

**SYMPOSIUM MATERIAL FOR SCIENCE (25 JANUARY 2008, THE HAGUE)
- ABSTRACTS**

Ursula Klein (Max Planck Institute for the History of Science, Berlin)

Between Market and Laboratory: Materials and Expertise in Early Modern Europe.

The paper takes materials and material commodities as a route into the material culture and innovative making practices of the early modern period, as well as the historical ontologies and programs for natural inquiry associated with material substances. It seeks to bring together the wider world of early modern commerce, commodification and everyday life, the relations between government, scholarly, artisanal and merchant activities, and the microcosm of scientific practice and literary endeavour. The materials presented here are plural in nature, at once the stuff of ingenious labour, mundane consumption, and sustained inquiry into nature. Of interest to a range of early modern technical experts, including merchants, polite connoisseurs and learned men, they were at once quotidian and specialised objects, circulating between workshops, kitchens, marketplaces, coffeehouses, salons, hospitals, dispensaries, laboratories, and studies. Following the circulation and the production of materials and the finished products made from them, or their experimental investigation and analysis in academic sites, provide insight into a variety of early modern forms of knowledge, ranging from skill and technical competence to articulated expertise and connoisseurship all the way to analytical natural knowledge. Such studies also provide an insight into the ways in which historical actors attributed meaning to material objects, and how this changed over time.

Eric Jorink (Huygens Institute The Hague)

Touching the Divine. Jan Swammerdam (1637-1680) on the study of insects

Jan Swammerdam was one of Europe's pioneers of microscopic research. During his life, he published his influential *Historia generalis insectorum* (1669) in which he refuted the concept of spontaneous generation of insects, and in which he presented a new scheme of classification. This conceptual book was further elaborated upon in the next decade, but Swammerdam would never see it in print. The manuscript was published in 1737-1738 as the *Biblia naturae/Bybel der Natuure*.

Contrary to his much better known contemporary Antoni van Leeuwenhoek, Swammerdam had outspoken ideas on epistemology. He ridiculed bookish knowledge, and instead went out in nature, which he considered as a second revelation of God. Collecting, preparing, observing, drawing and describing went hand in hand. Swammerdam mastered all these techniques in an astonishing way. He made his own microscopes, developed a revolutionary new technique of preparation, was an extremely talented observer and draftsman, and brought together an impressive collection of specimens. His cabinet was both the starting point of his research, as the final result of it. Those who did not believe his writing or drawings, Swammerdam wrote, could verify his findings in his collection, or in nature itself.

Sven Dupré (University of Cambridge / Ghent University)

Kepler's Experiment inside the Dresden Kunstkammer

In his *Paralipomena* (1604) Johannes Kepler reported an *experimentum* that he saw in the Dresden Kunstkammer. In one of the rooms of the Dresden Kunstkammer, which had been turned into a room-size camera obscura, he witnessed the images formed by a lens. The aim

of my paper is twofold. First, I will show that the curator and mathematician Lucas Brunn selected, displayed, designed and used optical objects within this collection to produce his own treatise on optics which reflected a specific image of optics, more generally promoted at the Saxon court. I will stress, in particular, the epistemic role of the creation of material objects in this image of optics. Second, I will show how Kepler borrowed aspects of this culture of optics created in the Kunstkammer at the Saxon court. I will discuss the role of the *experimentum* in the development and foundation of his new theory of optical imagery. The experiment inside the Dresden Kunstkammer allowed Kepler to sort out the confusion between images ‘in the air’ and the experimentally produced ‘projected images’, which were empirically familiar but conceptually alien to perspectivist optics. Finally, I will reflect on the meaning of ‘experiment’ in Kepler’s report of the *experimentum* inside the Kunstkammer.

Esther van Gelder (Leiden University)

Searching for plants, looking for methods: Carolus Clusius (1526-1609) and the local flora of the Alps.

Coincidence played a major role when the famous Flemish botanist Carolus Clusius (1526-1609) started his pioneering research on the local flora of Austria in 1574. At that moment he was employed by emperor Maximilian II as head of botanical matters at the Vienna court. While searching the environment for herbs worthy for the court garden, he found many plants which were unknown to the ancient and modern authorities. After deciding to describe these new plants, the fifty-years old scholar encountered many difficulties: expeditions in the mountains were tough because of the weather-conditions, the rough terrain, or attacks by Ottoman soldiers. Once at home, the collected seeds, bulbs or cuttings did not grow in his garden in Vienna and court-artists seemed not to be qualified enough to make the precise watercolor depictions of the new plants. In the end, Clusius found his ways to describe many new species of Middle-European flora and published his results in 1583. Both contemporary and 21st-century botanists praise the accurate descriptions and illustrations in his publication. In this paper I shall reconstruct the research practices of a 16th century botanist: how did Clusius collect, describe and classify his material? And which methods did he develop to legitimize his knowledge?

Annemieke R. Verboon (Leiden University)

The raw material of God's creation: about smelling practices and the intellectual conception of anatomy (14th - 16th century)

Andreas Vesalius recalled in his beautifully illustrated *De humani corporis fabrica* (1543) how he and his fellow students were shown a picture which represented the human brain. He was not impressed. For how were they to learn about the human body if they were not to dissect one by their own? What are they to learn from a pious theologian discussing anatomy and how could a poorly drawn picture be of any help? Vesalius’ complaints were equally uttered long before him by medieval anatomists from the fourteenth century. In this paper I shall explore the relation between the practical circumstances on the one hand, especially the availability of corpses, dissections and pictorial material, and the intellectual conception of anatomy on the other. Concentrating on the case of the brain, I will deal with anatomical reports dating from the fourteenth to the sixteenth century, thus putting Vesalius’ achievements in the light of his medieval predecessors in anatomy.

Paul J. Smith (Leiden University)

Reconstructing exotic species in early modern ornithology. The case of the toucan.

In the early modern period unknown exotic species were reconstructed on the basis of scarce and ephemeral material (skins, feathers, often only a bill), and scarce information, scanty descriptions and awkward illustrations, made by cosmographers, travellers, collectors and other amateur (i.e. non-professional) zoologists. The improvement of taxidermy in the 18th century, changed this situation radically, but had other disadvantages, as can be seen in the work of the French ornithologist Brisson, focused almost exclusively upon the external description of the bird, not upon its inner morphology nor its behavior. These developments will be exemplified and discussed by a case study: the early modern 'reconstruction' of the toucan and the hornbill.