

Bibliotechnica

Humanist Practice in Digital Times

Edited by John Tresch



San Giorgio Dialogue 2014



John Tresch, Editor

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Humanist Practice
in Digital Times



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Photo on back cover: Baldassare Longhena Library, Fondazione Giorgio Cini, Isola di San Giorgio Maggiore, Venice, photo by Matteo De Fina.

Bibliotechnica: Humanist Practice in Digital Times

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How do changing technologies of the library alter the ways we relate to knowledge, nature, and each other? What do we learn about the present and future of data storage, analysis, and retrieval by studying the machines that have made these practices possible, from ancient Greece and China, all the way to contemporary global networks? To answer these questions, historians of science, digital experts, art historians, philologists, library historians, and a poet were brought together in Venice at the Fondazione Giorgio Cini. For three days, they inquired together about how different kinds of buildings, institutions, systems and objects have collected and classified books, manuscripts, artworks, as well as those who make and use them. Linking and comparing past and present, science and humanities, West and East, analog and digital, each chapter is followed by a lively and wide-ranging debate, making surprising connections and raising new puzzles. Set in one of Europe's most remarkable libraries and cultural centers, *Bibliotechnica* explores how today's emerging digital knowledge order depends on earlier techniques of handling information, and suggests the ways in which the ideals of humanist scholarship may continue to serve as guides into strange new worlds.

VI-328 pages; 85 illustrations

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Two Digits: Digital Materials against Dystopias of Replacement and Utopias of Participation

Ann-Sophie Lehmann

Disciplines such as philology [...] and art history [...] have deployed elaborate material apparatuses and highly skilled disciplines, employing multiple sensory modalities, to reconstruct lost and distant worlds.

(From the introductory note to the *Bibliotechnica* Dialogue)

The dystopian and utopian scenarios noted in the subtitle of this essay frame the rather simple point I want to make: that digital technologies have neither replaced nor revolutionized materials (e.g. paper), objects (e.g. books), and places of knowledge (e.g. libraries), but instead, they are now simply a part of and exist in digital networks, in addition to the complex material and social networks in which they already existed. This is notwithstanding the critiques made by new media scholars in diverse fields that form two extreme poles in the discussion surrounding the relation between digital media, art, and knowledge—those who claim that the digital has utterly replaced or transformed what preceded it, and those who deny such claims. Material, social, and digital networks are not neatly stacked or layered; they are inextricably intertwined. If we want to contribute to, profit from, and at the same time critically monitor those networks, we need tools to understand them.

From the beginning, digital media and tools have been engulfed in generalized fears of replacement and erasure. However, rather than replacing pre-existing objects and practices, digital media have altered them, adding new aspects to our material environment. Even things pronounced dead—like LPs, tapes, hand-written

letters, and printed books—have survived, entered new and unforeseen relations with the digital, or are enjoying a renaissance, like polaroid photographs, for example, which are now cherished for their restricted ability to capture one ephemeral moment, instead of twenty moments from which one has to choose.

In the domain of the visual arts, digitalization often makes visible that which may not easily be accessed, but this does not diminish desire for the original—on the contrary. Despite resources like Google Image Search and the Google Art Project, which enable us to view myriads of great artworks in high resolution and with deep zoom from anywhere, these images—either provided by the institutions themselves or by the many users who upload them to all kinds of digital platforms, such as Twitter, Facebook, Flickr, or Instagram—only seem to have enhanced people’s desire for the real thing, the material thing. Thus, art lovers travel to see the original, immediately capturing their personal “auratic” moment using their omnipresent camera phones, often perched atop a selfie stick. So rather than immaterializing a painting in a museum by taking its digital record, as predicted by early hypotheses about the effect of digital objects on our daily lives, digital and non-digital things and materials *live together*, closely intertwined in new practices of engagement, which neither replace nor render superfluous their precursors, but instead add new layers to a complex network that comprises both. In fact, the thicker this network becomes, the more we experience its materiality; the seeming separation of physical and virtual worlds diminishes as “digital physicality” reifies.



Figure 8.1. *Taking Pictures in the Louvre*, photograph: author.

Picture-taking in museums is an exemplar for the kind of conflicts that arise from “digital physicality.” For example, the National Gallery in London lifted its ban on photographing, as guards found it increasingly difficult to distinguish between people looking up information on the apps specifically designed for that purpose by the museum, and people who were taking pictures. The Van Gogh Museum in Amsterdam also lifted its ban in 2013 only to reintroduce it a year later because there simply was not enough space in front of the paintings to take pictures *of* these paintings, selfies *with* these paintings, to look up information *about* the paintings, and to actually look *at* the paintings all at once. I suspect museums will soon offer visitors the “opportunity” to free themselves of their phones temporarily at the entrance, promising a “unique unmediated experience” of art.

Another example of the intricate merging of digital and non-digital technologies in the experience of artworks involves the *Ghent Altarpiece*, completed by Jan and Hubert van Eyck in 1432, and currently exhibited in the St. Bavo’s Cathedral in Ghent. In 2010, the Getty Foundation funded an extensive conservation campaign that included photographic documentation of the monument, under the condition that the resulting images would be made available to the public online. Thus, the “Closer to Van Eyck” platform, on which macro photographs and zoom-in functions afford a far better and closer look at the paintings than one would ever be able to get in front of the original, was born.¹ Users of the platform are able to

see the subtleness of the painted beards of the figures: a close-up of Christ's face clearly shows the proverbial stubbles of beard that were already admired by 15th and 16th century viewers [Fig. 8.2]. Despite the digital reproduction "outsmarting" the original in its current setting, which is rather inadequate due to its display in a small, dark side-chapel of the church in a thick-walled glass case, the chapel is now even more crowded than it was prior to the campaign: the marvelous reproductions have enhanced the altarpieces' ability to draw onlookers as sweet figs draws bees—a metaphor coined by an admirer of the painting in the 16th century.²

Therefore, digital reproductions of all kinds should not be seen as replacements, but rather as part of an ever-extending web, in the middle of which sits the original like a spider, or a sweet fig, for that matter. And not only do digital reproductions form part of this web, but so do all copies of an artwork that have been made over the course of time, regardless of their medium. Still, the objects in this web are located in very different kinds of spaces, all of them with different archival topographies. Some of these topographies are rigid: the postcard stand next to the chapel, which is filled every day with postcards; or the "Closer to Van Eyck" website, which is a stable digital environment that allows for the creation of links to any detail of the altarpiece. But there are also less organized, more unstable platforms like the selfies that are secretly taken in and snuck out of the chapel—where taking photographs is strictly forbidden—and then shared on Facebook or Twitter. If the original is altered in any way, this entire surrounding network is affected. For example, the restoration of the outer wings of the Ghent altarpiece exposed far more massive overpainting than was expected: in the niche behind the portrait of the male donor, Joos Vijd, a painted spider web was uncovered beneath a layer of paint. The long and expensive process of taking macro photographs and infrared-reflectographies had to be repeated after the restoration, and all the high-resolution photographs had to be uploaded anew while old macro-photographs still swarm the internet.

What becomes apparent here is an interconnection between the meticulous work on the original by the restorers, involving solvents and fine brushes, and the work of reproduction, which, through mechanics, bears traces of human expertise and dexterity as well. In his article on Adam Lowe's elaborate to-scale, three-dimensionally printed reproduction of Veronese's *Marriage at Cana*, which hung on the island of San Giorgio in the refectory of the cloister before Napoleon's troops stole it for the Louvre, Simon Schaffer has called this interaction between the hand and the digital the "two digits": human fingers and computer technology working together.³ Apart from illustrating the complicated relationship between digital and non-digital image making practices, the notion of "two-digit" image production also offers a different perspective on the popular idea that we suffer from an information overload, a notion regularly employed to describe the impact of the digital

on our non-digital environment. With regard to visual culture in particular, an “image-overload” or “flood of images” was an expression evoked by the Czech philosopher Vilém Flusser as early as the late 1980s.⁴ It has remained a popular metaphor to denote the apparently ever-increasing amount of images, which over the past decade has mainly been ascribed to the rise of visual social media. The image deluge is an important trope in discourses about image production, migration, and archiving, and has also inspired new works of art.



Figure 8.2. Jan & Hubert van Eyck, *The Ghent Altarpiece*, 1432, Oil on Panel, St. Bavo Cathedral, Ghent. Detail of Christ in the Upper Central Panel. This detail: <http://clostrovaneck.kikirpa.be/#viewer/sync=3&view=1&id1=13&scale1=0.02704¢erX1=1536.1035521249996¢erY1=2239.975177125>

The Dutch artist Eric Kessel, for instance, has collected photos taken on a single, given day, made them available on the Internet, and printed them out, filling a whole gallery space and allowing viewers to literally “drown” themselves in the mass of printed pictures (Fig. 8.3).⁵ New digital methods like big data analysis, distant reading, and cultural analytics, which suggest that a numerical analysis of billions of images can generate new insights about cultural production and image makers and image users alike, are certainly exciting.⁶ Still, what precisely these insights will be, apart from findings such as “the amount of photos of late artworks uploaded to social networks increases during the morning on the West coast of North America,”

still remains to be seen. Just as digital images have not and do not replace non-digital images, big and visual data analysis should not replace deep and close readings of single images, nor the critical appraisal of the algorithmic tools and visualization software that generate and interpret that data.

So, the question is this: does the quickly evolving network of digital and material objects and spaces enhance knowledge, and if so, how does it do so? And this brings me finally to the utopian scenario(s) in my subtitle. In discourses on knowledge acquisition and digital media, the combined notion of *collectivity* and *participation* has become common place. It resurges every so often, in educational reforms for instance, which often involve cutting budgets for face-to-face teaching; it's connected to the belief that because all information is fed into the Internet, the Internet enables everyone to acquire all that information and turn it into meaningful knowledge. Underlying this rhetoric is the biological notion of a "world brain" or collective intelligence that we can all tap into. The French philosopher Pierre Lévy was the first to develop this idea with regard to the Internet, introducing the notion of a collective cyber-intelligence in the mid-1990s. Recently, this idea has been picked up and used by Michel Serres in his book *Thumbelina: The Culture and Technology of Millennials* (London 2015), in which the miniature girl from the fairy tale by Hans Christian Andersen becomes the allegory for today's social media generation, an ode of Michel Serres to his grandchildren. The premise is essentially that *Thumbelina* has this world literally under her thumb on her touchscreen, and she interacts with it so naturally that she eventually revolutionizes the educational system. She no longer needs universities because she can acquire all the knowledge she needs from the Internet; she will shape her own knowledge world.

The Thumbelinas and Tom Thumbs I encounter in my classes—and I have directed a master's program on new media and digital culture for more than ten years—are, however, not so sure of the world of knowledge they supposedly have under their thumb. Naturally, and rightfully so, they take the Internet for granted. But just as earlier generations took cars for granted (and still do), this generation does not necessarily know how the Internet runs or what to do when it breaks down. Precisely because the information comes to them at the push of a button or the click of a link, they are lost in this Library of Babel—because its underlying structure is invisible. Moreover, the Internet does not preselect or sort information according to academic criteria, and the ability to Google anything is not accompanied by an ability to turn information and text into knowledge—in other words, to sort, dissect, analyze, and reflect. As a result, I know many Tom Thumbs and Thumbelinas who do not want to be told that "all the knowledge is out there."

Instead, they long for lectures and face-to-face classroom interactions with their teachers, in which they see and learn how information transmogrifies into knowl-

edge. They do not want to be thrown the directive, “here is the Internet, just sort it out.” So, in order to engender sensitivity towards the complexity of digital materiality in the classroom, I have my students do little exercises, like tracing an article they read for class that is made available to them via a link in their electronic learning environment back to where it came from: which digital repository provides access to it? Is it available if you are not logged in through your institution? How does this institution choose its subscriptions to repositories? Are there elements in a link to an article that betrays its origin? What is a DOI (Digital Object Identifier), and how is it linked to citation indexes, which are made available in Google Scholar?



Figure 8.3. Erik Kessels, *24 Hours in Photos*, Installation, FOAM Amsterdam, 2011.
Photograph: author.

Using questions like these, I try to visualize and (re)materialize the digital network. Somewhat surprisingly, this rather dry technical analysis can actually sensitize us to the paradoxes of digitized reading materials—paradoxes like the note that “this book is under no circumstances to be taken from the building” stuck in a 19th-century painter’s manual from the New York Public Library that was included in its Google Books version, which now allows the book to be “taken from the building” in ways unimaginable to the person who once posted the notice (Fig. 8.4). An artefact like this also points towards the economic and political aspects

of digitization. Especially in the early days of Google Books, digitization was done by scanners and human beings together, the latter mostly women in faraway places who were paid very little. Sometimes, the scanners accidentally captured one of their hands in the action of turning and flattening out a page.

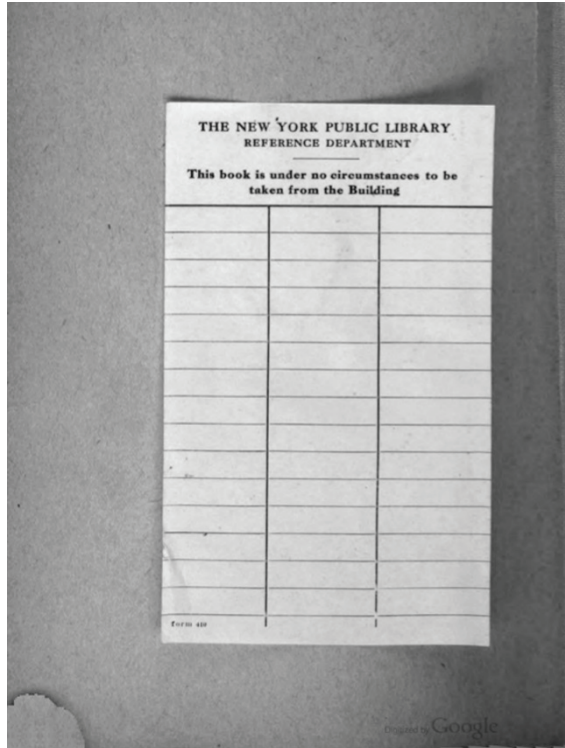


Figure 8.4. *Library Notice in a Digitized Book*, Google Books, 2013.

The artist Benjamin Shaykin collected such glitches and gathered them into beautiful book projects, where the accident comes to center stage.⁷ The palpability of the digitizing process forces us to reconsider the trust we put into the infrastructure that maintains the Internet. Like any other industrial and commercial enterprise, the Internet relies on energy, people, and materials—it costs, it pollutes, and it has its own ecology, which we have only just started to study.⁸ The anthropologist Timothy Ingold urges scholars of all disciplines to acquaint themselves with the role that materials play in all realms of culture and nature—simply by “following materials.” Following materials allows us to make a pathway through the complex relationships between texts, objects, people, and the environment.⁹ It thus helps us to better understand the complexities of material entanglement if we cannot grasp the whole picture at once.

So if you just pick one little thread of material and start pulling and following it, this movement along materials will generally lead to insight and understanding—certainly not a complete understanding, but at least one that is aware of its own incompleteness. Art history is a discipline with a deep history in following materials—from their “raw” state as paint, marble, software, earth, etc. to their “cooked” state and back again. We may, for instance, follow the gold mosaic tiles that adorn Heinz Mack’s “The Sky Over Nine Columns,” placed for the 2014 Venice Biennale on the Isola di San Giorgio Maggiore, and which I have been watching every day during my stay at the Cini Foundation, admiring how the gold reflects and reinforces the stunning Venetian summer light. These thousands of golden tiles reference and actually stem from the centuries-old skill of precious glassmaking in Venice and Murano; the staggering effect of a material that seems to become light itself when it reflects light has a strong aesthetic lure, which has combined ambivalent connotations of earthly materiality and heavenly immateriality for centuries. Coupled with the tiles’ underlying economic value, this ambivalent confluence of meaning has fed a long-standing political iconography of power: if one enters the church designed by Palladio, which rises behind Mack’s columns, one finds a larger-than-life portrait of the twenty-fifth Venetian doge Memmo, set against a background of those golden tiles.

If one follows the materials further, however, the exciting fusion of Venetian tradition and German conceptual art that art critics consider in their discussions of Mack’s work appears to have yet another, more covert dimension. Originally, the artist wanted to cast the columns in bronze, but the sheer weight would have threatened the island’s stability. Having to realize the project using different materials, Mack enlisted a German company that specialized in light plastics with a production site in Dubai. In order to be fixed to the column’s surface, the golden mosaic tiles were shipped to Dubai and then back again as part of the finished columns. Production costs and costs of human labor thus dictated a different flow of materials, which call up the shipping and trading of costly substances between Europe and the Near East, in which Venice had a key role during the early modern period. Following the materials of Mack’s columns reveals an aspect of their narrative that is important to the ways in which contemporary art production, like any production, depends on intricate networks of globalized markets, value of labor, and value of resources. Artists—such as Ai Weiwei, for example—may choose to situate such paths at the center of their works’ meaning, while others may choose not to draw attention to them at all. Mack’s “The Sky Over Nine Columns” is an extremely visible and palpable object that may require less probing and searching in order to pull a thread and follow the materials. But the principle is the same for the digital material networks I have been trying to describe, which are less

obviously “material:” we need to start pulling threads that incidentally stick out and, by doing so, unravel and discover how they hold together. So, what does this approach do? What can it achieve? It may achieve what could be termed *material literacy*, a term first used in archival studies.¹⁰ But rather than denoting a particular set of skills, such as reading and writing, I see this literacy as being grounded in a general sensitivity to the world that surrounds us, and an attentiveness to the fact that materials are inherently noteworthy. From this foundation, learning with and about materials, and understanding that they are everywhere, would already be a wonderful achievement: to consider the materials of a digital photograph or those that constitute the DOI of an article as just as relevant and meaningful as those that constitute a golden mosaic tile in a Biennale landmark.

Learning about, with, and through materials is not new. It has, in fact, quite a long tradition in the history of education. Consider a teaching concept developed in the early 19th century: The English minister and teacher Charles Mayo had spent three years at Pestalozzi’s school at Yverdon to study the great reformers’ innovative *Anschaunungsunterricht*. However, he found the teaching practice there rather chaotic. Back in England in 1822, he developed a systematic approach to object-based learning together with his sister. In 1830 Elizabeth Mayo published *Lessons on Objects*, a book containing one hundred lessons on everyday things and materials including precise instructions on how to carry them out. She also produced the accompanying *Object Lesson Boxes* that contained the very things and materials to be used in teaching. The things in the box were to be passed around, touched, smelled and even destroyed, if this enhanced the understanding of particular material properties, for instance the inflammability of Indian rubber. Only a handful of these boxes survived the intensive teaching method, for instance in the Museum of Childhood (Victoria & Albert Museum, London), the University Museum at Leeds or the Museum of Things, Berlin.¹¹ Contemporary material archives and libraries, such as the materials library in the *Institute of Making* (University College London) or the Swiss *Material-Archiv* combine a collection of actual, touchable samples with digital databases and form the legacy to the didactic combination of words and things.



Figure 8.5. *Object Lesson Box*, Werkbund Archive – Museum of Things, ca. 1850.
Photograph: Armin Hermann.

Material studies in fact form a substantial yet little-studied aspect of education. The famous children's story "Eyes and No Eyes: On the Art of Seeing," by John Aiken and Anna Barbauld, is a prime example.¹² In it, schoolmaster A. has sent two of his pupils, Robert and William, on a walk in the countryside. Robert returns quickly, and when the schoolmaster asks where William is, Robert replies that he

did not want to wait for him, because he took forever, stopping at every stone and sight ('what a boring guy'). But then William returns and relates everything he has experienced, all his encounters and observations of people, animals, birds, plants, stones, clouds—in short, the entire world: "I hardly took a step that did not delight me, and I brought home my handkerchief full of curiosities." The moral of the story of course is that William has eyes, and Robert needs to learn how to use his. When I read it, I found myself in a very similar position to that of the schoolmaster A. I would like to have my students develop eyes for their material environments, to be curious about seemingly mundane, simple, boring things, about their natural habitat: their physical-digital environments. Ideally, their encounters would not all be delightful, and they would develop critical eyes and not only gather curiosities, but also bring home the dirt. Above all, however, they would be curious. Material libraries in which physical and digital objects are not kept separately and in which the close relation between the two digits is emphasized rather than covered up would be just the place for them to start training with the two digits.

DEBATE

Glenn Most

I wanted to ask you about material literacy. It's a fascinating concept, but there's one regard at least in which it's very different from the kinds of literacy that I work on, in that it depends upon samples. A material archive, such as the one in Switzerland, or the objects stored in the Victoria and Albert, depends upon the notion that you can take something which is representative of all the things of that sort. I'm curious about this concept of samples, specimens, which underlies this material literacy, its limits, its defects, and so forth.

Geoffrey Bowker

Early in your presentation you talked about how we can rediscover old things by re-photographing them. I'd like you to talk a little bit about the economics of that. In tracking botany for example, if you something switches genus or switches species, I would guess it takes fifty to one hundred years to properly make the adjustment, because it's so expensive to change all the labels, to rewrite the text books, to do new editions. I imagine it's the same expense that's built into re-photographing and re-propagating the digital copies. That's now an automatic process—and I

don't think you're saying it is—but could you speak a little more about the temporality and economics of it?

Ruth Padel

I have an educational worry, it's about curiosity, which is just where you were heading. It's what Darwin had as a child: at age eight, he wanted to know the provenance of every single pebble in his father's gravel drive. *Eyes and No Eyes*: it's the curiosity. But those pebbles were things he could bend over and touch, pick up, feel with his hand. This is our natural inclination, and its central to curiosity: to put our hand in. Yet the illusion of the digital goes in the opposite direction, because "digits" should be about fingering. Some use this wonderful world 'haptics' to keep the "two digits" separate." Although with the electronic digital, you do press buttons, it's impossible to actually touch the object, so there is no curiosity-generating way of interacting with the object. These screens only say 'talk to us, talk to us' because they want something from us. It seems to me like this presents a huge educational worry.

Ann-Sophie Lehmann

To collect all materials is a never-ending enterprise at the Material Archive; this is also what the curators themselves experience. The archive is not sponsored by any private institution. If one collects one material only, it quickly becomes apparent that there is no such thing as 'one' material. Take wax for instance. It has been developed in so many ways since industrialization that it is really difficult to say what exactly 'wax' is. Yet I think it's exactly this unending enterprise that makes my point: the material world has no limits, there is no end to following, understanding; any collection and compartmentalization of materials makes that clear. You cannot categorize the whole material world. It's simply impossible, which makes it such an exciting thing to do because it points back at itself all the time. That's what you're learning while doing it. But at the same time, it does raise awareness. It's not about "oh, you know, we speak about the materiality of something, and we're done, because we've raised the topic," but it actually continuously opens up again. So a material like wax changes; Ursula Klein has called this the historical ontology of materials. It does not remain the same. There is a paradox there. But that is what makes it so interesting of course, and we have to study that.

Geoffrey asked about temporality and economics. I chose the Ghent Altarpiece because it's such a massive, old, gigantic, important artefact, that the problem of changing its documentation becomes very clear. But it's also here with the Veronese painting which Adam Lowe and Factum Arte copied. Pasquale pointed out to us

that Christ's face was probably a 19th century intervention, but that the Louvre did not want to know this. Maybe one day, different curators will want to know, and then the whole amazing 3D print hanging here in the refectory, which costs millions, may either have to be reprinted, or maybe they could reprint just a section for the face. Temporality is especially interesting for digital-born materials. Something like the hands in the Google Books images, collected by Benjamin Shaykin—I think turning these images into a book was somehow a bit too easy. It's very beautiful to look at it because you see the hands on the hands, but somehow, actually to have it as an online repository where people can add for instance their own finds in Google Books—I think that would reflect what is going on better. The Closer to van Eyck project should have a new high res image of the spider webs so I could have shown it to you!

As for curiosity, in a way, finding the Mayo box and doing research about it now is also a form of self-criticism because I realized, 'Hey, what am I trying to do here? What is the history of this form of education?' Is it really OK to tell students that they have to go "out there", or else they won't see anything? In *Eyes and No Eyes*, Robert 'sees' in the wrong way. He's going to remain stupid all his life and arrogant, and William is the nice guy. Can this really be a way of educating today? It seems to me we really lack when it comes to digital material is vocabulary. That's an area where a lot of work needs to be done—and that is something you can do with students really well. For instance thinking about the names for the actions you carry out on the screen of your smart phone: *swipe*, *pinch*, *scroll*—can we move beyond these descriptions? Is it always a question of remediation, using the terms of an old technology to describe a new one? "Slide to unlock" for instance is an action completely unrelated to any kind of unlocking, except in the digital domain. How can we find words for such new material actions?

Gregory Crane

We in the philological gallery, on our bad days, tend to get lost in the words; we forget to bring in the materiality of culture. But I think there's a real change here. When I was young and trying to view antiquity in its entirety, I discovered that it was impossible to study art history with books. Everybody had boxes of pictures, or they had their own secret stash, and this had a really bad effect upon the culture. My experience is that the art historians were really mean, very proprietary of their little collections. One of the great joys was to have a hundred and fifty pictures of a Greek vase; you could see the knees, you could see the eyes clearly. Of course that by itself does not convey knowledge, but it is a necessary if not sufficient condition, because if you can't see details, you cannot do the connoisseurship.

One of the things that I'm interested in is this shift of connoisseurship from 'I know it all and I'm superior to you' and its authority, derived from exclusive access to the objects, to the new mode we're seeing, where it's: 'I'm going to put these pieces together and make a compelling story out of these fragments. I could show you the Berlin painters—ten knees by the Berlin painter, ten knees by somebody else—and you will see the pattern that I'm looking at.' Which awakens the eyes. I'm excited about the prospects of people with no eyes acquiring eyes, being able to take the walk in the woods and interrogate the plants and the stones which they see.

John Tresch

One of the many admirable things in your talk was your rediscovery of Mayo. It goes along with what I think a lot of people who study the eighteenth and nineteenth centuries are starting to see now. This period wasn't about the transition to pure abstraction, disembodiment, print culture, objectivity, that the late twentieth century often described it as. There are worlds of material practices, part of knowledge practices, all of which were public and visible. We now have to go retrieve those; they're not that hard to find once you start looking for them. The Mayo box is a wonderful case of this other modernity, this non-abstracted modernity, this eighteenth and nineteenth century materiality which historians have sometimes ignored entirely in trying to denounce the enlightenment and what followed it. So I see your contribution to getting us past that assumption about modern "abstraction" as in line with what a lot of other people are doing by saying "let's look at materiality and let's look at objects." But then I want also to point out that this return to objects still can be very flat. We end up with objects in boxes as the example of materiality; as you say, we need to develop a language for how people get those objects out of boxes, how they use them; these interactions, the haptic, are the key to those historical forms of curiosity. To get a vocabulary for that haptic interaction, the shifting of terms such as swipe and pinch is part of it.

But I'm also thinking back to Dagmar's talk, with the map which was not a map, which was not of any space, but instead a diagram of points of ritual stabilization for an entire cosmology, including the objects that make up that cosmology. The map was a guide to ritual, to rituals which hold that world together. So another source for this haptic language is anthropology, which has an incredibly rich vocabulary about folk practices and rituals. And this returns me to Filippo's point from the first day, that training is not just about providing information; it takes a lot of time. These rituals—of training, and learning, too—take time; we have to change our bodies and our minds through certain kinds of practices and repetitions. So in addition to the materials in boxes we need to think about how we access those ma-

terials in the boxes, and begin to think about some kind of vocabulary for taking those things out of boxes and doing so in standard, repeatable, and subject-producing and transforming ways. Ritual may be one of the sources for that.

Simon Schaffer

I would want to start where John's comment began: the reason for the Pestalozzian revolution, which the Mayo box inherits, was the crisis of the dematerialization of the lower middle class. How weird, it might seem, that in the early eighteenth-hundreds it had suddenly become necessary in Great Britain to train anybody to engage with things. The reason for that was not, it seems to me, a passionate investment in materiality, but the exact opposite. Young Roberts and Williams are no longer working with matter; they'll be clerks and accountants and administrators. So they have to be surrounded by these artifices which have the form of commodities. You buy the boxes along with the books. So you're absolutely right; I think this is a brilliantly perceptive way of reclaiming some optimism from digital pessimism. Why? Not so much because of material literacy, but because it reminds us of the complete opposite, literal materiality: precisely the work that Glenn Most was talking about—in his work with Grafton and others—that insists on the constant materiality of precisely the most literate, most apparently abstract, most apparently cerebral, most apparently disembodied work.

So alongside the need for a much richer vocabulary of material engagement in digital worlds, I would also want, to put it bluntly, a better class analysis of what that world is; that it's a world in which there is a material archive in Switzerland, and the matter is manipulated in Dubai, and it's not manipulated in Dubai by Gulf Arabs, but by Bangladeshi and people from Karachi. What was remarkable about your intervention was the way it wanted us somehow to hold simultaneously the denial that the world is flat, which is just the characteristic abstraction of the ruling class, and an insistence on the necessity to work out ways in which literal materiality as well as material literacy can be brought to presence, all the time. What is the cost of that? Extremely slowed down digital work. All of a sudden, the speed of swipe and pinch gets glacially slow. Thank God; I would quite like that.

Ann-Sophie Lehmann

Greg mentions these nasty art historians who kept their pictures: that has certainly changed. There is a very palpable change here, in a move towards research methods from the natural sciences, for instance the whole restoration campaign of the Ghent Altarpiece, which has been made available in open access to the public

online, with both images and scientific publications. This is something that art history has never done before; it's a very slow field to react to innovations in the humanities. So that has been a very good and important push.

You've also pointed out performativity and rituals of interaction. The Victoria and Albert also has a copy of the Mayo book, but the box and the book are not linked in the catalogue—which repeats exactly what Dagmar pointed out yesterday, how objects and texts get separated by the classification. So here digital affordances could make that interaction visible again. John pointed out that we should be looking at the boxes as they're used, in along with the books. But even in the original uses, there were restrictions on access: the boxes were quite expensive, though they were sold in different places in London. Only four hundred and five educational institutions actually got them. There was a lot of educational material, but it was a question of money. Biographers of the Mayos described how their teaching methods were watered down; teachers stopped using the boxes and only went through the book quickly—in other words, material education became bad and boring. But the way the book was written, you would not need the box.

Actually it describes many materials not in the box. For instance: milk. Mayo couldn't put milk in the box, it would go bad, but presumably she and Charles thought that teachers could take milk into school. So there if we start looking at the interaction of texts and objects, we arrive precisely at the actions you were referring to, the getting up and the handling, and; the improvisation that may have been going on, "if it's not in the box, what do I do?"; that is what interests me. And I hope that this sort of slowing down will occur by following materials and the political, social, and economic questions that arise almost by themselves if you do. I came across the production of Mack's columns in Dubai because I wanted to know about these links, and that information is not on the text boards next to the columns. Of course it's not. But thanks to the Internet and a brilliantly illustrated making-of feature in Frieze Magazine, it's available.

Filippomaria Pontani

I think that one issue that should be put in focus is memory, because one of the problems we have—at least in teaching—with the new technologies, is that people do not memorize things. The more things are dematerialized, the less students tend to remember them. To remember not only the way to access them, but also to remember the very features they are supposed to become familiar with. In this sense, I think there are two aspects that you have highlighted. First, when you have a selection of dematerialized works of art that are put together online and totally out of context, one of the risks is precisely being trapped into the idea of the flatness

of the page. On the other hand, you have the history of more common objects like this Mayo box: there you do not have art, you have everyday objects. In Berlin a couple of years ago I went to the Museum der Dinge. It's an interesting experience, quite unique in its genre, not only because it represents a museum context—not the Wunderkammer, which is the obvious reference for the box—but a collection of everyday objects on exhibit not so much for their artistic value, but because they represent history. In that sense, they can contribute to the memory of a generation, of the German people in that case. I wonder if this idea of materializing things, even low-brow stuff, can produce some impact in enhancing an increasingly lost memory, both in learning and in awareness of one's past.

Geoffrey Bowker

I actually think we're dealing with new memory configurations. I just don't know how they're going to work out in the end. I'm very happy that people don't have to do lots of rote learning like we used to in the past. But we obviously do need familiarity with material. I was feeling a bit contrary when you said “swipe to unlock” is not a haptic gesture—it is. Shutters for windows, latches on windows, you slide to unlock those.

There's a wonderful concept that William Wimsatt has: generative entrenchment. An example is the QWERTY keyboard. We still have the QWERTY keyboard, though there's no need for it. Similarly, there was a digital imaginary that was created (I guess five to ten years ago now, but I don't think anyone remembers it), of a completely new way of putting stuff into your cell phone, where you wouldn't type, you would swoosh. You would just kind of move your finger around it and it would capture the movements. But that haptic gesture was not something that we could take in because we were so used to typing, whether it be with our thumbs or our fingers; we wanted that pressing of the keyboard. I really think we need a new vocabulary for the digital imaginary, to recognize it and develop it, and recognize that entrenching that digital imaginary is going to be long, slow, and expensive.

Stéphane Van Damme

My question is about the culture of attention. I am struck today that there are many denunciations about digital culture in terms of a lack of attention, and in terms of ecological effects. What you clearly demonstrated in your paper is that we are also returning to an aesthetic of details. I like this counterintuitive interpretation. My second comment is about material literacy. It goes back to Simon's remarks about the nineteenth century. I think this teaching of material literacy

in the nineteenth century, though you can also find it in eighteenth century, was linked to a conception of an art of making, *l'art de faire*. Today this link is probably lost. In trying to write a book for French cuisine with my wife, we're thinking about changes from the digital culture also—which gets really interesting if you reconnect it with *les arts de faire*. If you think about the *L'Encyclopédie*, with its plates of practices, obviously the so-called process of abstraction is purely an ideological view of modernity. In a new encyclopedia the Bangladeshi artisan will be there.

Aihwa Ong

There's a kind of nostalgia for objects in boxes; you remind me of the Pitt Rivers Museum, which I love. You pull out random drawers and you find buttons and bowls. But the thing is, these objects are themselves representations of other materialities, just as you suggested when you talked about gold. I think there's a danger here, that we over-determine the concreteness of material objects because there's a range of them in different permutations of objects, across vast distances. The objects in those boxes in the Pitt Rivers Museum represent material objects in the world, in the colonies, for the British. They are standing in for these other things and relationships of production, in their different permutations across time and space. Though of course for the people they were taken from they're part of very different relations, different materialities.

But you are also suggesting that there is another shift in the different qualities of tactility of the human and digitalization—you use your hands and in a sense conjure up and elicit different kinds of realities. Despite a kind of shift from the tactile, the sensual, the physical towards the visual, the abstract, or the linguistic, it seems to me that fundamentally you are interested in understanding the affects of objects: how objects affect us, how objects are part of an affective architecture for the understanding of relationships. I think they are different apprehensions of materiality that shape different modes of reality, which all can bleed into one another. For example, my students are constantly playing on their stupid digital gadgets, but they are also doing very physical things. And there is a relationship between those things.

Ann-Sophie Lehmann

Yes to all, to everyone! I did not want to come across as arguing for going back to old fashioned objects because “oh no, they're disappearing!” No. What I'm arguing for is that the digital does not make anything disappear. I think we're still inside those paradigms I've sketched. That's my whole point. We need to jump out of them, or get jump-started. And this is exactly what you are pointing out, Aihwa. I'm

not saying we can only get at this by the route of the actual or of the touchable—the digital is touchable already—but just by simply saying, “let’s follow those practices and let’s not make this distinction, is it on the iPhone, or is it a fifteenth century artwork?” Let’s just take them together and look at them as one network. For instance, the people in the National Gallery taking the pictures and looking up stuff, and wanting to see the original, and in doing so they irritate one another: What’s happening at that moment, and how does that explain the network that’s emerging?

Glenn Most

To return to what Simon said about slowing down the digital. Nietzsche defines a philologist as someone who reads slowly, and there aren’t many better definitions of a philologist than that. And he opposes it to newspapers and superficiality and mass media and so forth. What is underlying a lot of the discussions that you’re referring to is something similar, and it’s there already in *Eyes or No Eyes*: it’s a notion that the danger is being trapped within yourself, and you can only be saved by something that comes from outside. The selfie, the digitalization, the child who walks through and doesn’t see anything—these are people locked in their heads. What can save you is something material, something authentic, the real painting, the real experience, the real object that you have to see, and it helps you in yourself as well. That’s something which is common to a lot of the discourses that you are talking about. There’s something religious about it, something of a notion of epiphany, of salvation from something transcendent and outside, however secularized it is now.

Matthew Battles

Experience of epiphany is also, after all, an individual experience. At least a kind of bipolar experience, since transcendence takes you out of community. Even though it puts you into communion, that’s a different community. I’m just thinking about what you began with, the kind of pedagogical example of walking through the materiality of a journal article, and thinking about it as unpacking this box. That’s an opportunity to attend to the economic relations, not merely the kind of sacral associations with objects, but precisely their embeddedness in the way that the gold tile is embedded in a network of relations. It is so important to create these occasions, these guided tours of reality, which are ultimately ritual occasions, they are occasions of communion and community between a teacher and student, and ultimately, one hopes, among all of us as members of communities participating in the digital realm. Because these experiences are commodified now.

I think of commodities as traders do: not as consumable goods, but as a fungible

heap of stuff, molar stuff, raw material, which is I think how we are being socialized to experience stuff in the digital realm. We're being taught that the world is in fact a bunch of objects, a bunch of figured things that people have made, and that they're connected to other things that are made. What we are doing with ourselves with those selfies is turning ourselves into commodities, into flowable, fungible material. The kind of ritualized itinerary that you describe may be one way of grounding that stuff in object-making practices. In that way the reading that you give those digital objects would not only eventuate in practical understanding of how to find and cite information, but also in an introduction to meditating on the making of community around, and understanding about the political economies of those digital commodities which are objects.

Ruth Padel

A lot people use the language of theology to talk about the real presence of being in front of the real object, which is what everybody wants to do when they're in front of the Mona Lisa. George Steiner, in *Real Presences*, says this is actually like drawing a check on a bank, because we, because most of the world no longer believes in that theology. So we are using, as it were, a bankrupt theological metaphor. We all think that new vocabularies are wonderful, but I also think that there's something absolutely wonderful about the theme that "this is not replaceable." A box is a jolly good idea. If we didn't have the concept of the box, if we didn't have boxes in the world, we'd be lost! And only if you know what a box is, and perhaps have opened one, can you think out of the box; only if you have some assumptions that you make in your experience of the world can you then take apart the things you take for granted. You've got to have some squares on the floor before you start to think what a square isn't, or how you can think round. This conference is about different knowledge worlds. And perhaps it's an obvious thing, but what's clear from these discussions is that we live in a meta-knowledge world. This is something crucial for kids to know. I love the way you begin by showing them what the Internet is taking for granted, and I think much more could be made of taking a smartphone apart and saying 'look, the aluminum comes from a mountain in a reserve, and because of this thousands of people are being displaced, because of the mining that is happening to make your mobile phone,' or, again, the Bangladeshis in Dubai. There are so many other ways of knowing worlds, and these need to be part of the knowing.

Gregory Crane

I find that it's really hard to get students to learn verbs. They've had really bad training, at least in American schools, and don't see the significance of having these in your head. Why the hell do I have to do this? What is the benefit? Now Plato, as we all know, started by saying "When you have writing, your brain rots.". So this memory loss both starts with writing and is an essential thing we accept in order to have the society we have.. I think the space in which we are having this discussion is a beautiful metaphor for this—we're in the library. I see the scientific heroes Ptolemy, Euclid, Hippocrates, the poet Orpheus, and I see the Church Fathers. Those are just the names I can make out. This is externalized knowledge. Then here, in the center of the room, you'll find the lone monk, or the priest, a Benedictine monk: all this stuff has only value in so far as it leads to the salvation of those souls. That's internalized knowledge. Now we don't have that salvation metaphor, people don't want to believe in it, but even so, there's something that happens inside the head. What is it? What is it that we want to have happen? What transformation within the heart and mind of our people? There are different cultural conceptions. What does it mean to be Chinese in a modern world? What does it mean to be visual? What does it mean to walk around? But the common thread is that we need a model of what people should internalize. That's the case we have to make to the people who are fifteen. Or six. Or two. That's our role as scholars and as researchers and I think Ann-Sophie's talk was very sensitive to this, as well as to the visual, tactile world.. This is a question I pose for all of us, and for me at least it's a unifying question across all these topics.

Simon Schaffer

The reason in *Eyes and No Eyes* why Robert is so hopeless is because he is only interested in humans. He says it would have been better if they'd gone on the turnpike road because then we would have met some people. There is something actually quite interesting for us to think with there: what we might be saying is that the way to get folk interested in stuff is to show them the humans in the stuff. That's what happens when you try to make them see the materiality of a mobile phone—you show the humans there. That's also called 'fetishism.' Fetishism has a very, very long, seductive, interesting history and it is obviously associated with the mode of commodity production, among other things. So is that the recipe?

Ann-Sophie Lehmann

So it all comes down to fetishism and religion.

John Tresch

Probably. A while ago, people started to realize that in the natural sciences a shift had taken place such that fifty or sixty or seventy percent of the budgets of the natural sciences all go to computing: to programming, to data storage, processing, maintenance. To be an expert in any field means also to be an expert in the computing skills that make it possible. Now we're starting to see what happens when that shift occurs in the humanities. But of course in the humanities, it has also traditionally been part of the job to ask what it all means, what it's for. Greg said as scholars and as researchers, we have to be thinking about the kinds of humans that we are aiming towards and modeling. That's not news to anyone here, but at the same time, that's not something that we usually include in our research proposals and justifications. In the current regimes of academic evaluation, it feels somewhat perverse to say that we have to be thinking, not just about our basic topics, and also about the novelty of our methods (and we get access to colossal resources if those methods are digital), but, in addition, that we have to be thinking about pedagogy, in a really classical sense. How do we interact with students? What techniques do we use, and what is the ideal student we want to help construct? Again, I think those are questions all of us here are always asking. I just want to point out that making them *explicit* goes against much of the current tendency for how we describe and justify research and scholarship—which is about units of knowledge produced and conveyed, or the average salaries of our students on graduation.

Ann-Sophie Lehmann

Thank you all, especially for pointing towards ritual. There is a religious undertone here we have to come to terms with, or make explicit. I would also want to go on discussing the notion of fetishism. In the story, Robert is not interested in William, and he is not interested in the work he sees with the horses, it's only certain people he's interested in; I think you're right, we need to know which kinds of human work capture his interest. John, I'm not quite sure, but do you mean that it is perverse that we're losing this aspect of education, that it should be part of what we are doing anyhow, that it's perverse that we now have to discuss it to become aware of it?

John Tresch

Exactly. It's part of our everyday life—how we communicate to students and how we're shaping humans and knowers and citizens—but this is very rarely part of our explicit justification of what we do as researchers. Maybe the novelty of the digital is an occasion for returning to this very classical concern.

Ann-Sophie Lehmann

I agree.

NOTES

1. <http://clostertovaneyck.kikirpa.be/>.
2. Karel van Mander, *Het Schilder-Boek*. Haarlem 1604, f. 201 r.
3. Simon Schaffer in Gagliardi, Pasquale, Bruno Latour, and Pedro Memelsdorff. *Coping with the Past: Creative Perspectives on Conservation and Restoration*. Firenze: Leo S. Olschki, 2010. See also Bruno Latour, Adam Lowe, "The Migration of the Aura or How to Explore the Original through its Facsimiles", in Thomas Bartscherer (editor), *Switching Codes*, University of Chicago Press (2010).
4. Vilém Flusser, "The City as Wave-Trough in the Image-Flood", trans. Phil Gochenour, *Critical Inquiry* 31/2 (Winter 2005): 320-328.
5. <http://www.kesselskramer.com/exhibitions/24-hrs-of-photos>.
6. Lev Manovich, "Data Science and Digital Art History," *Digital Art History* 1 (2015): 12-37. <http://nbn-resolving.de/urn:nbn:de:bsz:16-dah-216313>.
7. See for instance here, Benjamin Shaykin, "Special Collection 2009-". In: *Printed Web* Nr. 1, Winter 2014: 58-63. <http://d1v8u1ev1s9e4n.cloudfront.net/54b448b35ccacf-259deee77f>.
8. See for instance Paul Feigelfeld, "Media Archaeology out of Nature. An Interview with Jussi Parrikka", *e-flux Journal* 2015. <http://www.e-flux.com/journal/media-archaeology-out-of-nature-an-interview-with-jussi-parikka/>.
9. See for example Tim Ingold, "Towards an Ecology of Materials", *Annual Review of Anthropology* 41/2012: 427-442.
10. Ala Recrut, 'Material Literacy: Reading Records as Material Culture', *Archivaria* 60: 11-36; see also Ann-Sophie Lehmann, "Material Literacy", *Bauhaus Zeitschrift* 9 (2017), 20-27.
11. Ann-Sophie Lehmann, 'Objektstunden: Vom Materialwissen zur Materialbildung'. In: Herbert Kalthoff, Torsten Cress, Tobias Röhl (eds). *Materialität. Herausforderungen für die Sozial—und Kulturwissenschaften*, Paderborn 2016, pp. 71-94; Lehmann, Ann-Sophie; Volkers, Imke, 'Object Lessons. Material begreifen in 8 Lektionen. Eine