KNOWLEDGE IN A BOX:
HOW MUNDANE THINGS SHAPE KNOWLEDGE PRODUCTION

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Municipal Tobacco Warehouse-Tobacco Worker Square (Dimotiki Kapnapothiki-Plateia Kapnergati)

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'If the package is right, the pills are right'[1]:
Branded Medicines, 1650-1900

Between 1650 and 1900, medicines were packaged in many ways: glass bottles, ceramic pots, paper twists and card boxes. Deemed the first 'brand name' product, the marketing of proprietary medicines in this period has been the focus of extensive research. The successful branding of medicines was achieved not only through advertising, however, but also in the physical character of pharmaceutical packaging. Proprietorial identities were constructed through this branding. Containers were covered in proprietorial and state marks, crucial in reassuring consumers of their efficacy and safety. Bottles were embossed; pots transfer-printed; labels pasted on boxes; and seals fastened paper sachets. Labels and wrappers bearing pictorial devices and signatures encased generic containers. The packaging itself (perhaps a uniquely shaped or coloured bottle) could also form part of the brand identity, all of which helped consumers differentiate between similar products and identify 'authentic' medicines.

In the absence of institutional regulatory presence of medical provision, consumers negotiated the minefield of healthcare products independently, and so interpreted proprietorial branding as a measure of the manufacturer or vendor's trustworthiness. Medicine packaging was crucial in transmitting this message. A late nineteenth-century advertisement for Carter's Little Liver Pills advised consumers: 'if the package is right, the pills are right.' As this paper will show, however, this message could be undermined by counterfeited packaging, an issue that remains widespread, with the fake drug industry's worth estimated at £128bn (€125bn) in 2011.[2] Combining archaeologically excavated and museum-curated objects in conjunction with documentary evidence, it will illustrate how closer readings of the marks found upon mundane containers and packaging can complicate our historical interpretation of 'branding', as well as having implications for our understanding of the operation of the market for medicine, 1650-1900.

[1] John Johnson Collection, Advertising, Patent Medicines 8 (49), 'Carter's Little Liver Pills Cure All Liver Ills' (1890-1900).
[2] Shilpa Kannan, 'Counterfeit drugs targeted by technology in India', 11th October 2011, BBC News http://www.bbc.co.uk/news/business-15208595 (accessed January 2012).

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Contours of the Soul:
Transforming the Containers of the Mind into Ventricles of the Brain in 16th Century Europe

For more than a millennium, from the 4th through the 16th Century, the intellectual organs of common sense, imagination, reason and memory of the intellectual soul were localized in the ventricles of the brain. For the patient and surgeon, expert and layman, elaborate diagnostic, healing, religious, perceptive and intellectual rituals developed based on the shape and location of the box in which the instruments of the soul dwelled.

This paper will first outline the cerebral performances that developed based on the location and container of the intellectual soul. Such rituals included body gestures, dietary regiments, reading strategies, and a valuation of oral over written speech. These rituals also created social hierarchies outlined by late 16th Century English, Spanish, Italian, and German theorists based upon a person's ability to properly perform the organs of the soul.

The second part of this paper will trace points of conflict when the long established brain rituals were confronted with new epistemic practices of typography, dissection, and artistic representation that eventually coaxed the soul out of its box. These early localization theories can be understood as precursors to 19th Century phrenological and 20th century localization concepts, which demonstrates that the containers of the soul help to fashion the soul's contours.

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Collections in Book Form:
The Symbolism and Technique of a Container

An object in book form, called a *faux-livre* or *livre-feint* in French, and a *Buchverfremdung* or *Buchattrappe* in German, is an object that looks like a book without actually being one. It is as old as the codex, which replaced the scroll as a textual medium from the third century onwards. Objects in book form can function as amulets, reliquaries, scientific or musical instruments as well as fashionable boxes. All these cases offer unique instances of transfer, allowing for the examination of symbolic, technical and cultural qualities.

In the 17th and 18th centuries, sometimes items from collections of natural objects or antiquities are contained within boxes in book form. The use of these containers has a symbolic function referencing the Book of Nature. Enclosed within an object in book form, the item represents a kind of page which that book permits to be read.

The use of the book also has an epistemic function. It is an instrument that allows a series of operations of classification, manipulation and standardisation for the creation and transmission of the scientific knowledge of the period.

In order to explore the epistemic relationship between container and contained, we will focus on a particular form of collecting, the *xilothèques* or *Holzbibliotheken*, which expanded all over Europe in the last years of the 18th century. These are collections of wood and of other tree parts, preserved in boxes in book form, and produced for the study of forestry.

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'A World of Wonders in one closet shut'[3]*:*
The Construction and Compression of Knowledge in the Miniature Curiosity Cabinet of the Seventeenth Century

The sixteenth- and seventeenth-century 'curiosity cabinet' was one of the foremost means by which early modern European collectors sought to accumulate, present and preserve knowledge. Critical to the production of knowledge and meaning in these early collections was the physical apparatus which housed, ordered and displayed them, and thus helped render abstract concepts and theories in tangible form.

By the seventeenth century, a popular type of cabinet among aristocratic collectors was the *kunstchrank*, or 'art cupboard', a miniaturised version of the cabinet, often designed to function as the centrepiece of a larger collection. Essentially an elaborate box, it represented a microcosm within a microcosm, and contained a complex series of compartments and drawers, sometimes growing smaller as one reached the heart of the cabinet, as if seeking to distil the essence of our knowledge of the material world down into its component parts.

This paper will explore how the *kunstchrank* was deployed as an active producer of knowledge, with a particular focus on the 'Augsburg' Art Cabinet of King Gustavus Adolphus of Sweden, created by Philipp Hainhofer in 1625-31. An extraordinary work of art, it was designed to entertain as well as to stimulate the intellect, and functioned as a fully autonomous cabinet of curiosity on a physically, but not intellectually, reduced scale. It was also a marvel of seventeenth-century technology, boasting anamorphic mirrors and a musical clock. Incredibly, it survives with many of its original contents intact, making it a particularly apposite subject with which to examine the seventeenth-century fascination with 'knowledge in a box'.

[3] From the epitaph engraved upon the tomb of John Tradescant the Elder and Younger at Lambeth, seminal English collectors whose 'Ark' became the founding collection of the present-day Ashmolean Museum, Oxford, cited in Findlen, P. 1994. *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy*. Berkeley and Los Angeles: University of California Press, p.17.

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Edmond de Rothschild's Boxes

Baron Edmond de Rothschild (1845-1934) was the greatest collector in a family of collectors. His prints, drawings, paintings and other works have long been the focus of scholarly attention that has thrown light on how he displayed his collection and made it available to friends, visitors and the wider public. However, this paper will consider, for the first time, the boxes in which he stored part of his collection when not on show.

At Waddesdon Manor we still use boxes that Baron Edmond commissioned for storage. Constructed of wood, and lined with velvet (usually red) or chamois leather (usually beige), each box bears a red leather label lettered in gold. Their fabrication relates the boxes to the bindings of books and to covers of scientific instruments, and suggests continuity with eighteenth-century Parisian expertise in the protection and transportation of precious things. The boxes at Waddesdon place their contents in contexts ranging from erudition to the erotic. A box for Roman glass vessels fixes them in an arrangement that resembles didactic illustrations in books on antiquities. Box-interiors give Sèvres vases a housing that bears fruitful comparison with settings they enjoyed when 'out' on display. One box, with unusual double doors, was made for a marble nymph by Falconet, and creates a drama of enclosure and revelation; the concavities in the padded lining (there is even a dimple to accommodate the figure's big toe) combining practicality with private sensuality.

For all their aesthetic and tactile appeal, the history of these boxes underlines the protection they have given to their contents through the darkest times. Nazi photographs show them stacked in a Paris depot during World War II, the largest box serving as a writing desk for a clerk making notes about the transportation of Baron Edmond's collection.

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The Material and Immaterial Flows and Storage of Things in Taiwanese's Household

In this paper, I will argue that the relations between material things at home are intertwined with each other in sophisticated ways. Material things signify and refer to each other in the domestic space. Containers are a special type of material entity, not only holding but also forming, transforming and mediating relations between objects in their material and immaterial forms. To show what I mean by this I will focus on two examples from Taiwanese's households in this paper: drinking water and collections, for example, of souvenirs. I will discuss the relations between water and the various 'reservoirs' that contain it within the home. Some of these are particularly for purifying and preparing drinking water and as such exemplify the particular material culture of Taiwan. Then, on the topic of collections, I will show how the relations between package, boxes, collection items and display cabinets transform and mediate the two-fold meaning of display and storage. Through studying these two cases examples, I will endeavour to draw a clear picture showing how domestic consumption is embedded in material and immaterial cultural system in Taiwan.

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From Everyday Life to the Finds: An Essay on the Use of Boxes in Archaeology

The work of an archaeologist is digging ancient sites to discover and study the habits of civilizations that preceded us. But once the fieldwork is finished, another scenario opens up. Perhaps even more fascinating, unfamiliar to most and that is such a fundamental aspect of our profession. Once you leave the yard, comes the time of studying and analyzing many items recovered, which must be cleaned and restored. Then, it will be necessary to store these invaluable artifacts neatly to preserve them as best as possible.

But when a country like Italy does not invest in culture and in the management of cultural heritage, daily work is not easy. In the case of a job with a private individual, the funds allocated to preservation are very limited; likewise, for a study in partnership with public institutions the shortage of funds is reflected frequently on expenses for artifacts preservation.So in many cases, recycle and recover the boxes is the only choice, as well as an ecologically sustainable use.

Archaeologists are familiar with the art to match the size of the box available with the find that has to preserve. So the package of a body lotion is perfect for an *unguentarium*, small late roman coins are easily preserved in roll of film boxes, carved bone hairpins find their place in a toothpaste box. Our warehouses are filled with cases of creams, medications, tubs of ice cream, cotton swab containers, cardboard boxes for shoes and bricks as well as finds from a single stratigraphic unit are generally wrapped in protective sheets of newspaper and stored in fish and fruit boxes, plastic or wood cases. After 11 years of experience in excavations throughout Italy, I'd like to tell the new second life for these containers that would otherwise be discarded and the importance of this recovery for our research.

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Hidden Information:
The Cases for Woodwind Instruments in the Renaissance and Early Baroque

During the Renaissance and Early Baroque period sets of woodwind instruments always have been merchandised in special sheaths, not only to facilitate transportation and to ensure an intact condition of the fragile and precious goods but also to assure the integrity and musical matching of the instruments. The last-mentioned aspect is the key to the hidden message the organologists are looking for and it is the most characteristic quality of historic boxes for woodwind instruments: They provide us with information on the lengths and forms of the instruments, point to concrete workshops and indicate the pitch of the (lost) instruments. The pitch, in turn, enables us to assign an instrument to a musical genre or to regional music traditions. If the instrument did not survive, the hidden information of the sheaths leads us on the track to a reconstruction of the instrument and in the best of cases the sheaths serve for an arrangement of individually handed down instruments to a consort. Apart from organological and musicological information transmitted by the cases we consider them as semiophors carrying art-historical and technological knowledge that gives an insight into forgotten artisan traditions and historic aesthetic styles.

Today only a few cases are preserved in collections and museums. A prominent example for a case containing instruments of different woodwind instrument families is kept in the *Maximilian Museum* in Augsburg. Other cases, holding together "whole consorts", are held in several museums: *Historisches Museum,* Frankfurt a. M.*; Schlossmuseum* Quedlinburg*; Germanisches Nationalmuseum* Nuremberg; *Kunsthistorisches Museum* Vienna etc. In my contribution I will focus on the four wooden sheaths containing recorders, the case for *cornetti muti* and a prettily made box for the *Tartölten* belonging to the Collection of Historic Musical Instruments of the *Kunsthistorisches Museum* in Vienna.

I aim to document the multilayer testimony of these instrument-cases by presenting natural-scientific analyses, by interpreting iconographical sources and treatises on music with respect to the museums items as information-carriers in today's philosophical context.

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Mirroring the Body:
A Social History of the Medicine Cabinet

This paper describes the social history of the bathroom medicine cabinet in American life, from its turn-of-the-century origins to its increasingly "high technology" modern incarnations. During the early decades of the twentieth century, new consumer medical technologies entered common use as a new scientific medicine entered both hospitals and homes. The medicine cabinet was an architectural innovation that mirrored and constrained the values and practices of patients performing medical work in their homes, housing technologies from the first thermometers and toothbrushes to modern contraceptives and orange prescription bottles.

Our dominant characterization of the American patient is as a consumer, controlling her health through purchasing and immediate consumption. My research challenges this assumption, proposing a model of patienthood that understands patients as scientific laborers who use many of the same techniques as their physicians. Within this framework the technologies that patients use take on added significance. The medicine cabinet has not only collected and housed these tools, but also simultaneously hid them and organized them into a new ontological category of small, intimate technologies of the body.

As the contents of our medicine cabinets have changed, so have our expectations of our bodies. Collected, these particular devices reflected and perpetuated new norms of private and vaguely medicalized self-care, with disposable razors, aspirin, birth control pills, and aftershave all sharing shelves behind a closed door. Using the history of architecture and design, accounts in the medical and popular press, and records from technology expositions, this paper will explore the role of the medicine cabinet in embodying these social expectations.

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Inside Boxes – Beyond Borders:
Female Contemporary Artists of the Greek Scene

Inside boxes: In the contemporary Greek artistic scene many female artists adopt the shape or the conception of the box in different media such as objects, assemblages, video installations και video environments. The mundane knitting box is being employed by artists who work on gender identities subjects (Th. Chioti). Feelings and hope are kept safe in the privacy of the box where they find their last resort (Ch. Romanos, O. Zouni). Through the narrow concave of the pit or through the spiral's movement has been redefined the conception of Eleusinian Mysteries, namely the circle of life and fertility (V. Xenou, L. Dambassina).

Sometimes the box occurs as the famous Pandora' s box that now is transformed into a "bomb" in the hands of women artists. It keeps safe the historical and personal memory saves beauty and disarms authority (L. Venieri). Other artists share the sensibility of Ecofeminism and question the human interventions on natural processes whilst envision a society that overcomes militarism and hierarchy (A. Litti).

Beyond borders: In Sofia Kosmaoglou's (Skinner Box) separated rooms, where two video projections are installed, the lighting switches on and off at short intervals and the game becomes an experiment. At stake is here the search for the similarities between the "scientific" and the "artistic". Both have in common the boldness of the experimentation and exclusive interest to verify a logical hypothesis, to objectify acquired knowledge and to create a meaning with a general significance.

In Jenny Marketou's environment (Smell Bytes) the virtual world in the rectangular cell of the PC intersects the real world. Whithin the frame of the Net Art Marketou creates artificially intelligent agents with hacking behaviors to get personal information from privately networked environments. Her goal is to use transformational imagery to explore the fluidity of identity and what kind of new coinage can be created through the open source agency of information hacking and classification.

The scope of this research is to study the material and morphological entity of the box in relation to the mythologie, fertility rituals, the memory, the established hierarchical structures and the intrusion of the virtual world into the real one.

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Shakespeare and Tudor Medicine Chests

It is remarkable that, in Shakespeare's plays, the reference to a 'chest' separates doctors and other characters associated to medicine. As the use of medicine chests was fairly common for people in early modern England, references to chests or boxes in the plays were used in some occasions. In fact, various kinds of medicine chests had already been recognised in Tudor times. There were chests for surgical tools, or some of them were just for bottles or herbs. The purpose of this paper is to investigate how Tudor medicine chests were used and how knowledge inside them had come down to next generation through the analysis of boxes and chests in Shakespeare's plays, focusing on doctors and some other characters.

In terms of the use of medicine chests, it might be more general for surgeons to possess their medicine chests rather than doctors. In addition, most doctors in Shakespeare's plays never mention medical tools or the chests. It might be urine flasks that the majority of Tudor physicians had, though it was not certain to what extent such flasks conduced to the patients' healing. In contrast to doctors without medicine chests, Cerimon in *Pericles* and Helena in *All's Well that Ends Well*, who are not doctors but have the chest, contribute to the dramatic recovery of their patients which was impossible for doctors.

Moreover, what should be pointed out is that Helena inherits medical knowledge from her father. In early modern period, it could frequently be seen that mothers passed their medical knowledge down to their daughters. They conveyed medical knowledge by means of the medicine chest and the book called a 'receipt book'. It can therefore be said that medical knowledge in the chests was not always a doctor-related matter, but was more to do with a family thing.

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„Only the best packed in glass....“
A Historical Case Study on the Containment of Modern Techno-Scientific Objects, 1900-1935

The advertising slogan of the *Glass Container Association* cited in the title not only points at the great practical use of a modern container material par excellence around 1930. It also reflects the rich cultural imaginary bound to a fascinating transparent and seemingly so “immaterial” material: Glass. The dark side of this symbolic prominence, however, is that the material historicity of container glass is obstructed from view and its well-functioning as a packaging material for modern techno-scientific objects is seldom questioned or problematized. Nonetheless, one could ask: How come glass containers are able to enclose such distinct techno-scientific objects as chemical processes, electronic systems in vacuum environments, bacteria cultures, or nutrients without altering, destabilizing, or ultimately destroying them by chemical or physical interaction?

In my paper, I will draw on my PhD thesis arguing that the chemico-physical neutrality of container glass is not self-evident or simply “given”, but the outcome of a complex historical process. Glass, in fact, is not *one* substance with an ahistorical essence, but rather a permanently growing family and changing genealogy of similar substances with a certain material “Eigendynamik” which can be – at best – used for, modified, or adapted to specific uses (and which should not be reduced to the well-known history of optical glass only). In this sense, the astonishing stability and immutable mobility of modern techno-scientific objects enclosed in glass can be understood as the result of a process of reciprocal accommodation – material *and* epistemic – of those entities in an enveloping milieu, i.e. the container, which has to be historically analyzed: Roughly speaking, the accordant techno-scientific “attunement” of container glass started in the 1830s with the search for the ideal “universal glass formula”, consolidated with the reform of scientific glassware between 1885 and 1900, and came to a (transitory) end in the 1930s when testing procedures and limit values for the chemico-physical properties of glass containers were issued internationally.

In my paper, I will focus on the latter period of this development. More precisely, I will sketch the wide-ranged process of container glass normalization between 1900-1935 showing how it engaged and connected different socio-technical fields like the manufacture of laboratory apparatus for scientific research, chemical engineering in industry, the distribution of pharmaceutical ampoules for medical use, modern nutrition technology and social hygiene, as well as modern architecture.

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Archaeology and Cigarettes:
The Packs of Cigarettes as Occasional Packaging Materials of Archaeological Findings.

As the acquisition of the past is achieved through a constant process and is reshaped through multiple readings of human action, the packs of cigarettes, as any other disposable pack, used by archaeologists for storing finds, especially during the usually unpredictable –and thus prone to improvisation –conditions of a rescue excavation, are nowadays an integral part of archaeological material kept at the storerooms, while in certain instances exhibited in museum cases as objects associated with the history of archaeological research. The packs of cigarettes are not merely a readily available storage material, but it is also part of the user/smoker's identity, as the persistence on a certain brand of cigarettes, therefore a certain type of pack, makes it "permanent", through its successive replacement by a similar one. Therefore, the confinement of an ancient artefact in it, can be viewed as an act of imaginary appropriation of the otherness. The paltry, disposable and standardized, but also familiar product is used as a storage 'container' for the precious, long-lived and unfamiliar material remain of the past, thus implying the archaeologist's personal involvement with the material of their study. Furthermore, the long-term preservation of chance storage packages as an integral part of their archaeological contents, possibly echoes the belief of succeeding archaeologists that their predecessors' work is of exceptional standards and every trace of their work should be preserved, signifying the paltry as precious. The preservation or exhibition of humble everyday materials is finally an interpretative approach of archaeological theory and practice. The packs of cigarettes are transformed into monuments, fragments of memory, ideas rather than objects, forming material traces of the relationship between the archaeologist and the archaeological find.

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Containing the Trees:
The Schildbach Wood Library and the Eighteenth Century Box

This paper is about a collection of boxes with an unusual relationship to their contents. In the last decades of the 18th century Carl Schildbach, caretaker for the menagerie in the court of Hessen-Cassel, created a wood library in a double sense. His was not only a library for wood, but a library out of wood, consisting by the time of its completion around 1798 of 546 volumes— intricate wooden boxes styled as books, each made of different cross sections of a single species of tree, and containing carefully preserved specimens of every stage of its development. The Schildbach wood library could be another specimen in the eighteenth century's preponderance of boxes: enablers of their maker's classificatory schemes. My paper attempts to revise this picture, telling the story of the library that was designed not as a reflection of a particular theoretical regime, but as a critique. Drawing on archival research into Schildbach, the production of the books, and the status of wood in the late eighteenth century, I argue that the library, by merging its object of study— trees— with its tool of analysis— the box—addressed the growing incommensurability between organizational systems and material resources in the Hessen-Kassel state. In the wake of the Seven Years War, the administration of Hessian forests expanded at the same time that wood supplies and access diminished. While state administration strove to induct the trees into the local political economy, Schildbach rendered the forest legible in an opposite manner, making the trees themselves into their own analytic masters. The paper concludes by reflecting on the terms of the autonomy of the box proposed by Schildbach's library, and the relationship between boxes and the critical projects of the eighteenth century.

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The Radiometer's Glass Bulb

The Radiometer, a scientific instrument invented by the chemist William Crookes in 1873, is formed of a glass bulb containing a partial vacuum in which a set of vanes, mounted on a spindle, rotate when exposed to light. This paper is a study of the various roles of the Radiometer's glass bulb, and of the kind of understanding that it contains. It follows its changing function from space of extraction of an anomaly, to environment suited for the performance of 'radiant matter', to stage for the suggestion of perpetual movement, to apology for spiritualism, to container of wonder.

It addresses the concept of a 'container of nothing' whose job is to keep stuff out, the properties of the glass bulb as a container that presents its contents, and the idea of an enclosed environment as extracted from the rules of the natural world. It also puts forward the notion of imaginative play, and the allowance for magic in enclosed spaces when investigating the world.

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Botanical Knowledge in a Parcel

Without parcels – that enabled the circulation of botanical specimens – the pursuing of botanical studies and the exploration of local flora in the British Empire would have been impossible. To construct knowledge, collectors addressed botanists who named specimens for them and published their botanical discoveries. Alice Marguerite Pegler (1861-1929), one of the most diligent botanical collectors in early 20th century South Africa, was instructed by Harry Bolus how to dry and press plants. In a letter to Cape Town botanist Bolus on April 9, 1902 she explained: *„As the orchids reached you in good time and were of some use I am glad I risked sending them, I hesitated about doing so fearing delay from the exercise of material law, – however, I am glad the officials have some respect for science, or at all events the peaceful sciences. I am sorry the moss had dried out, it was almost dripping when packed, and the P.O. officials refuse parcels when moisture is defected, as they say it endangers the general post: I do not know how [others] manage so well – it may be that the short post cart journey […] has a little to do with it.“*[4]

In this paper the focus lies on two historically under-researched topics: Women's role in the construction and circulation of botanical knowledge and the role of parcels as means of transporting specimens and observations from amateurs in rural areas to scientists at urban institutions. Correspondence networks are a most interesting research topic. Based on letters (and descriptions accompanying parcels) from botanizing women in South Africa (1820-1920), general insights on the parcel's role in knowledge production – in botany and in general – can be gained and first conclusions will be drawn.

[4] Bolus papers, correspondence P, Pegler, BC 234, Manuscripts & Archives, University of Cape Town Libraries.

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The "National" as Revealed Through Reading of Turkish Cigarette Packages

A collection of Turkish cigarette packages, with a number of 1161, dating back to 1900s up to the present, were studied in a PhD thesis at Istanbul Technical University by Elif Kocabıyık, entitled "Evolutionary Perspective for Design: Describing the Change in Design of Cigarette Packages from Turkey". It was argued, in the thesis, that the changing designs of Turkish cigarette packages were reflections of and responses to the shifting climate of economic policies and regulations, cultural practices, ideological hegemonies, and developing technologies and styles with reference to Darwinian evolution theory and the memes.

In this workshop, we would like to further investigate the reflection of Turkish government's actions on the cigarette packages. These 'actions' are limited to economic policies and socio-cultural structures in Turkey. During the thesis research, two distinct typologies of Turkish cigarette packages were identified: Brands and Special Editions. These two different types seem to have resulted from the shelf life, accessibility, and spatial reach of the cigarette packages on the market. 'Brands' refer to the cigarettes that are produced in mass and distributed nationwide for quite a long time such as *Samsun* and *Maltepe*. 'Special editions' are for specific events, locales, occasions and inaugurations, including anniversaries, memorials and special days/weeks, which are produced in smaller batches and sold or distributed for a limited period of time. Most of them were distributed only in certain places such as *1965 Bursa Milli Fuarı*[5], *Adana Sigara Fabrikası*[6], *Tekel Yeni Yılınızı Kutlar*[7].

We would like to focus on the Special Edition cigarette packages from Turkey and investigate the knowledge that they embody, convey and transmit through years in a climate of changing cultural and economic policies of Turkey. For our reading of cigarette boxes we propose a number of different yet interrelated historical trajectories:
- From national development through import substitution to a liberal economy without national borders,
- From state monopoly capitalism to privatization,
- From a stable class structure with state provision to increasing social mobility through the adoption of different lifestyles indexed to varying consumption habits and capacities,
- From the nationalism and paternalism of the young Republic to the period of integration into global economic and cultural structures,
- From national identity to local sub-genres.

[5] 1965 Bursa National Fair
[6] Adana Cigarette Factory
[7] Tekel Celebrates Your New Year

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Lymph Nodes in Folders:
An Experimental System in Pathology

The Lennert Archive contains about 6,000 cases of diseases of the lymphatic system, collected by the German pathologist Karl Lennert (b. 1921). On the basis of this material (microscope slides), Lennert developed a groundbreaking medical classification, the Kiel Classification of Malignant Lymphomas. The archive was put together over five decades and has passed through several changes in use and modifications in organization.

The oldest objects in the archive, microscope slides from the 1940´s, were generated during Lennert's studies at the University of Erlangen. In his earliest period of collecting, Lennert stored the slides in conventional slide boxes – flat wooden cases which have been in use since the nineteenth century. But a few years later, he changed the system: From 1950 onward, he put the slides in small folders made of folded index cards, with pockets fixed into place by three staples. The slides were inserted into the pockets on the back side and notes could be placed on the front side. This change in storage seems minimal but it is radical. The old box storage system provides space in the box lid for one line of notes per slide, so only the name of the disease and the patient's case number could be listed. This system points to a former concept of Pathology, whereat the concept of a disease is derived from methods and epistemic access of pathology alone.

The folder, however, includes information on an individual's entire case. It contains a patient's name, tissue, and personal data, such as age and sex. Underlying diseases are described using a number of dimensions (blood count, course of disease, therapy). The concept of a disease includes the findings of related medical disciplines. In the mid-20th century, the field of pathology was no longer a purely theoretical discipline, but rather a practical one. Now diagnostic routine with regard to clinical use prevail the daily work. In Lennert's new system of organizing medical data, case files could serve as entire mobile units with a patient's medical history and data, which could be moved from desk to desk.

This paper will point out that the archive is much more than a simple filing system. Its simple but effective organization allows for the integration of new and changing (institutional, personal, theoretical) conditions that modify the research process of Lennert´s group. The archive is a fluid experimental system that incorporates flexibility for unexpected occurrences by the use of simple storage techniques. Therefore, the microanalysis of the archive connects the daily routines of a research group with fundamental developments in medicine.

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Photographic Glass Plates Negatives' Boxes:
Guarding the Memory

The cardboard boxes of photographic glass plates negatives', used for the transportation and the safekeeping of that sensitive material from mid-19th century until the invention of the film (end of '20's), are considered today as "boxes of identity". They contributed in the evolution of the photographic technique and they carry a piece of memory, either in the surfaces of the glass plates they contain or in the labels existing on their external side. Those labels are characterized by a particular aesthetic view in the frame of graphic design's history, they make part of collections and, in the same time, they are important sources of information about the type of glass plates, the nationality of their production company, the series of production etc. The determination of production time, the technical background and the international circulation, as well as the particularity of each production company and maybe, in parallel, the particularity of the country from which they come are some of the numerous elements which are declared on those small surfaces. Their strong colors, the decorative motives which reflect the artistic trends of the time, their awards in the frame of international exhibitions, and the differences in their design accordingly to the evolution of the company status compose a "picture" which offers a variety of interpretation's possibilities.

The disposition of those boxes in Greece, via the exclusive importation by the Pallis and Kotzias Company and their localization today in several public collections of photographical material reveal the "traces" of photographical activity in Greece. The diverse material which comes into sight through our research is dominated by the sovereignty of the optical symbol but also by the authenticity of an artificial material, the examination of which will lead us in the evaluation of its importance as far as the history of technology is concerned.

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The Travels of Folke Linder:
As Traced by His Microscope Box

During the fall semester 2011, my colleague (Razia Asad Kandastar) and I (Ylwa Pettersson) participated in a project being conducted by the Uppsala University museum, The Museum Gustavianum. The project was an audit of all of the unmanaged departmental collections of old and obsolete items that had been preserved. Our part in this project was to survey a collection of items at the Evolutionary Biology Centre (EBC). While documenting, we came across a microscope from the 1930s in its travel box. The microscope belonged to an Uppsala researcher named Folke Linder. His most famous work is his thesis *Contributions to the morphology and the taxonomy of the "Branchiopoda anostraca"* (1941), where he investigated the nervous system of Fairy Shrimp (Branchiopoda anostraca) and with this information learned more about that specie.

Our studies show that Linder was a relatively ordinary researcher, but he is just as historically interesting as more prominent scientists. Few researchers are involved in the major breakthroughs; most simply pursue more common scientific activities. All too often the world's attention is directed towards the major scientific breakthroughs, while the more mundane work falls into oblivion. Our presentation will not focus on the microscope itself but rather, what is more interesting for our purposes, its travel box. The fact is that Linder had put stickers from his expeditions around North America and England on the microscope box. Thanks to these stickers we can see the areas where his research took place and thus gather knowledge about this particular researcher from his microscope box.

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A Librarian Makes a Box

For over two millennia, librarians have been critical to the production and transmission of knowledge. They have helped to collect, catalogue, and curate a vast range of materials that now constitute much of our cultural heritage —from epic poetry on papyrus scrolls to PDFs of scholarly articles. In classifying these diverse entities, librarians have constructed "boxes" to facilitate the retrieval of information and the production of knowledge.

We seek to interrogate these boxes by building and populating a librarian's cabinet of curiosity. As Paula Findlen has observed, the cabinet of curiosity was a space for collectors to experiment with different ways of understanding the world in the early modern period. By re-emphasizing this *personal* engagement with the ordering of information, we bring to light the influential hand of the librarian in the configuration of knowledge. Our cabinet is an embodiment of acts of collecting, cataloguing, and curating —and therefore invites consideration of how such practices shape the library, its holdings, and its patrons. The cabinet contains explicit examples of the librarian's curation of information, such as "Dissection: physiology of an object," which investigates the ways in which materiality and textual transmission both contribute to meaning-making, whether in the codex or its digital counterpart; and "Masked Labour," a meditation on the human expenditures involved in the digitization of information. We thus deploy the librarian's cabinet to make evident the activities that support and surround the production, preservation, transmission, and circulation of knowledge.

A guided tour of the cabinet and its contents will demonstrate how the librarian is key in crafting the paths by which people may come upon information. Our discussion will furthermore emphasize the continued significance of the relationship between the librarian and the public, given the proliferation of commercially-mediated "data" on the Internet. By foregrounding and problematizing the boxes that are part of the librarian's everyday work, we begin to see the ways in which information is carefully formulated and prepared for consumption —not only in the library, but also elsewhere.

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The Forest Multiple:
Facts, Artefacts and Practices in the Detection of Illegal Deforestation in Amazonia

The proposed paper draws upon a three-year study of the detection and prosecution of illegal deforestation in the Brazilian Amazonia. The study itself is situated within the post-ANT empirical programme of (what we might call after Annemarie Mol and John Law) 'material semiotics'. As is well known, a key objective of this programme is the exploration of how particular realities are enacted in practices. Based on the observation of the actions of the 'human actors' (e.g. scientists, farmers, forest rangers, lawyers, administrators) and the performances of their artefacts (e.g. satellite images, GPS, trucks, digital cameras, barbed wire) across a variety of sites the paper argues that the fact of 'illegal deforestation' is in 'done differently' by different actors in the different sites studied (soybean farms, scientific labs, forest clearings, government offices, courthouses). For those involved in the fight against deforestation therefore, the problem of 'illegal deforestation' translates into a 'problem of difference' (Mol, 2002): the problem of effectively patching these different realities together. When this can be accomplished, then deforestation does indeed appear as a straightforward fact, a set of relations of correspondence between representation and referent (e.g. satellite image and patch of ground); deed and agent; offence and detection; crime and punishment; policy and outcome. At the same time, in practice, these relations are often contested. The different realities cannot always be co-ordinated (singularised) but jostle with one-another in a cacophony of legal, ontological and epistemic claims and counter-claims. The facts concerning deforestation therefore appear as outcomes of these ontological and epistemological contests, contests in which mundane artefacts often play key roles.

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Furnishing the House, Furnishing the Mind:
Early Modern Literary and Material Cultures of Containment

This paper is an introduction to my PhD thesis, currently in the final stages of completion, which synthesises literary and material cultures of the period *c.* 1530-1660 in a newly productive way by focussing on the concepts of containers and containment. The European Renaissance is recognised as a time of increased consumption and access to a multiplicity of material possessions. Partly in response to this, the domestic sphere witnessed a proliferation of objects which can be classified as containers: chests, caskets, cabinets, and closets, as well as drawers, boxes, and other smaller containers. Emerging cultures of bureaucracy necessitated a multiplicity of containers for the storage of documents, as well as new enclosed spaces for bureaucratic activity. Sixteenth- and seventeenth-century chests, cabinets, and boxes could be elaborate objects, often highly decorative. They could feature complicated locks, numerous internal drawers, and secret compartments, and they could also be 'nested' objects, sequences of consecutively contained containers.

This ubiquity of 'container' objects in early modern material culture is matched by a ubiquity of literary tropes and metaphors constructed through resemblances and analogies to such objects. Notions of containment categorise some of the most enduring ways of thinking about memory, for example: ancient and medieval theorists of memory consistently imagined it as an enclosed space such as a treasure-house or chest, and Renaissance writers visualised elaborate memory theatres and palaces. Early modern writers frequently used images of containers – caskets, cabinets, chests – to talk about texts. My thesis explores the rich imaginative potential of containers in early modern literature, considering the ways in which the physical properties of containers can underpin powerful images and rhetorical tropes about writing and texts. I contend that the codex is the ultimate 'container', an interface between the physical and the imaginary, which should be considered alongside other containers in early modern culture.

This paper shows how the notion of containment enables closer engagement with the early modern period's persistent imaginative connections between furnishing space and furnishing the mind, and demonstrates the previously overlooked significance of the category of the 'container' as a fundamental tool for experiencing and imagining.

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Calibrating Radiotherapy Equipment:
Sending TLD's in Postal Boxes

In the early 1950s radium therapy and the use of needles, tubes and other crude radium applicators were gradually replaced by the first radioisotope teletherapy units in the treatment of cancer. Those that first adopted such medical technologies were the more advanced countries like the US, Canada, and Britain but these machines started also to be employed by less technologically advanced areas. This rapid development and the adoption of new medical technologies created new concerns. As the International Atomic Energy Agency's press release of 24 May 1961 explained, "many radioisotope teletherapy units are now in use in establishments where neither the staff nor the facilities required to make complete dosimetric measurements are available. The Agency has been requested by Member States on several occasions to provide assistance in this respect."[8] This paper examines the TLD dosimetric method that was finally developed and adoptedby the Agency based—among other things—on the convenient way that dosimeters were boxed in simple postal boxes.

One of the earlier tasks of the Agency's dosimetry lab was to design and construct an absorbed dose calorimeter and test a system suitable for a postal dose comparison service. In 1965 physicists Johann Nagl Nagl and Alexander Sanielevici, organized the first trial postal dose comparison for electron beams using the Fricke dosimeter. The next year the IAEA embarked in a more systematic investigation in order to set up an intercomparison system among radiotherapy clinics. A new kind of dosimeters was proposed to be used, known as TLDs. Those were, and still are, small, portable dosimeters produced by dispensing thermoluminecent powder into a tiny plastic tube. These were then placed in postal boxes and sent by the IAEA to medical physicists in hospitals all over the world, simply by post. The medical personnel irradiated the dosimeters to a specific dose and then, through the same postal procedure, they sent the sample to the Vienna dosimetry lab for readout and analysis. The dose received by the small dosimeter as it was measured by the IAEA staff was compared with the intended dose stated by the hospital physicists. The first TLD run took place in 1966 with a few advanced clinics while three larger-scale TLD pilot comparisons were organized involving about 50 radiotherapy centers in 13 countries.

[8] "Radioisotopes for Therapy", *IAEA Press Release,* PR 61/33.

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Can you take what I owe you?
Money Technologies and Dis/abling Practices

Personal moneyboxes like one's purse are highly 'egocentric preserve(s)' (Goffman, 1971: 29) that strictly belong to the territories of the self, kept separated and often hidden from the gaze of non-familiar others: the 'inside of pockets and purses (…) are not ordinarily freely accessible to other than the possessor' (ibid. 294). Handing over the purse is like a public expropriation of the personal territory, the passing of territories of the self into public affairs (ibid. 289). When a person is forced to hand over her purse in order to pay, the world around her becomes 'hot', as Goffman would say, and the persons becomes highly vulnerable to fraud, since the 'scripts' of dealing with money in everyday life are not written for handing over one's purse in public relationships.

The paper discusses how the dealings with mundane things like money and money technologies make up the complex and contingent scenarios of disabilities that create enabling and disabling (dis/abling) practices. Drawing on qualitative empirical material, the paper explores how (visual) dis/ability is the outcome of human and non-human configurations and suggests that dis/ability can be understood neither as an individual bodily impairment nor as a socially attributed disability. Rather, dis/ability refers to complex sets of heterogeneous practices that (re-)associate bodies, material objects, and technologies with sensory practices. These practices, the paper concludes, draw attention to the multiple processes that (re-)concatenate the conduct of human affairs.

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‘Outside the Box’:
Domestic Practice, Display, and Containment in Early Modern England

In 1596, ‘A. T.’, a ‘practitioner in phsyic’ recommended treating ‘the webbe in the eye’ by means of a mixture of pimpernel, euphrasia, and capon fat stored in a ‘boxe of Horne or Tinne’. Another receipt, however, required merely a ‘close box’ to keep the tincture it contained tightly sealed. In the former example, the box has a dual function: it is a useful container, but one whose material properties themselves have a curative effect. Moreover, at the same time that as the related domestic arts of physic and food preparation highlighted the function of the box for storage, housewives’ guides offered instructions that directed attention to the outside of the box through the alternative household arts of decoration, applying shells, embroidery, or pictures to the surface of caskets, boxes, and other containers.

In this paper, I will explore the duality of the box as container and as an item of display in its own right, and unpick the different relationships these examples suggest between making, skill, knowledge, and the box. The boxed tincture or ointment, I suggest, effaces the practice of making that produces domestic physic, whilst the container privileges its contents as objects with physical, curative effects. In contrast, the decorated box announces itself as the object of attention, yet I will argue it also effaces or ‘blackboxes’ (Latour) the knowledge enacted in the embodied practice of making in favour of the presentation of narrative and symbolic knowledge.

In conclusion, I will ask how these boxes relate to concepts of interiority: a connection made more compelling by theological discussions which draw upon the metaphor of the box. In 1626, for example, Thomas Adams urged men to keep ‘no little god in a boxe, no especiall sinne in his heart’. I will suggest that where the fulsome externality of the embroidered or decorative box denies its containing function at the same time as it insists upon the production of interiority, the medicinal box which, on occasion, not only houses but also subtly transforms and works through its contents, undermines the boundaries between container and contained, the making of knowledge and the knowledge of making.

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Thinking Inside of the Box:
17th Century Dutch Perspective Boxes and Perspectival Illusion

Peeping into a seventeenth-century Dutch perspective box is an enticing and astonishing exercise. Created in the Netherlands between 1650-1675, perspective boxes consist of wooden cabinets that are rectangular, triangular, or pentagonal in shape and stand atop a heavy wooden pedestal. There remain only six extant perspective boxes to date. Looking through a coin-sized peephole, the viewer sees into an illusionistically rendered space, painted flat on each side of the box's interior panels. Through an intricate arrangement of perspectival mathematics, the feigned interior scene appears as if in three dimensions, often replete with standing furniture, human figures and house pets. Perspective boxes rely upon the illusory devices of anamorphosis, a method of representation that distorts the structures of linear perspective in order to create a "hidden" illusion. Fittingly, the first image of a perspective box is found in a sixteenth-century treatise on perspective, where a drawing of an anamorphically stretched head is fitted within the confines of a box, with slits cut into the side in order to align the viewpoint with the distorted image. As one of the most ludic demonstrations of the perspectival method, the three-dimensionality of the perspective box pushes perspective to its utmost extreme, thereby exposing the foundations on which it rests. In this paper, I will explore how the perspective box's very design reifies the inherently monocular and embodied nature of perspectival vision. Here, I will ask how these peep-box demonstrations foster a heightened illusory experience. What is the relationship, historically and perceptually, between linear perspective and peep-box displays? Are all perspective images optimally viewed in a peep-box-like encasing? Ultimately, this paper suggests that the amazement derived from looking into a perspective box has as much, if not more, to do with concealment and confinement as it does content.

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Ackermann's Photogenic Drawing Box and the conception of photography

In 1839 the invention of photography was anounced. William Henry Fox Talbot, English scientist and one of the inventors of photography, presented his method of picture production to the Royal Society at the end of January. To create his so called "photogenic drawings", he arranged flat objects like lace patterns or leaves of plants on a photosensitive surface, which was then exposed to the rays of the sun.

Shortly after the proclamation of this new technique, Rudolph Ackermann, print seller, publisher and artists' supplier with a popular shop known as "The Repository of Arts" and a journal of the same name addressing to female readers, advertised in magazines for a special box with prepared materials to make photogenic drawings. In those ads one could read:

"Ackermann's Photogenic Drawing Box, for copying objects by means of the Sun, containing the various Requisites and Instructions for carrying out this most important and useful discovery; particularly recommended to Botanists, Entomologists, and the Scientific, and sufficiently clear to enable ladies to practice this pleasing art."[9]

Just two months after the announcement and still in a time when there was a big incertitude about which chemicals to use, how to prepare photographic paper and how to expose objects, Ackermann delivered a box consisting of instruments, liquids and paper to create photogenic drawings. For this purpose he used common paraphernalia like brushes, a sponge, a frame and other things known in an artistic field, but utilized them for a different purpose. A so called "looking-glass frame" was therefore transformed into a "photogenic drawing apparatus".

Even though this box was sold widely (England, Germany, America and even Singapore) there is no such box known to exist in a private or public collection. In collaboration with an artist, I am trying to reconstruct Ackermann's Photogenic Drawing Box to develop approaches of material and epistemic references, object histories and the potential role such a box played in popular culture, gender stereotypes and knowledge production.

For this conference I want to focus on questions like how such a box could establish a way of thinking about the cameraless technique (or photogram technique), how it shaped the conception of its simplicity or inferiority compared to camera photography as well as how such a box constituted subsequent practices of production and instruction throughout the 19th century.

[9] Photogenic Drawing Box, Advertisement published in: Art Journal, Mai 1839, Nr. 4, S. 77.

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Mobile Environments:
Glass Containers as a Medium and Epistemic Object in the Nineteenth Century

The proposed paper spotlights the proto- and early history of the parlour aquarium in the 1840s/50s, which is inscribed in an epistemic, technological and commercial framework. The hitherto neglected impact that 'simple' glass containers in the hands of amateur scientists had on the development of zoological research stations and, more generally, on modern laboratories and experimental culture, calls for a revaluation of the *agency* of material objects. Studying the historical role that glass containers played in biological and proto-ecological knowledge production and scientific practices allows to add new perspectives on the history of the life sciences and their media and shows how material objects shape and regulate, but also experimentalize knowledge. The itineraries of living things in glass containers, from the seaside to domestic spaces, from natural to urban environments play an important role in the development of parlour aquariums. An intensified exploration of marine species in the nineteenth century made glass containers become an important means for natural historians and amateur collectors to store and transport living specimens. The paper wants to retrace the forms and meanings of (living) objects' movement through space, first locally, later integrated in (trans-)national postal networks and infrastructural systems of circulation.

Besides their function as a medium of mobilization and transport, glass containers thus allowed the cultivation of living animals and plants *at home*. The passage from the ocean to an urban milieu must be understood as a media-technical chain of operations, also marking an epistemic shift from taxonomic traditions to practices of observation and of experimentation with the living. The parlour aquarium fulfilled a multiple function as a container, a cabinet of display (an optical device) and as an epistemic object. Being referred to as "Wardian cases" or "Cages à la Jeannette Power", the glass boxes served as laboratory devices in the emergence of new experimental practices and knowledge production in botany and zoology. Further, the aquarium constituted a microcosmic environment in itself, thus stimulating proto-ecological studies of closed cycles and self-sustaining milieus.

Finally, the paper wants to outline the imaginary potential of the aquarium as a box. Operations of miniaturization and regulation allowed a symbolic domestication and a holistic vision of nature. Despite its material transparency and its (declared) epistemic display, the aquarium then is a 'box' also in the sense of a black box (Latour); thus its technological and regulating mechanisms and operations become invisible.

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The Cultural Consequences of Boxes

Containers are intended for material things. But packed inside are also ideas and practices embodied in the products that a container contains. The role of a box as a cultural convoy is played out unintentionally. The cultural consequences of this unintended act, however, deserve attention: cultures are put into intensive contacts on a global scale, resulting in part from the qualities and quantities characteristic of modern boxes safeguarding goods and products traveling through time and change. Without a dutiful container, Coca-Cola would not have owned a consumer base across near 200 countries; American ideals would not have reached such a wide audience through this single beverage.

This paper presents an interesting cultural comparative study about cola drinks: it contrasts the interpretations of American and Chinese consumers and reveals how knowledge and ideas, the immaterial imports, are accommodated in the receiving culture after the container has fulfilled its designated material duties. Simply put, once the box is open, what is found and how.

This study originally is conducted in juxtaposition with fast food restaurants and blockbuster movies: cola drinks reach foreign consumers through cans and bottles alone, whereas the other two through material packages plus social contexts. As a whole these three types of products represent globally traveling goods and commodities. The case of cola drinks, however, has a fundamental and independent contribution to revealing the cultural consequences of global connectivity and cultural contact.

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Ordering the Things in the Drawer:
Visualizing a Transition from Ornamented Private Cabinet to Institutionalized Collection

This paper examines the changing ways in which boxes and drawers have functioned as a means of organizing natural history knowledge from the eighteenth-century through to the present. The main focus of the paper is *The Order of Things*: a wall hanging of 15 Cornell drawers devised in collaboration with scientists from the Peabody Museum of Natural History, Yale University, in response to E.C. Spary's observation that: "critiques juxtaposing the jumbled chaos of the cabinet of curiosities with the taxonomic discipline of the classified collection have been taken to equate with a transition from the ornamented private cabinet to the institutionalized collection, from the amateur naturalist and from fashion to science."

The Order of Things formed part of the installation *Promiscuous Assemblage, Friendship, & The Order of Things* at Yale Center for British Art, commissioned as "a cabinet in celebration of the friendship between Mary Delany (1700-1788) and Margaret, Duchess of Portland (1715-1785)". The installation represented: the *Promiscuous Assemblage* described in the catalogue of the sale of the duchess's collection of natural history and artifacts, consisting of over 4,000 lots, which took place over 38 days in 1786; the *Friendship*, emblemized in a specially devised cabinet that combined scientific and ornamental ordering, inspired by Jean-Baptiste Courtonne's (1711-1781) illustrations to the natural history collections of Joseph Bonnier de la Mosson (1702-1744); and *The Order of Things*, an exploration of changes in conventions in collecting, and ordering natural history in drawers from the eighteenth century - with the inception of the then new Linnaean taxonomy, about which both Mary Delany and the Duchess of Portland were knowledgeable - to the present day, when the same governing principles, though now accommodating numerous revisions, remain foundational to the ways in which natural history specimens are classified and organised in museums.

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Packaging Playful Technology:
Boxes for Technical Toys in the Collection of the Deutsches Museum, Munich

The paper responds to the workshop/conference call by focusing on the collection of technical toys in the Deutsches Museum, Munich. “Technical” (or “Construction”) toys originate from the world of construction and machinery; they are inspired by the architectural and technological environment and developed on the basis of the opportunities these environments afford for play.

The author has studied the toy collection of the Deutsches Museum as a scholar in residence (2011); this paper on boxes is a partial outcome of a wider project entitled “Technical Toys as a Source for an Innovation-oriented History of Design”.

Boxes for technical toys are not mere containers to protect and carry the toy, but they are indispensable parts of the product; they support the significance of the playthings they contain and contribute to their functions and symbolism in multifarious ways.

The paper will present boxes from the Deutsches Museum collection and will analyse patterns identified with respect to various domains: the kinds of play encouraged, the shaping of parental and consumer attitudes, the professional orientation of the young and the development and diffusion of specific attitudes towards science and technology, as well as the unfolding of wider political or social agendas.

It is expected that this will be a fitting and positive contribution to the workshop's core theme on the ways in which mundane, neglected, ephemeral and perishable artifacts shape knowledge production.