will focus on alchemical tree structures and evaluate their effectiveness so as to identify the arboreal specificity of alchemy. It will seek to understand the link they have with other epistemic fields, meditation, magic, cabal and Lull's thought, as well as the way they are supposed to make the invisible, visible. Above all, it will examine in what extent alchemical tree structures are appropriate tools able to modelize alchemical processes. The paper will consist of two parts. First, it will analyze the alchemical arboreal structures in the Middle Ages in order to understand their operativity and their effectiveness. It will also characterize their mnemonic efficiency and evaluate their links with the mendicant orders. Second, it will offer reflections on what happens to alchemical arboreal structures during the Renaissance, when alchemy meets Neoplatonic hermetism and experiences a major turning point with the thought of Paracelsus (1493-1541).

Lyke de Vries

Between the Manual Arts and Theosophy: Daniel Mögling's Attempts to Change Scientia

The early seventeenth century witnessed the transformation of many fields, including medicine, astronomy, religion, politics, and scientia in general. Alongside these transformations rose the call for a universal reformation, as many authors strove to contribute to further changes in the intellectual world. The topic of Universal Reformation has received increasingly more attention, as scholars recognise the early-modern attempt of universal reformation alongside the religious Reformation and early-modern scientific developments.

This paper aims to investigate a highly important but understudied figure from the seventeenth century from the background of universal reformation. Among those who aimed to change society and learning was the fairly little-known Daniel Mögling (1596-1635), who came from a family of Tübingen intellectuals and was among the first to respond to the Rosicrucian manifestos that called for such changes. Mögling was a highly important figure in his time and place, working on the thresholds of philosophy, medicine, the arts, and theosophy. He defended the Rosicrucians in their aim to change university against fierce criticism, and set out to improve matters also outside of academia. Special attention will be given to his attempts to change the manual arts and his work on the perpetuum mobile, as well as on his contributions to theosophy, which seemed to Mögling to be of equal importance, and which, in his view, was closely related to contributions in the manual arts and sciences.

Antonia Weiss

Dividing the plot: the garden as a site of gendered knowledge and identity in Dutch and German printed discourse, c. 1650-1800

Throughout the early modern period, gardens were considered powerful spaces for accessing, assembling and stabilizing knowledge of the natural world. These traditions directly informed Enlightenment pedagogy which viewed gardens as a privileged place of learning. While the general connections between

gardens and early modern cultures of knowledge are well understood, scholars have thus far failed to acknowledge the gendered connotations of the garden as a prominent epistemic motif in 18th-century thought. Working with a wide-ranging selection of Dutch and German printed sources, this paper seeks to address this lacuna.

Starting in the early decades of the century, authors of pedagogical, moralist and even feminist literature envisioned gardening as a defining attribute of female education. I argue that this stood in direct relation to paradigmatic changes in the way gardening knowledge was theorized in oeconomic and garden literature. Between the mid-17th and late-18th century, in an effort to canonize and professionalize the field, garden theorists introduced strict epistemological hierarchies between different utilitarian, aesthetic and technical aspects of gardening. Gender played an instrumental role in how such delineations were drawn. Women were intentionally excluded from access to certain realms of gardening practice at the same time as other parts of this epistemological domain were explicitly assigned to them.

The paper argues that it was the creation of gendered hierarchies within garden discourse which rendered gardens such a powerful motif for modern pedagogy as well as an ideal prism through which a gendered order could be projected onto society as a whole.

Gerhard Wiesenfeldt

The Limits of Scholarly Practice: Mixed mathematics and professional needs

The mathematical arts in the early modern era are often regarded as a field, in which methods, interests and expertises of scholars and of practitioners overlapped. Conflicts between the two groups can thus be interpreted as a result of the chasm between distinct social and cultural spheres. In my presentation, I want to review the scholarly approach to practical mathematics from a slightly different angle, i.e. I want to discuss how particular needs for specialist mathematics provided challenges for scholars used to embed their work in a generalist epistemology. Using case studies from fortification, surveying, navigation and architecture, this paper will look at the way how mathematical scholars in the 16th and 17th centuries related their work on practical matters to their general scholarship. The core argument will be that scholars based their understanding of utility in practical applications on the traditional implicit assumption of the utility of scholarship for public life. With this assumption, however, scholarly mathematics encountered problems when the practical applications required specialist needs beyond a general utility. Whether the gulf between scholars and practitioners could be closed thus depended on the particular practical expertise.

Tobias Winnerling

Johannes Braun, Adriaan Reland, and the Holy Land between the Disciplines in the 18th Century

Johannes Braun (1628–1708), professor of Theology at Groningen University, and Adriaan Reland (1676–1718), professor of Oriental Languages and Biblical Antiquities at Utrecht University, in the late 17th and early 18th century both produced substantial – and to a certain extent quite similar – works focused on the Holy Land in Biblical times. These were most prominently Braun's *Vestitus sacerdotum Hebræorum* (three editions between 1680 and 1701) and *Selecta Sacra* (1700) and Reland's *Antiquitates sacrae veterum Hebraeorum* (four editions between 1708 and 1741) and *Palaestina ex monumentis*

veteribus illustrata (1714). Yet despite their similarities, the reception these works underwent in the 18th century was quite dissimilar. While Reland's works were widely discussed within the Holy Roman Empire and often used as course books, Braun's all but disappeared. I want to argue that the reasons for this lie not so much in the content of their works but in the ways in which they and their authors were ascribed to different disciplines in the making, all of which could lay claim to such results, and which were theology, philology, history, geography, and cartography. This resulted in different epistemic communities taking an interest in and making use of the respective publications. The degree of success these communities achieved in establishing themselves in those of these fields they saw themselves as active thus became a major factor determining the success of Braun's and Reland's books – and their differences in this respect.

Daniel Woolf

“Did anybody really know what time it was?” Knowledge of Time and Date in Early Modern England

In the modern world, we know our time and date down to the second thanks to the ubiquity of calendars, watches, clocks and computers. Such, of course, was not the situation in the early modern world, which operated under a multiplicity of calendars, had no ready availability of clocks and watches, and a dearth of precise record-keeping so far as even personal dates of birth were concerned. Scholars such as Anthony Grafton have explored some aspects of this, for instance attempts to reconcile ancient calendars in order to establish a single chronology for world events—what John Selden called “synchronism”. And economic historians such as Carlo Cipolla have studied the impact of time-keeping on the processes of modernization and capitalism in the longer period between c 1300 and 1700. But there has been little investigation of what might be described as “common knowledge” of time and date. How did the “ordinary” early modern person keep track of time and date in the present, much less assign firm dates to experiences in their own past. This had profound implications, not merely for scholarship during the period, but for everything from economic transactions to legal proofs and alibis.

This paper uses a variety of literary and archival sources from central and regional record repositories across England to provide a preliminary answer to the question posed in its title, covering the period c 1450 to c 1700. While it is focused on England, the broader world context of time-knowledge will also be considered.

Svorad Zavorsky

Saving Time and Enhancing Certainty across the Sciences: Principles, Axioms, Postulates and Definitions in the Thought of Martinus Szent-Ivany

In his nine-volume project entitled *Curiosiora et selectiora variarum scientiarum miscellanea* (1689-1709), the Slovak Jesuit polymath Martinus Szent-Ivany (1633-1705) included a concise and effective method of acquiring and generating scientific knowledge, a method in which he conflated and considerably simplified the existing approaches of his Jesuit contemporaries, such as Athanasius Kircher, Sebastián Izquierdo or Caspar Knittel, thus creating a new and original model. Consisting of six parts—observation, axiomatics, analogy, analysis plus synthesis, Kircher's modification of the Lullian art (*Ars Magna Kircheriana*) and combinatorics—this method was to be applied universally to all branches of

science in order to harmonize the ever-growing amount of data with the paucity of time available through man's life span. Apart from this time-saving effect, it was mainly the purpose of enhancing certainty and eliminating error that Szent-Ivany's brevissima methodus was designed for, and certainty—conceived by Szent-Ivany as an absolutely indispensable precondition of science—was to be attained particularly by means of axioms and analysis, tools fetched from geometry and mathematics. Two years ago, at the Scientiae conference in Minnesota, I discussed in my paper the first part of Szent-Ivany's method—namely, observation. This paper is a follow-up to the previous one, taking as its focus principles, axioms, postulates and definitions in the thought of the Slovak Jesuit polymath. It examines the nature of Szent-Ivany's axiomatics across a variety of scientific disciplines, including logic, natural sciences, ethics, medicine, law, history, and diverse branches of theology. In this way, it may serve as an illustration of the premise that knowledge in the early modern period truly was pre-disciplinary.

Martin Zemla

Teutonicus minus cautus. Jacob Böhme's relevance for Jan Amos Comenius

Since more than a century, Jacob Böhme (1575–1624) has been counted for one of the numerous sources which influenced the Czech pansophist Jan Amos Comenius (1592–1670). However, this observation, relying mainly on the Centrum securitatis of Comenius, was often very vague and the references misleading. In fact, although Böhme's presence in the work seems palpable, some of the motifs might be attributed not to Böhme but to the heterodox Lutheran pastor and Paracelsian Valentin Weigel (1533–1588), or to the tradition of the German Mysticism in general. On the other hand, Böhme was obviously not unknown to Comenius: he was named more than once in the Consultatio catholica, his unfinished opus magnum, and his name features also in the late Clamores Eliae. After all, Comenius visited Görlitz, Böhme's hometown, only one year after his death, and it is well known that he was profoundly interested in religious and eschatological topics, an interest materialized in his collection of mystical-political prophecies Lux ex tenebris. In my paper, I will track down the influence of Böhme in some works by Comenius, together with a broader context of Paracelsian, Weigelian and Rosicrucian ideas. I will also reconsider the claims of the older Czech Comenius scholarship including Jan Patočka, the eminent Czech 20th century philosopher who was deeply interested in the work of Comenius.

Daniil Zimin

Knowledge about apes in eighteenth-century Russia

Russian scientific institutions were established relatively late in European terms, only in the first half of the eighteenth century. This presentation seeks to show how Russian academic professionals managed to transfer knowledge about apes through translations in educational periodicals. The subject is of particular interest in view of a lack of any direct studies of apes and monkeys in Russia itself.

Europeans had been curious about anthropoid apes since Classical Antiquity. In the early modern period travelers brought back stories about semi-human creatures from central Africa and SouthEast Asia, but their information was mixed with all sorts of fictional inventions. In 1699 British anatomist Edward Tyson took apes out of the field of mythology and highlighted their difference from both humans and monkeys. Throughout the eighteenth century, however, naturalists remained dubious about these creatures.

In the second half of the century, Russian academic journals provided translations of texts by European authors in which apes were considered to be a unique link between human and animal in the great chain of beings. Apes were conceptualized within the context of racial speculations and speculations about human-animal hybrids, as well as of Ancient mythology and anecdotes about “wild men” (individuals raised by animals) and “inferior nations”. This concept of apes was reflected in a variety of original Russian texts, including poetry, a philosophical treatise and popular prints.