

materia medica **on THE move**

Collecting, trading, studying, and using
medicinal plants in the early modern period

CONFERENCE SUMMARY

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Introduction

On April 15-17, the conference “*Materia medica* on the move: collecting, trading, studying, and using medicinal plants in the early modern period” was held. The conference was organized as part of project Time Capsule by Utrecht University, Huygens ING, Naturalis Biodiversity Center in Leiden. The latter hosted the conference as well, together with Museum Boerhaave.

A range of senior and junior scholars from numerous disciplines shared their views on the circulation of *materia medica* in the early modern period: plants with medicinal uses that proved to be a major innovation on the early modern medical market. Understanding how these plants were used and understood in the past can still help us to understand the problems and possibilities of medicinal plants in the present. This conference was a great stimulus the participants to exchange ideas on the subject. To reach a wider audience as well, this conference summary will give short descriptions of all the talks held at the conference. We hope it will stimulate further exchange of thoughts and ideas about the wanderings of *materia medica*. Enjoy!

Keynote lecture 1 (Wednesday, April 15th, 2015)

During her lively kick-off presentation at Wednesday evening, **Florike Egmond** addressed the connection between the history of medicinal plants and visual culture. The relation between plants and images in the early modern period is a complicated one. We must be careful not to over-interpret the importance of images. Quite a few exotic plants were known in Europe already in the 16th century, hence could be drawn after nature. Others, however, were only known as images, while still others were drawn after dried imported specimens. The disadvantage of images is that they do not tell much about the uses of plants in the past. The sunflower is an excellent example: in the famous herbarium by Felix Platter (1536-1614), we find a mash-up image composed of parts of the plant, showing a sunflower without showing a sunflower. Such an enigmatic relation between plants and images can be found throughout the early modern period. Even though the number of exotics successfully introduced in early modern Europe remained small, compared to the traditional medicinal plants that had been known for centuries, their occurrence in many non-printed sources of the time is significant. This draws our attention to the vivid trade routes that enabled the international, even global, trade in medicinal drugs. While traditional centres of trade (Crete, Venice, Istanbul) remained important, the discovery of the New World caused a shift in activity from the Mediterranean to the North Sea, with ports like Seville and Antwerp taking on a new leading role. The dynamic drug trade of the period caused the introduction of new plants, many of which were appropriated by European culture not only as medicinal plants. The scattered occurrence of these plants in herbariums, watercolours and frescoes is indicative of this process, and raises new questions: what exactly should be understood as exotic; could certain plants be used to trace the introduction of others; and would it not be better to relinquish modern categories and instead talk about plant and health studies, to do justice to early modern practices?

Warming up 1 (Thursday, April 16th, 2015)

Thursday started with a warming-up presentation by **Esther van Gelder** about the research possibilities of the correspondence by the famous botanist Carolus Clusius (1526-1609). The 1600 or so letters reveal much about early modern plant practices. In spring 2015, a digital, work-in-progress edition will be launched to make these letters more accessible. Users should be able to contribute e.g. transcriptions and plant identifications. To arrive at a collaborative, international effort the project was christened Clusius Community 2.0, indicating the similarity of Clusius' own dynamic, interdisciplinary network to the community interested in his legacy. Esther's invitation to the audience to collaborate met with a very enthusiastic response!

Parallel session 1a: Boxes, drawers, cabinets: collecting pharmaceutical samples (Thursday, April 16th, 2015)

In the subsequent parallel sessions, one session was devoted to early modern cultures of collecting. **Marlise Rijks** addressed the role of apothecaries as collectors of and intermediaries for exotics in 16th-century Antwerp. Focusing not only on medicinal use, it becomes clear that exotics also played an important cultural role. Guaiacum wood for instance was not only used as a new remedy against venereal disease, but also to make utensils. The use of exotics in devotional paintings draws attention to unexpected audiences for these plants. Likewise, we cannot understand exotics in collections solely as part of the collection. The cultural ramifications of exotics are much deeper: they show the interconnection of trade, art, science and religion, thereby linking individual objects to wider notions of the diversity of nature. As collectors, apothecaries played a key role in this process of cultural appreciation of exotics.

Raymond van der Ham talked about simplicia cabinets, a largely forgotten genre of pharmaceutical heritage. Several dozens of cabinets like this can still be found in the Netherlands, from the mid-17th century onwards. They were mostly used for examination of aspiring apothecaries and as reference tools for examining crude, simple drugs. Later they were also used to aid teaching in apothecary shops, as learning tools for students, and even as mere collections. An inventory of cabinets shows a divide at the end of the 19th century, in terms of contents, materials, storage and sealing. As such, they are a largely unexplored way to trace the evolution of *materia medica*. Although the genre appears to be a Dutch phenomenon, many more collections can be found throughout Europe. Many of these are under threat of destruction, due to scientific disinterest and anonymity.

Another collection that is gaining increasing interest from historians are the vegetable substances collected by Sir Hans Sloane (1660-1753). The talk by **Victoria Pickering** showcased the great diversity of this collection and the extensive network of informants behind it. The 8000 samples and the catalogue in three volumes are rather enigmatic, given the fact that they do not provide many clues about the uses of the plants. When the catalogue gives information about medicinal use, many of this information was taken directly from the notes provided by informants like James Petiver and Robert Uvedale. What also becomes apparent is the diversity in practical uses for a collection like this. For instance, the 800 or so Jamaican plants that Sloane described during his journey to the island show

Sloane's medical interest in purging, while Jamaican planters were disappointed by the fact that Sloane had not been able to identify more economic possibilities of the plants he described.

Parallel session 1b: "We must cultivate our own garden": growing and studying living plants (Thursday, April 16th, 2015)

Meanwhile in the other parallel session, **Gerda van Uffelen** talked about the much traveled botanist Carolus Clusius. He worked, after being invited by the University of Leiden, on the botanical garden there, which was created in the late sixteenth century. But the scope and purpose of the garden are not so clear. Whether it was medicinal, or just botanical is problematic for the modern researcher. Very few medicinal properties are stated for the plants that were present, which seems to demonstrate the garden had no medicinal purpose at all. Certain plants one would expect in a medicinal garden – like opium – were not even grown there. In comparison with de Codex Fuchs, there were far less medical specifications in the garden at Leiden. One may conclude from this that the garden, at the outset, was just a botanical garden and may have become a medicinal one along the way.

In 17th century Muscovy a great quantity of medicinal knowledge circulated between city and countryside. The Apothecary Chancery imported knowledge on the uses of plants from Europe, which intermingled with local knowledge that was already available. **Rachel Koroloff** asked the question how deep this local knowledge actually went. Some social stratification in terms of elite, folk and clerical expertise is to be expected, but in reality the situation was far more complex. The Apothecary Chancery relied on hired agents that knew their way around the countryside and could interact with locals for the gathering of medicinal plants. During the 17th century these groups of herbalists became semi-professionals who received a great amount of freedom during their activities, which they sometimes misused to forsake their assignments and disappear altogether. In any case, in what does not seem to be a coincident in the process of professionalization, herbalists became connected to the military's 'field pharmacies'. With the armies they could directly put medicinal knowledge to use, and make an inventory of the medicinal plants available in the area. Local agents served as bridges between the Apothecary's studies and local knowledge in practice.

Alicia Borys showed that the dividing line between professional and amateur botanists is not always a clear one. In the case of Johannes Woyssel in Wroclaw (modern day Poland) it is hard to find out whether he was a private collector of plants who also, occasionally, supplied local pharmacies, or that he was a botanical scientist. His garden became very famous, far beyond the borders of Silesia, in the second half of the 16th century. The garden grew rapidly, with a catalogue from 1594 which included over 500 exotic plants. But, ignoring the question of professionalism, when studying the plants included in the garden and its catalogues, a network becomes visible. This network shows Silesia as a place of gathering for botanists and their knowledge, from both the Ottoman Empire and the Americas. Even the famous botanist Carolus Clusius visited the garden and teamed up with botanists at the scene. In this way, a knowledge based cooperation appeared, between centralized and private botanical researchers.

Keynote lecture 2 (Thursday, April 16th, 2015)

The second keynote presentation was by **Tinde van Andel**. Her ethnobotanical approach is radically different from what most scholars of early modern *materia medica* are accustomed to. Her project Plant Use of the Motherland highlights the importance and continuity of native botanical practices by slave communities in Dutch Guyana (i.e. present-day Guyana and Suriname). In their new environment across the Atlantic, they were forced to adapt themselves to new circumstances, and new plants. Since they had not been allowed to bring plants with them from West Africa, they had to look for new plants that could help them survive, not only as remedies, but also for food, clothing and housing. Only the names of familiar West African plants found their way to the New World, and these would be attached to local plants that were found useful. This was a hazardous process of trial and error, since similar-looking from West Africa and Suriname could have radically different characteristics. An analysis of present-day plant names in Guyana and Suriname reveals much about these adaptation practices. Many African plant names have survived in Suriname until the present day. Likewise, many Surinamese plant names in the Sranan language can be traced back to original African names that were used for similar plants in West Africa. This knowledge was handed down by maroons, communities of slaves who had fled the coastal plantations to the swampy hinterlands, to escape their masters. It was essential for these communities to quickly find useful plants to survive. In early modern sources, not many instances can be found of this transformation process from traditional, familiar knowledge, to new uses of indigenous, unknown plants. Western observers generally had a low esteem for indigenous *materia medica*. Luckily, we still have the local names, early modern herbariums and collections of economic botany, to tell us something about these past practices. Many of these practices have survived up until present times, and therefore still represent “*materia medica* on the move”.

Parallel session 2a: Medical theory, pharmaceutical practice: discussing the vices and virtues of plants (Thursday, April 16th, 2015)

At the start of the second parallel session, **Katrina Maydom** drew attention to the important role played by merchants in the transfer of botanical knowledge. Contrary to what is often believed, they were not simply the intermediaries necessary to get new knowledge and goods across the seas. They were important conduits of knowledge in their own right as well. Between 1550 and 1700, they gained a new kind of recognition as experts of exotic knowledge. They were the ones responsible for the initial reception of exotics in Europe, and as such they were intermediaries of the unknown: indigenous connotations were filtered by merchants before new knowledge reached Europe. In this way, merchants transformed into trustworthy agents of global *materia medica*. This newly acquired authority in matters of exchange was closely related to their ascendance on the social ladder. As can be seen in merchant manuals, they started to regard their trading activities as vital for the transfer of knowledge.

A fascinating account of the intercultural exchange of botanical information was given by **He Bian**. From the 16th century onwards, non-Chinese plants started penetrating the existing literature on Chinese *materia medica*. This posed problems

for the adoption of new plants in traditional frameworks. Plants derived from trade were initially designated as such, but at the same time a process of acculturation was taking place, whereby non-native plants were incorporated into familiar schemes of knowledge. Thus, new plants could eventually be described as varieties of Chinese plants. This process blurred the boundaries between the local and the exotic. For consumers, it became ever more difficult to distinguish between local and non-native botanical substances. In a striking comparison between contemporary developments in Europe, it turns out that processes of commodification were not very dissimilar on opposite sides of the globe.

A comparison between various exotic substances, like tea and ginseng, can tell us much about the diversity of early modern opinions about the medical applicability of these drugs, as **Alexandra Cook** pointed out. Both tea and ginseng were regarded as panacea for a time, before serious investigations of their therapeutic properties started taking place. Especially in the eighteenth century, medical practitioners started to report more systematically about their experiences with these drugs. What is interesting to see in this process is the way in which actual testing went hand in hand with other developments: for instance, scientific institutions like the Royal Society and the Académie Royale des Science were increasingly demanding reports that were based on observation and experience alone. In this way, exotic drugs like tea and ginseng quickly cast off their panacea cloaks and were under constant discussion by experimentalists, who focussed on the therapeutic breadth of the remedies.

Parallel session 2b: Fieldwork in the Far, Far Away: Dutch botanical endeavours in South East Asia (Thursday, April 16th, 2015)

In the other parallel session, **Anjana Singh** emphasized that the medicinal knowledge of the Malabar region was of great importance for European medicinal studies. The *Hortus Malabaricus* (1678-1693) by Hendrik van Reede, under the auspices of the Dutch VOC, consisted of twelve volumes in which as much information as possible was gathered. But how, if at all, did this gathering of medicinal knowledge reflect local practices? Brahmas who had medicinal knowledge did not share this to the local population, since giving knowledge away would undermine their own position of power. Van Reede's book was eventually published, but only in European languages, which kept it away from the population in Malabar. In fact, local knowledge was even removed from descriptions of local medicinal uses that Van Reede had learned about. In this way, the book is useless if a reader wants to learn about local traditions. Only in the 18th century did a printing press arrive in Malabar, and in the 21st century did Van Reede's book reach the local Indian population. The problems encountered in Malabar in the 17th century were not, so it seems, of an intellectual nature, but institutional.

In the late 17th century many plants on the island Ceylon (present-day Sri Lanka) where inventoried, studied and used by the Dutch East India Company (VOC), situated on the south of the island. A great variety of scientific paintings of the medicinal plants are kept at the Artis Library at the University of Amsterdam. **Mieke Beumer** found out that the anonymous hand that painted the plants, also seemed to have created the Ceylon paintings, kept at Leiden University Library. The first 27 paintings are very accurate and presented in beautiful detail. The anonymous painter

(pragmatically named Painter X) must therefore have been a seasoned artist. 262 paintings in the book have never been closely examined, but they turned out to be from a different painter. These other drawings (by Painter Y) lack X's precise illustration. Even so, they are very ably made. Many questions are still unanswered, for example with regard to nameless illustrations of which it is no longer clear what plants they represent. Where they fantastical reproductions? Where they based on hearsay, or just found irrelevant for study? Interdisciplinary research is needed to find out more about the collections and the anonymous painters.

At the end of the 18th century, the Dutch were losing their place in global trade in the East Indies. To consolidate their colonial possessions, according to **Jeroen Bos**, the States General sent agents to investigate the overseas settlements, from 1789 to 1793. Friedrich Reimer was such an agent for the States General, as well as a high-ranking official in the VOC. He wrote on plants and medicinal uses in the colonies, even though most of his time he was occupied by his obligations as investigator for the States General. But the question still is why his manuscripts were mostly ignored and forgotten. It could be because of the secrecy surrounding VOC economic interests, but these secrets had a tendency to be brought out by the VOC's own employees for money from rival companies. Probably it was, rather tragically, just Reimer's bad luck. He lost with obligations for the States General and lived in a politically insecure time in which the Dutch States General lost most of its colonial possessions. And after calmer times returned, Reimer's writings were outdated and therefore ignored. New attention for his writings can restore his rightful place in history, and teach historians today about medicinal tradition in the 18th century.

Keynote lecture 3 (Thursday, April 16th, 2015)

Medicinal plants in the context of In the third keynote lecture of the conference, **Sabine Anagnostou** drew attention to the exchange of pharmaceutical information across global cultural boundaries in the pre-modern era. The importance of the influx of *materia medica* from the New World into Europe can hardly be overestimated, but equally interesting are the medical practices in the New World itself. There was a great demand for good practitioners, so missionary pharmacists quickly and successfully filled a void of medical needs in the New World, especially the Jesuits. They applied local knowledge and uncomplicated modes of preparation, to facilitate missionaries in remote areas. The combination of familiar European pharmacy with local practices was eventually codified, as for instance in the handbook by Pedro Montenegro. What is interesting about this work is the adoption of indigenous knowledge into a European theoretical framework. The Jesuits were also involved in the transfer of this culturally adapted knowledge to local practitioners, as can be found in a manuscript titled *Pohja nana*, written in Guarani. This work contains a bilingual list of plant names, apparently intended for instruction of local practitioners. Thus, the Jesuits were well aware that the integration of local knowledge was essential for the success of their pharmaceutical activities in the New World. The Jesuits institutionalised their activities in missionary apothecaries, which became the most important places of distribution for remedies in Spanish America. Meticulous archival records of the apothecary shops shows that they were as well equipped as their European counterparts. Even though the Jesuits used many European plants

(which they grew in their own garden), they actively sought or bought local plants to enrich their pharmacopoeia. They were largely responsible for the transfer of useful South American plants to Europe. Still, the largest part of pharmaco-botanical knowledge of the region remains unknown to this day, or has been forgotten over time. The potential for useful plants from these missionary regions is therefore as big as it used to be.

Paper session 3: The charm of the unfamiliar: New World drugs in Old World settings (Thursday, April 16th, 2015)

Samir Boumediene argued that global networks did not automatically guarantee a successful transfer of exotic botanical knowledge in the early modern period. What is important to keep in mind is that interpersonal and family relations were vital for the introduction of new remedies. Another aspect to consider is the proper therapeutic application. Guaiacum, for instance, was applied for venereal diseases, which had not been known to the ancients. Therefore there was no competition for this remedy to make a speedy career. Succedanea, however, remedies that were to be used against known diseases, could have a hard time establishing themselves on the medical market. An example is sarsaparilla, which experienced a commodification process by being first prepared according to a recipe from Seville. The Spanish botanist Nicolás Monardes, however, made adjustments to the recipe to emphasize the usefulness of American plants over Asian alternatives.

That knowledge of exotic remedies found their way to the European medical market in fuzzy ways was the subject of the talk by **Wouter Klein**. Considering Peruvian bark, which was used in the early modern period against fevers, the commodification process of this drug was largely an undercurrent of scientific practices. A range of scholars specialized in all kinds of knowledge got acquainted with the bark during the second half of the 17th century, but often by chance. The scattered source material available for this period shows the complexity of the problems surrounding notions of fever, varieties of bark, global networks and supply chains. Even though numerous books had been published on the subject in Europe by 1680, and many scholars had come to know and even use the bark, it took the blessing of the French and English monarchs before the remedy became generally appreciated by society at large.

The early modern transfer of botanical knowledge from Europe to the East shows a gap in our understanding, as **Clare Griffin** pointed out. Russia is an excellent object of study for this process. The Russian Apothecary Chancery controlled the trade in non-native drugs, and was composed of Russian noblemen. The medical staff, however, was recruited from abroad (surgeons from Poland; physicians and apothecaries from England, the Netherlands and Germany). Foreign practitioners were recruited by the Russian state, and were expected to bring their own supply of remedies with them, running the risk of being sent back if they failed to do so. Russian archival records show that exotic, notably American substances were imported on an ever grander scale, especially Peruvian bark, guaiacum, sassafras and sarsaparilla. The booming trade in exotics, however, was a marked contrast with the codification of these remedies: they did not start to appear in medical handbooks of the time.

Warming up 2 (Friday, April 17th, 2015)

On Friday morning, **Mireia Alcántara Rodríguez** presented the results of her study on the continued use of Brazilian medicinal plants between the 17th century and the present. Focusing on the *Historia naturalis Brasiliae*, the 1648 masterpiece on Brazilian botany by Willem Piso and Georg Marcgraf, a systematic analysis shows that over 60% of plants mentioned in the book is still known by a similar name in Brazil. The number of plants with a medicinal use has not decreased significantly since the early modern period, and only a handful of plants has been erased from the traditional Brazilian pharmacopoeia in the meantime. The survival of many indigenous names in current Linnaean nomenclature shows the large amount of continuity in traditional medicinal practices.

Keynote lecture 3 (Friday, April 17th, 2015)

In the fourth and final keynote lecture, **Harold Cook** addressed the importance of a multidisciplinary approach to pre-modern *materia medica*. Diverse accounts of similar things can be a valuable addition for our understanding of historical practices. A previous generation of historians (among them Roy Porter, Andrew Wear and Frank Huisman) has already emphasized the importance of the social aspect in the history of medicine, resisting previous explanatory models that focussed on e.g. ideological forces in the history of medicine or a Foucaultian approach. The diversity of early modern practices demands a multifaceted interpretation. Whereas astrological medicine, for instance, was widespread in early modern Europe, medical practitioners in Leiden never did much with astrology and were soon to adopt chemical principles instead. And even earlier, Carolus Clusius left out many traditional Galenic interpretations from his translations of Nicolás Monardes and Garcia da Orta. Overall, one could say that underlying physical principles started to overturn interpretations of the impersonal working mechanism of plants on the human body. Also, material culture embodies an essential framework to understand early modern ways of thinking: goods and commerce started to play an increasingly important role in the circulation of knowledge. Many interesting aspects of the early modern, transatlantic flow of medicinal knowledge and goods thus become apparent. The West Indies have gained much more attention from scholars than before as a vital place of drug trade. The importance of interpersonal relations is attenuated by the fact that it was often the existence of financial surplus, not personal relations, that proved decisive in the global drug trade. Everhard Rumphius may well have benefitted substantially from his trade in Ambonese exotics. Monardes and Orta gained an interest in exotics only as a consequence of their commercial activities. Pirates and private entrepreneurs have started to receive substantial attention for their role as intermediaries in the transfer of medical and botanical knowledge. Plantation owners in the Caribbean turn out to have been much more involved in the procurement of remedies for their slave populations than has hitherto been acknowledged. The diversity of practices behind the transatlantic drug trade, then, require a multi-layered interpretation.

Parallel session 4a: Exchanging knowledge: the case of early modern Central Europe (Friday, April 17th, 2015)

Dominic Olariu showed that manuscript herbals at the end of the 15th and in the 16th century were already characterized by naturalistic representations of plants. Examples include one of the earliest herbals, made about 1520 in Florence by one Zenobius Pacinus, who used a very sophisticated printing technique for the 203 plant impressions in his book, combining nature printing with manual additions and colouring. Furthermore Olariu discussed how even if the antique influence was still manifest, especially in German and Italian herbals there was also discussion of new, non-European plants that were not included in the herbals of Antiquity, e.g. those from the New World and from eastern countries outside Europe.

Drawing from various letters between Caspar Bauhin and the Veronese apothecary Giovanni Pona, **Davina Benkert** explained how naturalists like Bauhin relied heavily on their correspondents in other European cities, especially in Italy, to supply them with the plants they were asking for, rather than depending solely on merchants and local apothecaries. Benkert also emphasized that Bauhin and Pona mutually assumed a certain level of acquaintance with plants. Only in exceptional cases did they give each other more information than just the name of the plant they were looking for. In Bauhin's case, he would then include these exotic plants in his "botanical mental map", which would result in his most important botanical work of reference, the *Pinax theatri botanici* of 1623.

Finally, **Tilmann Walter** presented an online tool that was developed within the project "Physicians' correspondences in the German-speaking territories (1500-1700)", a searchable database containing over 23.000 letters with metadata such as author, recipient, location, date, provenance, and, whenever available, references and links to digital copies on the internet. As Walter showed, 16th century German physicians such as Leonhard Rauwolf, Johann Aicholz, Adolph Occo, and Joachim Camerarius exchanged many letters on botanical matters, and these letters offer a wealth of information on botanical issues, practices, and their economic value: plants, seeds, and bulbs (even tulip bulbs) usually were sent freely as a friendly turn.

Parallel session 4b: Global goods, local practices: materials and matters of fact in 18th century Europe (Friday, April 17th, 2015)

In the other parallel session, **Christine Fertig** compared a range of early modern remedies that were traded in the port of 18th-century Hamburg. The toll registers provide lots of material on imports. An analysis of trade volumes shows that, throughout the 18th century, the amounts of colonial goods in general increased dramatically. While sugar and coffee become massive consumer goods, the Hamburg registers also show that tea and cacao remained low-volume goods, that were not distributed extensively to the hinterland. Trade volumes of certain therapeutic drugs increased exponentially, especially Peruvian bark, rhubarb and ipecacuanha root. Less well-known substances, however, like asa foetida (devil's dung), jalappa and castoreum, also experienced a significant rise in imports. Many of these remedies also found their way to the pharmaceutical literature of the day.

Rhubarb, for instance, received special interest from those who tried to let their home-grown plants compete with imported varieties of rhubarb.

The presentation by **Hjalmar Fors and Nils-Otto Ahnfelt** asked the question what modern medicine can learn from traditional practices, such as Ayurveda or Traditional Chinese Medicine (TCM). A good example to find out about this is to reproduce historical practices, to understand the processes and pitfalls of drug discovery in the past. Swedish bitters are a case in point: they can enlighten our understanding of global pre-modern pharmaceutical practices. In laboratory conditions, the early modern process of preparation will be imitated, to see what happens to the drug in the process of production, distribution, and use. Many of the remedy's ingredients are still known today for a certain therapeutic use. The contents of Swedish bitters were part of the pharmacopoeia until the 20th century, when they were characterized as 'signature chemicals' for the quality they were supposed to have. Therefore, investigating the contents of traditional remedies can draw attention to characteristics that have either been forgotten or neglected over the course of time.

Marta Lourenço reflected on the material culture of collections, especially scientific heritage. Conservation of scientific heritage is one of the challenges for historians of science nowadays. Generally speaking, herbaria, scientific instruments and the like, are preserved in bad conditions. Thankfully, historians of science increasingly stress the importance of preservation of these collections. Three developments have been crucial in this respect: the discontinuity in scientific discourses, the social turn (which stresses the interplay of science and society), and the cultural turn (which emphasizes that the importance of the scientist transcends his disciplinary boundaries). Following from these developments, the material turn posed a difficult problem. There is no equality in the treatment of textual and material sources, which requires a cultural shift. Museums have long regarded scientific objects as illustrations to scientific education, not as objects of study on their own. Learning from things requires a different kind of attention than learning from texts. Therefore, material culture studies gain ground in universities and museums very slowly.

Panel discussion

The panel discussion addressed the issue of the role of material culture for the history of science in a globalized world. The discussion was led by **Marta Lourenço** who started out with the observation that there is no proper definition of what material culture actually is. For the time being we can use the notion of a scientific tool that does not focus on textuality. This raises the immediate problem that an interpretation of objects requires words, thereby re-establishing the link between object and text. So how close are the two connected, and how can we mobilise material culture for scientific purposes? **Alexandra Cook** emphasized that objects are more likely to perish, or at least that they do not receive the proper care that is usually given to texts. Moreover, the traveling history of objects is often hard to trace when we do not have guiding texts. Specimens from Hans Sloane's collection, for instance, have come a long way before they ended up in their current place and arrangement. Texts are therefore necessary to retrace the provenance of objects. **Clare Griffin**, however, pointed out that the necessity of texts is not as self-evident

as we usually assume. In non-literate societies, there is often no need to accompany objects with texts, whereas multilingual communities need to adjust textual connotations to objects when they want to address an audience with a specific language. Following up on this, **Eric Jorink** maintained that the aspect of locality is very important for understanding the relation between object and text. Samples from herbaria, for instance, are both object and representation of plants, thereby infringing on the role usually assigned to text. Marta Lourenço understood this to be a potential problem: on the one hand, samples from herbaria can be interpreted as instances of the global transfer of knowledge, but on the other hand they are full of local connotations. This uneven relationship needs to be taken into account when assessing the value of objects. With the help of the audience, some suggestions were made to invigorate the role of material culture. Great possibilities come from digitization, even though it is generally understood as a double edged sword: objects (as well as texts, for that matter) can be shown in multiple ways to various audiences without harming the objects themselves, while at the same time running the risk of making the objects redundant as objects of study. Clare Griffin emphasized that for certain types of research the objects themselves should be preferred over their digitized representations. Marta Lourenço added the possibilities of 3D, an area that is still largely unexplored: we are not bound to two-dimensional representations of objects. Finally, the reproduction of historical processes could be a stimulating angle to renew our understanding of the past: for instance, creating a herbarium, or following historical procedures of making remedies, can help us to gain insight in the problems and possibilities of dealing with material culture, in the past as well as the present.

Epilogue

As this overview of talks has shown, the diversity of early modern practices and concomitant modern modes of interpretation is enormous. Some recurring themes can be discerned. First of all, what the conference has constantly stressed is the global nature of practices surrounding *materia medica*. Medico-botanical knowledge and goods were transferred in the early modern period by a range of individuals and groups: medical men (i.e. mostly men) like apothecaries and physicians, but also amateurs, collectors, merchants, and the like. Trade companies and scientific academies were also heavily involved with the transfer of *materia medica*. Because of this diversity, we have a multitude of different sources that each require their own interpretation. Herbaria should be understood in another way than letters, herbals, manuals for merchants or apothecaries, physical collections, images or trade accounts. This poses challenges for students of *materia medica* in the past, but also opens opportunities for interdisciplinary research. The local context of non-European practices (both indigenous and derived from slave accounts) poses particular problems of interpretation. A multi-layered view, including history, ethnobotany, linguistics and anthropology is necessary to get hold of these largely neglected practices. At the same time, however, there is still much we can learn from *materia medica* on the fringes of the European continent: Russian and East European scholars and collectors had a different outlook than their counterparts on the western shores, but these practices could reinforce one another. Numerous approaches could be devised to enable these types of multifaceted research into *materia medica* of the past. First, digitization is already a massive theme in history in general, but the

possibilities and pitfalls are not yet fully recognized and understood. The history of *materia medica*, like any topic in history, requires community building of present-day scholars to invigorate the possibilities of research on a global scale. Second, the simulation of historical practices could help a great deal in understanding the problematic nature of many practices of the past. The workflow of apothecaries or collectors in the past, for instance, requires a different approach than an analysis of their recipes or collections. Third, a closer study of material culture is very helpful to ascribe meaning to practices that are often only discussed on the basis of historical texts. Objects have a web of meaning of their own that can enlighten aspects of *materia medica* that one would not readily associate with texts.

We hope the conference, and this summary, will continue to stimulate debate among scholars on early modern *materia medica*. Perhaps we will then be able to organize another *Materia medica on the move* sometime in the future!