

# Anthropocenic Objects. Collecting Practices for the Age of Humans

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## Abstract

The knowledge needed to tackle future environmental and societal challenges can only be generated through exchange between science and society. The conventional distinction made between natural and cultural heritage in museums and other institutions is no longer appropriate in the Anthropocene. Museums must rethink the social and cultural dimensions of existing museum collections and reinvent the organization of knowledge production for

our present. In three workshops at the Museum für Naturkunde Berlin, practitioners and interdisciplinary theorists discussed the concept of “Anthropocenic objects” and considered how they create opportunities for the emergence of new collecting practices involving participatory research and open exchange between research, society, and conservation institutions.

## Keywords

Anthropocene, museum, collecting practices, anthropocenic objects, natural and cultural heritage, knowledge production, digital collection, participatory research

## List of participants

Participants who have agreed to having their name published in the report are listed by alphabet for each workshop.

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## Introduction

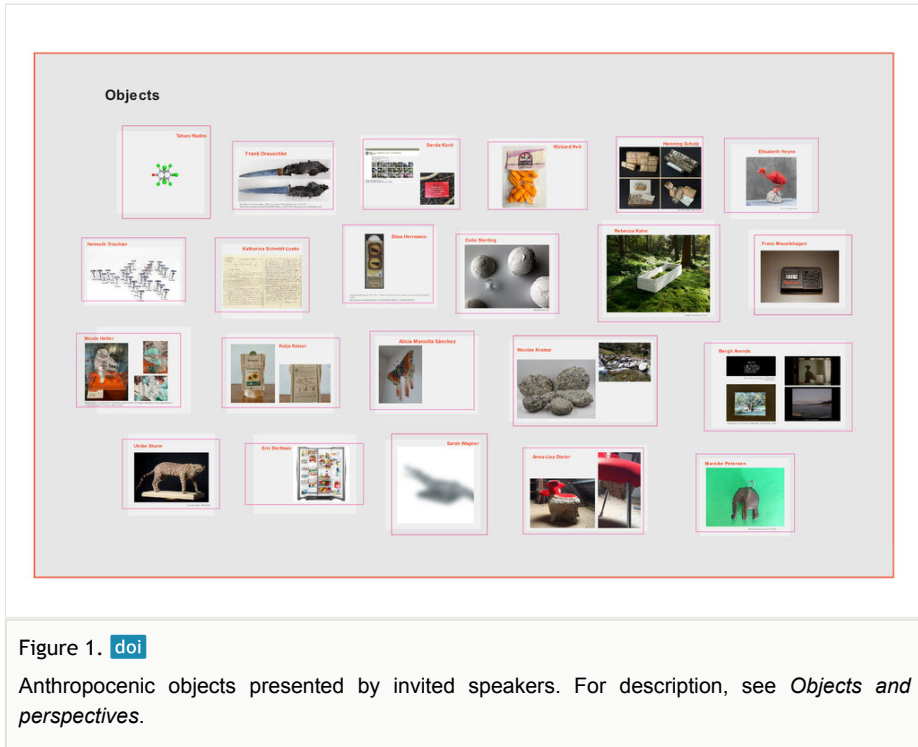
The Anthropocene, the "Age of Humankind", fundamentally undermines the distinction between human culture and nature as its counterpart. In this new geological epoch, human culture, industry, and technology impact the Earth system dramatically. It has also become apparent that human societies and economies can only thrive within the limits of the planetary boundaries. In order to gain a deeper understanding of these interdependencies, it is crucial to develop new approaches to the organization of knowledge for our present (Wark 2015, Dorfman 2017, Mitman et al. 2018, Arends 2020, Harrison and Sterling 2020, Oliveira et al. 2020, Renn 2020). Closer connections must be built and the dialogue between society and science, and between diverse disciplines must be strengthened in order to tackle the environmental and societal challenges of the future. This requires a reconsideration of the social and cultural dimensions of existing museum collections and a rethinking of the concepts of knowledge transfer in museums and archives.

The Anthropocene and the debates it has sparked have concerned museums and archives in recent years, as demonstrated by the founding of the [Center for PostNatural History in Pittsburgh](#) (2012), the [Anthropocene Studies section at the Carnegie Museum of Natural History in Pittsburgh](#) (2018), and the [Anthropocene working group at the International Committee for Museums and Collections of Natural History of the International Council of Museums](#) in 2018. In Germany, in the wake of the ground-breaking exhibition at the [Deutsches Museum in Munich](#) (2014), the Haus der Kulturen der Welt in Berlin has hosted diverse exhibitions, conferences and other events as part of its [Anthropocene Project](#) and [Anthropocene Curriculum](#). All these initiatives pursue an interdisciplinary approach that brings together the natural sciences, humanities, and the arts. They also share a special interest in material culture. The narrative materials of the Anthropocene – from nutmeg (Ghosh 2021) and mushrooms (Tsing 2015) to coal, petroleum (Klose and Steininger 2020), and rubber (Mitman et al. 2018) – reveal the intertwining of social, colonial and political issues with questions of technology, energy regimes, biogeochemistry, and Earth system science.

In view of the close connection between material culture and the Anthropocene, it is clear that preservation institutions such as archives and museums have a special role to play here. The discussion of Anthropocenic objects, their characteristics, and their significance encourages reflection on the traditional organization of museums by disciplines, their collection practices, and approaches to knowledge transfer, and points to new directions for science, preservation practices, and the identity and mission of museums and archives. Above all, however, the concept of the Anthropocene challenges both institutions of the Global North and research practices to address questions of representation in the context of collections and museums: Which "humanity" is addressed here? And what exclusions do the institution of the museum and the term "Anthropocene" generate in equal measure?

The workshop series has been organized by the Museum für Naturkunde Berlin as part of a project in collaboration with Europeana Research within the Europeana Research Grants Programme 2021 - Theme: Crowdsourcing and Research. The series comprised three

workshops, each with a specific thematic focus and selection of speakers (see also Suppl. materials 1, 2, 3 for the agendas and list of speakers). Each workshop opened with a brief presentation of objects that exemplified the speakers' understanding of Anthropogenic objects (Fig. 1). These inputs were followed by a different method of discussion adapted to each topic. The first online workshop “What is an Anthropogenic object? Transdisciplinary perspectives on natural, cultural and hybrid objects” (17 February 2022) was attended by 52 participants. The following questions were discussed in three plenary sessions:



1. If the distinction between natural and cultural heritage is no longer tenable, what new categories are needed to classify objects in the Anthropocene? This distinction was never precise, as the ‘two cultures’ debate reveals, but we must nevertheless ask: How could or should Anthropocene objects be described?
2. How can we rethink our relationship to global environmental transformations and the unprecedented challenges they pose? How can looking at the material culture and objects of the Anthropocene help us understand global environmental transformations, with all their interdependencies and vast scales?
3. What new institutional and political perspectives result from revisions to the status of Anthropogenic objects? What is the role of conservation institutions, archives, and especially natural history museums in the Anthropocene? How must institutions change if we assume that Anthropocene objects can no longer be clearly assigned to the categories of art, science, and cultural or natural heritage? Moreover, what institutional and (cultural) political changes are needed for future collecting in the

Anthropocene? Who has access to objects, for example? Who does not? How do museums engage with the public or foster transdisciplinary research? Which institutions and projects are funded and why?

The second workshop “How to collect, store, and curate objects in the Anthropocene? On participatory and digital collections” (17 March 2022) was held as a virtual event with 24 participants. The following questions were discussed in two breakout groups:

1. What are the benefits and challenges of crowdsourcing projects and participatory collections? How can conservation institutions collect, digitize or visualize memories, atmospheres, and relationality?
2. How can conservation institutions facilitate and produce transdisciplinary and multi-perspective views of digital objects? What data and standards are needed to link community-generated data and research perspectives with multiple meta-levels?

The third workshop “Anthropocenic objects: Perspectives for the future of conservation institutions and collection practices” (14 April 2022) was held as a hybrid event at the Museum für Naturkunde Berlin and online. The 34 participants shared their perspectives on the following questions in three rounds of discussions in small groups:

1. How must museums, collections, research and science open themselves in the face of the Anthropocene? What does a framework for the reorganization of collections and collective knowledge need to look like for the Anthropocene? Which overall conditions need to be changed? What new contexts are needed?
  1. How should natural and cultural heritage be connected at the institutional level?
  2. What connections must be created between research and society, and between digital and analogue practices?
  3. How can local and global perspectives be brought together?

The following sections summarize the results, theses, and open questions developed across the three workshops but do not necessarily represent the views and positions of individual participants. A list of recommended reading and relevant projects contributed by participants during the workshops is included at the end of this report.

## Key outcomes and Discussion

The discussions held throughout this series of workshops proved the importance of this debate for the future and the role of museums and archives. From questions of how to facilitate adequate knowledge transfer in exhibitions (see keynote presentation by Helmut Trischler, Suppl. material 4) to a critical discussion of the exclusions and new borders generated by the concept of the Anthropocene (see keynote presentation by Tahani Nadim, Suppl. material 5), the participants grappled with the central issue: what kinds of institutions do science and society need in order to tackle the unprecedented challenges of this new geological epoch?

## Inequality and multi-perspectivism

In discussions on the Anthropocene and Anthropocenic objects, it is crucial to reflect on the Euro-centric biases and implications not only of these discussions but also of the notion of the “Anthropocene” itself. Prompted by this, participants considered what it means to think about the Anthropocene from another perspective than that of Global North. Is it really a question of finding new categories for the description of Anthropocenic objects? Or is the act of categorizing a pure reflection of European knowledge orders that stand at the beginning of the Anthropocene? A significant question for Anthropocene objects is the one of representation: Who collects? Whose stories are told? Whose objects are considered valuable for research and preservation? There is a need for reflection, transparency, and a reorientation of current practices. The question of transcultural transformation must be debated more deeply, challenging the dynamics of objects and discussions that include, encompass, or combine elements of more than one culture. It is important to acknowledge ambiguity and different perspectives. Such an approach would help to bring the complexity and inherent contradictions of the concept of the Anthropocene into focus. However, it is also to be expected that people may not be prepared to deal with this ambiguity and that this could create new challenges in knowledge transfer (see also *Places of knowledge production*).

A sense for the relationality between Anthropocenic actors, infrastructures, and objects is important and requires that the historical, economic and postcolonial dimensions of the Anthropocene concept always be considered. The notion of “Black Anthropocenes” (Yusoff 2018) introduces a productive critical perspective on the Anthropocene and the legacy of White Geology (see “Seeds of Empire in a Black Anthropocene”, by Bergit Arends). In addition, the Antipode Foundation film “[Geographies of Racial Capitalism with Ruth Wilson Gilmore](#)” directed by Kenton Card was discussed as a significant basis for the contextualization of Anthropocene objects.

Digital collections might be an opportunity to change current collection practices in the sense of opening them up, including other perspectives and rethinking questions of representation and ownership. Their possibilities invite us to consider which objects institutions genuinely need to physically possess for research purposes and the potential role of digital representations. Nevertheless, digital collections can also proliferate epistemic violence if they lack a reflection of underlying hierarchies and ownership (see Odumosu 2020). Merely adapting existing practices and digitizing objects will not change or improve inequality and representation. A new attitude and approach are needed, based on co-creation and co-curation, and using the affordances of digital media as appropriate, for example in mapping relational networks and adding multi-layered descriptions.

In broader terms, preservation institutions must seek to strengthen their reflexive capacities and those of users. In the process they must also expand the notion of who is part of the global and question from whose perspective something is defined as local or global, both in science and society.

## Research cultures, epistemologies and institutional perspectives

These discussions on how to deal with research cultures, categories and terminologies also raised the issue of whether new museums are needed and what should be preserved in them. As perspectives and notions change, how and by what criteria can museums gauge what might be considered valuable or insignificant in the future? In a nutshell, museums must ask: For what kind of future are museums preparing to be relevant? Participants advocated for a systematic approach to the inclusion of more political history in natural history museums. It was noted, however, that museums are trusted institutions and must maintain this trust while adapting to a new role in society and politics. The extent to which museums relinquish their interpretative powers and the approach they take to reflecting on the brutal practices from which their collections stem will undoubtedly be the subject of critical debate. A change in epistemic regimes and an adaptation to new and open practices is needed. These changes must be accompanied by new approaches in recruitment to create a diverse workforce that includes people with different disciplinary and cultural backgrounds. Natural history museums are already taking first steps towards collaboration beyond the borders of individual disciplines (e.g. <https://takingcareproject.eu>). One possibility to develop a deeper level of transdisciplinarity could be to establish an exchange of curators between different kinds of museums.

The importance of fostering exchange between universities and museums on the reassessment of the Anthropocene discourse was also noted in discussions.

This discourse has to a large degree been driven by science to date and there is a need to diversify and broaden the debate. However, the very term “Anthropocene” illustrates the difficulty of translating complex concepts into everyday terms. In order to foster dialogue within and between science and society it is crucial to explore and create ownership through the development of appropriate language and learn how the meaning of terminology might differ in different contexts. Crowdsourcing projects and platforms could contribute to this process by inviting people to enrich the vocabulary. It was also suggested that the focus of discussion should turn to different notions of the politics of objects and stories in order to open the debate to new ways of thinking. Overall, there is a need for new constructive debates and critiques that are built on trust and mutual understanding. These must be supported by new approaches and formats of exchange that provide a setting in which friction is acknowledged as a component of fruitful debate rather than something that must be overcome.

Language is an important element in participatory projects. Scientific vocabulary can be very exclusive, however, the use of overly simple language can lead to misunderstandings, misconceptions or even the loss of meaning or the connection to science. Language also plays a critical role in the perception of participatory processes as valid forms of research and in scientific debates, where significant differences persist in the perceived quality of data gathered by experts and citizen scientists.

How new categories for Anthropogenic objects might be created and established remains an open question. And there are doubts as to whether *more* categories are really needed.



It was stated that there is also a need to recategorize the process of knowledge production and connect it to infrastructures, places of knowledge production, and different scales. It has been argued that continuing to use “Nature” as a concept is contrary to the idea of the Anthropocene, because the distinction between nature and culture is no longer (or never was) valid: There is always something natural (and cultural) about every object. However, this assumption is also viewed critically. It was suggested that historicizing the concept/idea of nature (and the environment) might open pathways to a deeper understanding and refine the concept of nature. As a counter-proposal, it was also suggested that non-Western ontologies be examined more closely and that the Western distinction between nature and culture represents a special case that has always been used to exclude something by declaring it to be “Nature”: This is still illustrated in ethnographic exhibits that treated indigenous cultural heritage as natural and the product of a less-human other.

When it comes to putting multi-perspectivism into practice, it is crucial that the historical, individual and cultural usage of words in different contexts and different epochs be reflected. The use of certain words provides a certain framework for debates and introduces moral, epistemic, or ethical standards. For example, the metadata (object descriptions, documentation, catalogues) of historical collections often contain racist or offensive language. Instead of simply erasing historical wordings, multi-layered descriptions from different perspectives are needed to contextualize, challenge, open up, and deconstruct historical knowledge production in collections.

Museums and archives must constantly engage in processes of self-reflection on the historical development of organizations, collections, and their connectedness to various political, economic and epistemic contexts, resources, agents and institutions.

## **Object and objectification**

There was a broad consensus among participants on the need to critically rethink the nature of objects and their different roles. How objects appear changes within the context of other objects and different interpretations. This dimension of constant transformation should also be reflected in collections. Objects can be understood as an invitation to think together with things. These reflections include not only the relationship of objects to nature and culture, but to the technosphere as a new sphere of the Earth in which natural and technological forces form together a new and almost independent entity.

The question arose as to whether a distinction should be made between collection processes and an object itself, and how the connection between the two should be addressed. The idea that any object can potentially be considered an Anthropocenic object, depending on the stories that connect with it, creates uncertainty as to what institutions should collect. In this sense, every household is a museum and combines digital, local and global dimensions. If this is the case, who decides what should be collected and on the basis of what criteria? Moreover, how can institutions collect something that is not an object, but a hyperobject (Morton 2013)? And how should they deal with things that are widely distributed through time and space, such as Styrofoam or plastic?

Participants adopted different positions as to whether materialities should be taken seriously and discussed further, or whether discussions should instead focus more on contexts. It was stated that the importance of objects should not be overestimated, as they are just one part of the Anthropocenic story. Objects are key to sample and tell new stories, but do not speak for themselves and always need interpretation. These added layers of interpretation may differ between research and knowledge transfer in exhibitions. The counterargument was made that researchers must look even closer at the objects and be guided by their materiality, because only then can the necessary knowledge about the connections in the Anthropocene be produced via multi-layered reactions and the development of multiple perspectives on these objects.

The [Städel Museum's digital collection](#) offers one example of how subjective keywords can be used to describe the atmosphere that is created with an artwork. The collection uses atmosphere and other categories of metadata to create diverse entry points for people without scientific knowledge as well as new connections between artworks of different historical and cultural contexts. The keywords applied in the collection reflect the various perspectives of the team and other sources, including university students with knowledge of systematic databases, museum guides, and literature reviews. The possible introduction of social tagging in the future could make the collection even more accessible but could also create biases.

The questions remain: how many objects do museums need to collect in the Anthropocene? Could it be enough to have five objects with numerous layers of stories rather than five hundred? What are the consequences for research and knowledge transfer? Do museums need to collect more objects at all? Or should museums focus on adding new interpretations to existing objects, revealing connections and socio-political dimensions instead? The Anthropocene and Anthropocenic objects also challenge the current approach to and ethics of displaying non-humans.

## Connections and absence

The concept of the Anthropocene is frequently deployed and interpreted within contemporary debates and knowledge transfer in ways that emphasize grand narratives. It is often used to connect not only topics but also disciplines and institutional ways of working. In museums, the concept is used to bridge the divide between departments and create connections across collections: both on an informative and emotional level. These connections serve as descriptive labels for Anthropocenic objects. But there is still the unresolved question of the purpose of these connections. In the discussion participants suggested that it might not be important to connect all objects with each other. Some participants argued that multiplicity could be used strategically to fracture the grand narrative and that it is more important to address and explore the different and contradictory meanings of objects and their connections. In the case of museums, the question arises as to how objects are connected by being together in a room/the museum. Thinking beyond this, the natural history museum itself might be understood as an Anthropocene object.

Besides connections between objects, the role of absence was discussed, and the ways in which uncertainties and non-knowledge could be made visible. How to deal on a scientific, emotional and political level with the absence of representation and gaps in knowledge? How to provide for multi-perspectivism but also be transparent in the absence of perspectives and missing data due to geographical blind spots and Eurocentrism?

### **Places of knowledge production**

The debate brought to the fore the need to redefine and expand our understanding of places of knowledge production to include non-institutionalized places. In addition, traditional institutions of knowledge production such as museums need to open up to new knowledge practices and hitherto excluded agents. These changes are necessary so that they can serve as places of research and knowledge transfer for our shared more-than-human history on this planet in a broader cultural context. In further discussions, the relationship between the tools of science and the environment was addressed, drawing on the example of urban ecology, and specifically airport ecology, to show that – by and large – there is no exclusive connection between the tools of science and a certain environment.

In order to bring about real participation and a change of practices, museums will have to relinquish their power to a certain extent. Breaking down hierarchies in this way can encourage people to engage with museums on different terms and to share their own observations, opinions and stories voluntarily. This led to the question of how participation can become part of museum practice. Workshop participants asked how participation is connected to the museum's expertise and how the veracity of information sourced through participatory research can be ensured. Overall, developing dialogue, creating community engagement, and incorporating new ideas into museums takes time. Experience shows how challenging this can be, as museums have to change in every aspect. This includes establishing stronger and more extensive connections between exhibitions and different collections.

In the area of knowledge transfer, the Anthropocene debate creates ambiguity. The question of whether one should focus on grand or more fragmented narratives of the Anthropocene looms large here. Participants held different views on this question and the consequences for knowledge transfer remained open. Nevertheless, the importance of storytelling was evident and it was proposed that it should not be left to climate scientists and economists alone. Overall, knowledge transfers – exhibitions, for example – need to be supported by programmes, as visitors cannot hope to grasp the Anthropocene on the basis of an object and a 50-word-caption. It was noted that unidirectional communication is bound to fail and that people need to be brought together to create a deeper understanding. Participants also shared their experiences regarding the difficulty people (academics) face when writing their stories and playing more freely with ideas and things.

Knowledge production and transfer in the Anthropocene must be opened up to create a global dialogue that includes multiple perspectives. However, achieving this will require both a cultural change and the development of appropriate tools. It is therefore crucial to think creatively, broadly, and inclusively. Both online, in-person, and hybrid formats can

help in bringing people together, generating exchange, and forging (institutional) partnerships. Science needs to be engaging: scientific institutions and actors need to communicate. Participation needs openness – including an approach that is accepting of errors and mistakes made by participants as these “mistakes” might be less important than the value that is created by adding different perspectives, expertise and knowledge.

Museums must make more impactful investments to ensure that genuine and honest exchanges between different perspectives are an intrinsic part of knowledge production.

### **Digital collections: media affordances, transdisciplinary and ethical perspectives**

Digital collections and linked data offer new possibilities to make collections accessible to a wider audience and allow institutions to enhance existing information associated with an object through various types of content and multiple perspectives. However, compared to physical collections they are limited when it comes to conveying experiences of the materiality of objects. Moreover, the connections between objects are often not made visible and accessible enough in digital collections. Using events in [CIDOC Conceptual Reference Model \(CRM\)](#) may help to disentangle the network from the object and allow users to apprehend several facts at the same time.

Overall, it seems that many digital collections are still rather static, mimicking physical galleries or museum buildings instead of making full use of the opportunities of the digital medium. The digital representation of objects and their display in the digital sphere often lack interactive elements. As a result, objects remain one-dimensional and feel less “real” or “special”. It seems to be more difficult to capture attention with a digital object. It is therefore crucial to reflect on the affordances of the chosen medium. Institutions should make more use of the possibilities provided by new tools to explore and interact with objects. There is also a need to reflect on whether the digital medium is always the best choice, given the pace of digital technological change and the need to ensure the long-term preservation of objects.

In order to harness the full potential of digital media, museums need to link data between disciplines and establish terms that can be used to create these connections. Currently, the lack of suitable transdisciplinary data standards and data models represents a huge barrier for linked data. Due to this, available metadata is often only partially linked to disciplinary collections and data standards. This could potentially foster biases and information loss beyond reasonable levels, as the value of the complete metadata is lost. Existing linked data models (like [EDM Europeana Data Model](#)) can be resource-intensive to use, creating hurdles for institutions with limited resources.

Participation can lead to undetected biases depending on the number of participants, scale and prominence of the collection and host institution, and the design of the process and types of contributions. Participation activities are often connected to a capitalisation of attention and this aspect requires reflection. It was noted in the discussion that gamification

approaches and their impact on the quality of participation and engagement of different perspectives call for careful consideration of goals and methods.

Overall, there is a need for constant ethical reflection on collections and their contexts. Should connections be made between objects simply because the technology facilitates this? Should data always be made available for reuse? These are important ethical questions that conservation institutions must engage with again and again. Standard ontologies reflect Western concepts. The context of data creation should be documented and preserved as well. It is also important to understand who collections are digitalized for and the role of digitalization for documentary purposes. Given the fast pace of development, it is important that institutions and researchers make reflection on new practices an integral part of their work.

### **Open data: data sovereignty and sustainability**

Participatory collections open up questions of ownership and data sovereignty with legal implications that must be considered carefully. [CC licenses](#) are one good option to address these issues. Nevertheless, tensions can arise with respect to data sharing and ownership in Citizen Science. Precisely how and under what terms participatory contributions are to be shared must be communicated transparently and in accessible language – even though these issues may initially cause participants to hesitate to share memories or objects, for example. It is important that open access digital collections safeguard the right of contributors to control and access their data by implementing the FAIR and CARE Principles (see Carroll et al. 2021). In addition to this, current practices of digital reuse could be re-imagined. Institutions could adapt the legal framework applied to physical objects to facilitate the lending of digital objects. Overall, open data requires institutions to identify and adapt long-term data archiving solutions for their needs. Shared databases can provide a sustainable, accessible and long-term solution.

## **Conclusions**

It appears that a new type of museum and archive is urgently needed that unites natural and cultural objects in a radical transdisciplinary approach, while reflecting which distinctions should be maintained. Museums must be institutions that recognize and embrace the cultural contexts of objects in their care, and engage the public as a vital part of their practice. This requires new approaches and practices that question the known and test the new through processes of reflection and experimentation. Museums must question both their motivation and the consequences of connecting, for example, local and global perspectives. As museums embrace digital media, reflection on its use must be integrated into museum practice to ensure that impacts – both intentional and unintentional – are acknowledged and inform institutional change.

Novel forms of funding are required to facilitate the development of these new institutions. This is not necessarily about more funding, but rather about funding that takes transdisciplinarity seriously, supports experimentation, and enables long-term

transformation processes. Institutions must therefore continue to expand the scope of dialogue to include other perspectives and different levels. The Anthropocenic object can be a conversation opener for efforts to build a common understanding and language and to deepen debates that go beyond the Eurocentric bias of the Anthropocene.

## Objects and Perspectives

### **3D model of chlordecone** - Tahani Nadim

This is a 3D model of chlordecone, an organic compound containing chlorine that was, beginning in the 1970s, used as an insecticide against the banana weevil. It was produced by Allied Signal Company and LifeSciences Product Company in Hopewell, Virginia where the waste generated in its production was discharged into local streams and rivers, causing widespread devastation to humans and ecologies. The plant was closed down in the mid-70s. But chlordecone continued to be used on a massive scale in the banana plantations, which continue to this day, on Martinique and Guadeloupe. It was banned in mainland France in 1990 due to its polluting and carcinogenic effects, yet it continued to be legally used on Martinique and Guadeloupe well beyond that. A 2018 study shows that over 90% of the inhabitants of islands are contaminated by the chemical, so are up to 50% of the land, and over a third of the coastland waters. For humans, being exposed to chlordecone increases the risk of premature births, arrested cognitive development and motoric disorders in children. Guadeloupe has the highest prostate cancer diagnostic rate in the world. The case of chlordecone shows how Europe polices its borders, keeping its insides clean while leaving its constitutive outsides left to toxic exposures. It evidences how environmental destruction and pollution are “an expression of colonialism”, as Michelle Murphy and many others are arguing.

### **A shrapnel paper knife from World War I** - Frank Drauschke

I want to introduce an historical object, which can exemplify human impact in the Anthropocene. From the beginning to unfortunately our current days. It was made from remnants of war, which can be found in all archaeological strata since humans started to use “tools” to fight each other. This object was produced by German soldiers on the Western Front of World War I as a souvenir and brought home by my grandfather. It is a paper knife with a handle made of a shrapnel of a grenade, decorated, and welded together with the blade by a copper piece of a driving band of a shell. The crowdsourcing project Europeana 1914-1918 collected many [more examples of such so called Trench Art](#) – souvenirs of war made out of weapon materials. Such crowdsourcing campaigns could be a role model to collect and digitise anthropocenic objects from different fields, a wide public, and across borders.

### **A red plant label** - Gerda Koch

As an example of an Anthropocene object, I have chosen a plant label in the Royal Botanic Garden Edinburgh. "In January 2022, storms Malik and Corrie swept across Scotland. Strong winds toppled trees, damaged buildings and more than 80,000 people were without

power." (Hinchliffe 2022). A specimen of *Rhododendron pseudochrysanthum* was also blown over at the Botanic Gardens. The image of the label is part of an online blog post by Botanic Garden staff describing the impact of the powerful storms. The species was identified by a plant label engraved in red as one of the many plants the garden grows that are threatened with extinction in the wild.

For me, therefore, the red label symbolizes several aspects of the Anthropocene: On the one hand, it is an expression of our purely human urge to classify and label, unfortunately doing so especially in the past, often without considering that with the desire to analyze and dissect, we run the risk of destroying last occurrences and beauty. On the other hand, by exporting native plants and animals, we accept the risk to vegetation and wildlife in non-endemic areas. While rhododendrons, for example, are threatened with extinction in their original homelands in the Himalayas and Southeast Asia due to large-scale deforestation and climate change, they are aggressive invaders of endemic flora in non-native areas such as England.

The condition of the trunk of this one plant meant that it could not be re-erected, but it is stated that there is plenty of material for propagation and the nursery team has already taken buds for micropropagation. A spark of hope, as it is estimated that up to 150 species of plants and animals disappear from the earth every day. A fact that emphasises our important duty towards the future generations that will live through the Anthropocene: to protect biodiversity, both in situ and ex situ, and thus to achieve, preserve and treasure a prosperous coexistence of culture and nature!

### **Banana-flavored "Circus Peanut" - Richard Pell**

I chose to focus my discussion of the Anthropocene around the ways contemporary extinction can be memorialized in unexpected ways.

In the early 20th century, the United Fruit Company consolidated private land holdings across Central America, and the Caribbean, largely in the service of mass marketing a single variety of banana called the Gros Michel ("Big Mike"), propagate exclusively through the cutting and planting method where each plant is necessarily an identical clone. The company had such sway over regional governance that the term "Banana Republic" was coined to describe its effect democratic institutions. The company's singular dedication to maximizing profits from this genetically uniform fruit resulted in the creation of the largest mono-culture crop the world has ever known. It did not take long before the vulnerable genetics of the Big Mike were exploited by a fungus that came to be named Panama Disease.

The early signs of this blight were chronicled in the hit 1920's song, "Yes! We have not bananas! We have no bananas today!" By the 1950's the blight had spread to every major banana plantation in the hemisphere, becoming one of the geographically largest industrial disasters in history. The spores of the Panama Disease fungus lay dormant in the soil of the region to this day, preventing any return of the Big Mike.

By the 1950's, the regional extinction of this banana variety was imminent, and a replacement variety with a slightly different flavor profile was already underway. The Cavendish banana is the one Americans eat today. It is worth noting that the Cavendish is also a mono-culture that is now being preyed upon by a fungal blight of its own. There is no back-up banana this time.

During this whole time, a parallel conversation about flavor was going on primarily in the candy industry. Researchers were discovering small molecules that triggered flavor responses and would attribute their taste to foods they were reminded of. One discovered in the mid-19th century is isoamyl acetate, a "fruity" flavor that the British associate with a particular variety of pear, and Americans associate with banana, specifically the Big Mike. It turns out, one of the differences between the Big Mike and the Cavendish, is that the former contains naturally produced more isoamyl acetate. So, the American association with artificial banana flavor is tied to an extinct variety of banana that few Americans under the age of 60 have ever tasted.

The Big Mike continues to be cultivated and sold on the other side of the planet. It is the dominant grocery store banana throughout Malaysia and Japan. However, if we were being honest about the scale of industrial catastrophe produced by the United Fruit Company, we could consider describing Central America as the "Big Mike Exclusion Zone".

Today, for Americans seeking to taste the distinctive flavor of the regionally extinct Big Mike banana, one need only turn to your bulk candy distributor. Among the cheapest and historically long-lived candy's produced is Spengler's Circus Peanut. This marshmallowie confection is adjacent to Peep's in texture but has been produced for well over 100 years. While they were at one time available in a variety of flavors, the manufacturer eventually settled on one: isoamyl acetate. Spengler claims to push approximately 32,000 lbs of Circus Peanuts into the world each day.

### **Collection of freshwater shells from East Africa - Henning Scholz**

This collection attracted my interest when I was working in the Museum für Naturkunde as a palaeontologist. It was an outcome of the first German expedition to Central Africa in 1907 and 1908, led by Adolf Friedrich, Duke of Mecklenburg. Egon Friedrich Kirschstein collected the shells at Lake Kivu and Lake Edward and used them as evidence for scientific theories. However, other aspects of this collection make it much more interesting than the scientific value.

Like in many cases with such old collections, the way they are packed tells a lot about the circumstances in which they were collected. Which ammunition they used for their guns, the cigars they smoked. The collection is still left in its original condition where possible, to keep this element of the story intact for future generations.

Another important aspect to this collection is the person Egon Friedrich Kirschstein and how this expedition became a springboard into a new life. He found his love in East Africa and got married and stayed his entire life there. You can even read about it in children's



books. The German author Hermann Schulz has turned the last days of Kirschstein's life - after an accident in a mine in East Africa - into a children's book.

This is what I find fascinating, how a collection made to support scientific theories reveals many other stories, to understand how research has been done more than 100 years ago, to give insights into the political and societal circumstances and challenges and finally the impact of all of this to the lives of individual people.

**Corrosion cast of a pigeon (*Columba livia*) from 2004 by Gunther von Hagens, Museum für Naturkunde Berlin - Elisabeth Heyne**

This corrosion cast was created by German physician and anatomist Gunther von Hagens, who is best known for his provocative and ethically questionable shows featuring animal and human bodies preserved in spectacular lifelike poses. This object is a synthetic cast of the vascular system of a pigeon, created by injecting a plastic (polyacrylate) into the vascular system so that it is distributed throughout the system right down to the tiniest capillaries. Once this plastic has hardened, the surrounding soft tissue is corroded away using an enzyme solution. For me, this bird turned plastic represents an anthropocenic object. Its blood has been replaced with human-made material, it has solidified into an object.

As a literary and cultural scientist, I am interested in the question of how the understanding of science, collecting practices and our relationship to nature are connected. This object was created to make the otherwise invisible vascular structures of the bird visible and to display them in a spectacular way. Looking at the particularly cruel production method of this object, it is linked for me to a discussion that can be traced back at least to German Romanticism: The critique of science, which must dissect its object in order to study it. For me, this ambivalence can be seen in the pigeon: The scientific gaze, which here is perhaps more of a voyeuristic one, aiming at the appropriation and display of a natural object - but destroying it in the process, of course. This ambivalence between scientific curiosity and destructiveness, biological animal and synthetic material, desire for knowledge and voyeurism, is for me an important characteristic to describe the relationship between humans and objects in the Anthropocene.

**Exhibiting the Anthropocene – and the Technosphere – means breaking away from established knowledge orders - Helmuth Trischler**

Based on the experiences with the exhibition “Welcome to the Anthropocene. The Earth in Our Hands”, on display at the Deutsches Museum from 2014 to 2016, the paper discussed challenges and opportunities of tackling a topic as new as the Anthropocene in museum galleries. The Anthropocene as a concept not only blurs the boundaries between nature and culture, disciplines and institutions, but also between types of museums. To be able to cope with the complexity of the Anthropocene, the curatorial team included collections not only from the Deutsches Museum as a museum of science and technology, but from all sorts of museums, including history museums, anthropological museums, natural history museums, and art museums. In addition, the team collaborated with various artists to profit

from the provocative potential of arts to question established viewpoints and perspectives. The main lessons learned from the Munich exhibition were:

- The Anthropocene concept stimulates both interdisciplinarity and transdisciplinarity.
- The Anthropocene asks for new narratives and new temporalities.
- The Anthropocene forces both academia and museums to leave their comfort zones and to critically reflect upon established concepts, practices, and institutional arrangements.
- In the framework of the Anthropocene boundaries – museum boundaries – become blurred, if not obsolete.
- The Anthropocene fosters inter-institutional collaborations.
- The public is not shying away from the complexity of the Anthropocene concept, if publics are addressed as responsible citizens.
- The Anthropocene can serve as a laboratory to experiment with new tools of communication and education in order to foster civic society and sustainability – or may even pave the way for a novel mode of knowledge production and communication, in other words: a new knowledge order.

**Handwritten letter from 1907 by Aaron Aaronsohn, Museum Koenig - Katharina Schmidt-Loske**

The author Aaronsohn is agronomist from Zichron. Recipient is Friedrich August Körnicke, lecturer of agricultural botany at Bonn University. This letter is part of a correspondence between botanical specialists at the beginning of the 20th century. Why is this letter important? Körnicke was a key figure in wheat research and co-edited a taxonomist a handbook, titled *Handbuch des Getreidebaus* (1885). Years before his correspondence with Aaronsohn, Körnicke had borrowed a sample from Kotschy's Herbarium in Vienna. He identified this sample, about little was known, as an ancestral form of bread wheat. Aaronsohn went for field expeditions to rediscover this so called *wild emmer* on Mount Hermon in the Near East. He sent specimens for further study to Europe.

*Wild emmer* is the ancestor of cultivated *emmer*, an important specimen of wheat. In the 21st century *wild emmer* is often mentioned in the context of archaeobotany. It is not known if those samples from the Neolithic sites were cultivated or simply foraged in the wild. Today we know: *emmer* was first cultivated in the regions of the [Fertile Crescent](#) around 9600 BCE.

When did the Anthropocene start? We know that there are different perspectives. Some argue that it starts when *Homo sapiens* entered the world, 200000 to 300000 y ago. Some argue, it started with the neolithic revolution when we developed from hunters and gatherers into tillers and farmers approximately 12000 y ago. Others argue, that the Anthropocene began, when mankind started to use fossil fuels extensively, about 200 y ago. From the chosen object it could be argued that the neolithic revolution marks the threshold towards the Anthropocene.

**Lampyridae Rafinesque, 1815, The Trustees of the Natural History Museum, London found on Europeana** - Elisa Herrmann

Thinking about the anthropocene I quickly come to the aspect of a declining biodiversity and to me fireflies (Lampyridae) are symbolic of biodiversity loss that I have experienced. As a child I was fascinated by fireflies although I only knew them from fairy tale books. When I asked my parents and grandparents about them, they replied that seeing fireflies was very common in their childhood. At this point I had not seen any myself and as of today I saw them only once. The encounter felt somewhat magical as I had never seen light that was not based on electricity, except for fire, lightning and the sun. Electricity enabled humans to shape the earth as we know it today and artificial light has made our lives more independent from nature thus resulting in the belief that we can make the world our own or control it. Ironically the artificial man-made light obscures the view of our surroundings as it creates light pollution, which is a threat to fireflies as they use their light for communication and attraction for mating. The moment I saw fireflies was also so unique as I don't know if I will ever see this light again. We can preserve the bodies of fireflies in museum collections, but the light itself cannot be preserved. Furthermore in some cultures fireflies resemble the souls of the deceased, so what happens to this belief if you never witnessed fireflies or their light?

In conclusion the firefly represents my self-experience decline of biodiversity that is often related to human activity and the belief to control nature. They show us the difficulty of preserving intangible objects in collections and raise questions about the impact of species extinction on our cultural heritage.

**Little Earths** - Colin Sterling

The Anthropocene object I chose to share is really multiple objects – the ‘Little Earths’ produced by Manifest Data Lab as part of their ongoing research into the materialisation of climate data. The Earths in question are 3D printed models made from plant-based filaments and other recyclable materials. Their form is based on data from influential Global Climate Models, which speaks to a certain mode of scientific knowledge production, but in their fragility they also represent something much deeper: the precarity of our planetary habitat in the age of the Anthropocene.

Developed in response to the Reimagining Museums for Climate Action project, the Little Earths explore how climate data can be communicated beyond ‘normative scientific contexts’, including science centres and natural history museums. Intended to be shared and, crucially, *cared for* as ‘talismans of our relationship to the planet’, the Earths seek to encourage a different relationship between people, their experience of climate change, the data through which this problem is often comprehended, and the planet itself.

I submitted this object to the workshop for two reasons. First, to express a certain ambivalence towards the very idea of ‘collecting’ the Anthropocene in any one space or institution; and second, to highlight the crucial role creative interdisciplinary practice can play in shifting attitudes towards planetary care and stewardship. Following Donna

Haraway, it is my firm belief that any engagement with the Anthropocene must seek to make this new geological time interval 'as short/thin as possible and cultivate with each other in every way imaginable epochs to come that can replenish refuge'. Perhaps this is what museums should aim to become: refugia for a post-Anthropocene future, whatever shape this might take.

### **Loop Living Cocoon biodegradable coffin** - Rebecca Kahn

Developed by a startup in the Netherlands, and costing around €1,500; the Cocoon is a coffin which is grown in an energy-neutral lab setting, using mushroom mycelium. It is designed to decompose within 45 days of burial, enriching the soil it is placed in, and speeding up the decomposition process of the human remains it contains to approximately three years - in comparison to the 10 - 20 years this process usually takes for a human body buried in a traditional coffin. In this respect, it is presented as an eco-friendly alternative to coffins constructed with synthetic materials, which can leech toxins into the groundwater around cemeteries (Jonker and Olivier 2019). In many respects this object embodies several of the dilemmas of considering the Anthropocene: Firstly, it presents a technical and nature-derived solution to a critical man-made problem, in this case, the pollution caused by industrialized burial practices. The concept is intriguing - mushrooms and their mycelium networks have captured the popular imagination in recent years, and the notion of 'returning to the earth' after death may be appealing to many people, as evidenced by the growing 'green burial' industry. However, the cost of the solution is high - in this scenario, environmental concerns have a specific price-tag. The Cocoon also raises the question of the scale of the problem it purports to solve. In many cultures, funeral rites are already deliberately low-intervention: untreated wood coffins or simple cloth shrouds are used, and bodies are placed directly in the ground, or cremated. These traditions are not without environmental impact, but they are rooted in non-industrialised practices. Contrasting these rituals and practices with the problem and corresponding solution presented by the Cocoon requires us to consider exactly who gets to define what a 'good' burial might look like.

### **Mephisto chess engine** - Franz Mauelshagen

This chess engine was developed in the 1980s and even became a World Microcomputer Chess Champion in 1984. Back then, chess computers were quite beatable, not only by chess grandmasters, but even by strong amateurs. It took another thirteen years, and an IBM supercomputer by the name of "Deep Blue", to beat the world chess champion, Garry Kasparov, in a six-game match (Kasparov 2017). Today, many chess engines are so strong that it would be difficult for the reigning human world champion, Magnus Carlsen, to win a single game in a longer match. The success story in chess engine development is pure calculation power. Back in the childhood years of chess engine development, calculation capacity approaches used to compete with modelling artificial chess intelligence after grandmaster thinking. The latest generation of engines using Monte Carlo tree search (starting from Alpha Zero, developed by Google) has very little in common with the way humans think (Moerland et al. 2018). In practice, the learning process has been reversed. Nowadays, professional chess players use engines to prepare for their games and, in this

collaboration with AI, they learn new patterns, which increasingly influence chess games played between human beings. In the Anthropocene context I use this collaboration between HI (Human Intelligence) and AI to illustrate how technosphere objects not only influence our relations with the earth system (or: the environment), but also have become drivers of change in the anthroposphere. Understanding the expansion and dynamics of the technosphere as a new earth layer has become a key focus in Anthropocene studies (Haff 2014, Zalasiewicz et al. 2019, Zalasiewicz et al. 2017). There are at least three principled ways of looking at this new layer: 1) its emergence from human inventiveness, science, and increasing access to natural resources; 2) its multiple feedbacks on all natural subsystems of the earth system; and 3) its feedbacks within the socio-cultural realm. My choice of objects speaks to the latter aspect.

### ***Messengers*** - Nicole Heller

I am sharing an artwork, *Messengers*, sculpted by Asia Ward in 2021 and displayed and collected for Carnegie Museum of Natural History. *Messengers* includes three sculpted tardigrades made of recycled plastic waste. Tardigrades are microscopic creatures that endure harsh and toxic environments and have survived all prior mass extinctions on the planet. They are symbols of resilience and adaptability. Each sculpture is a time capsule designed to carry visitors' messages about hopes and fears for the future of life on Earth. The time capsules will be preserved and opened in 2027, 2035, and 2095--years based on political aspirations for climate action and potential times of transformation for life on Earth.

*Messengers* is an anthropocenic object for two reasons. First, the Anthropocene is as much about situating a break from the past (a new epoch) as it is about cultivating a desirable and livable future. *Messengers* speaks to the future: What is at stake? How are we going to respond? How do we channel our fears and hopes into action? Second, *Messengers* is a container for a relationship, capturing, with the community's consent, the zeitgeist of planetary crisis. By collecting *Messengers*, the museum promises ongoing dialogue with its community while transmitting optimism: The museum will still be here; there is a future! As a curator of Anthropocene studies, I am most interested in how museums can move away from the extractive practices that are at the root of both historic museums and Anthropocene crises, and toward practices of care and co-learning. I believe attention to relations - human *with* non-human and human *with* human - is the ethical turn we need for survival, and *Messengers* invites reflection on these themes.

### **'Minigarden': small planting set with soil, sunflower seeds and planting sticks, sold by the company city gardeners** - Katja Kaiser

I consider this planting set a truly anthropocenic object because it symbolizes the attempt of people living in German cities to counteract the destruction of the environment and the loss of nature. It aims at individual small garden projects especially in an urban environment to counteract this man-made crisis. Gardens –botanic gardens but also gardens around homes– are interpreted as vision to recreate paradise, the garden Eden. Especially botanic gardens were also designed to bring plants from all over the world together at one place, to understand the system of nature. Therefore, the idea of controlling

and governing nature, humankind as creator of landscapes, has always played an important role in the history of botanic gardens and natural history in general. Scientific, political, economic interests have always been deeply entwined. The search for useful plants, spices, medicinal plants and many more natural resources was the driving force for colonial expansion. Science, wealth and power were inextricably connected. Plant transfers to Europe and between colonies as well as the establishment of plantations changed landscapes and environments especially in colonised territories in Asia and Africa. This has an effect until today on the environment as well as on economic and social aspects of life in formerly colonised countries. What does this global interrelation of nature, politics and economy mean in the Anthropocene? What are the results of the attempt to study and control nature, to harness it, for whose benefit and at whose expense? For me these are central questions.

### **My japanese kite** - Alicia Mansilla Sánchez

The object that I am presenting today is a kite that was offered to me by a friend of my father's when I was a child. It was handmade in the 90s, and bought in a children's toy store in Japan.

When I got it I thought that it was beautiful and I wanted to go and try it. And I did! If we zoomed in on it we could see that it has lost half of the stickers it had twenty years ago.

Twenty years later, beyond its beauty, there is the shape, a butterfly: an animal that knows perfectly air currents and relies on them to migrate and to survive. Humans got inspiration from them and other aerial animals to build not only kites but also paragliders and planes that worked the same. And that is just one example of how the natural environment has been a fount of inspiration and resources for humans, and biomimicry a key element to their progress.

And beyond the beauty as well, there is its use, my use. I used to fly this kite in a clearing of a forest in the north of Spain, covered by grass and surrounded by trees. At that time, I had to be careful not to tangle the kite in the trees. Today, there are no trees, no grass. Even the plastic trash has disappeared. The area has been annexed to the surrounding neighbourhood, and a housing development covers the surface.

I chose this object it is because to me the Anthropocene lies in this contradiction represented by shape and use in my object. The shape represents the connection and fascination that human beings have shown towards their environment, copying it and approaching it for their survival and progress, and the use the inability to keep it alive in the long-term.

### **Pebble made of concrete** - Nicolas Kramar

The Anthropocene is a multi-faceted concept, highlighting socionatural relationships of the present through the prism of geological time. For setting up an Anthropocene collection, at the Nature Museum Valais, we decided to make a distinction between items that essentially accounts for a symbolic dimension of the Anthropocene and items that account

for a more geological dimension of the Anthropocene, as a long lasting trace of that latter. Both types are part of our collection.

I chose a pebble made of concrete because this object perfectly takes into account both the symbolic and the geological dimensions of the Anthropocene.

From a strict naturalistic point of view, the round shape of the pebble results from a natural process where shocks make the blocks round. But obviously its material, concrete, is not as natural as the other rocky pebbles. Concrete can be more precisely related to the technosphere. This object is so a hybrid that combines at the same time natural and artificial dimensions. It so shows out the inefficiency of the classical nature/culture dichotomy that still stands for the main ontological framework of western countries and, by colonization of many other places on earth.

A pebble has the advantage to be perceived as a geological object by a large audience. It is important to have in mind the geological dimension of the Anthropocene, the idea that the fast global changes we are facing are significant related to Earth History. That pebble could last for a long time as a trace of the Anthropocene. But it could last much longer if, by combining with other rocky pebbles, it would be part of a potential future sedimentary rock precisely named conglomerate through a well-known river stratigraphic process.

### ***Seeds of Empire in a Black Anthropocene*** - Bergit Arends

My contribution addressed readings of race that have been occluded in the proposition of the Anthropocene. Instead, *Black Anthropocenes*, in the plural, seek to interject and to articulate multiple events and experiences in order to counter-act the 'racial blindness' of the Anthropocene and ongoing extractive economies (Yusoff 2018). Jamaican cultural theorist Sylvia Wynter refers to the '1492 event' to connect European arrival in the Americas and the expansion of European capitalism. This narrative forms an alternative framework for environmental change and has implications on natural history museums' responsibilities for collecting, collections research and access.

Two collaborative artworks *A Little or No Breeze* and *Observations: Rose* – the anthropogenic objects – by British photographer Joy Gregory and South African composer Philip Miller from their exhibition *Seeds of Empire* (2021) re-performed medical and weather observations from 1687 to 1689 by Hans Sloane in *A Voyage to ... Jamaica*, and interpreted these together with contemporary Jamaicans' testimonies on the experience of migration, climate and gardens.

These works opened up an understanding of the Caribbean, its role in European modernity, joint histories with Europe and its museum and botanical institutions, thereby contending with the coloniality of the Anthropocene. The modern Caribbean has been represented in European institutions through its nature and not its culture (Modest 2012). Such a split between natural history and cultural histories is an ongoing characteristic of European modernity – and underpins its museum institutions. Thus, the Caribbean is a site not only for modernity, but for histories of human interventions into the natural world. The events of the Black Anthropocene destabilise the construction of the Caribbean shaped by

Europe and re-claim Black knowledge, using epistemologies as embodied in the affective works of *Seeds of Empire*.

**Taxidermy ocelot (*Leopardus pardalis*) from 1819, Museum für Naturkunde Berlin - Ulrike Sturm**

This ocelot was collected by Friedrich Sellow in South America in 1819. It is displayed in the exhibition on taxidermy at Museum für Naturkunde Berlin. In combination with an ocelot taxidermy from 1934, it impressively demonstrates the history of mammal taxidermy. The taxidermist in 1819 stuffed the specimen and had to relay his work only on the skin and sketches of the animals as he has very likely never seen a live ocelot. From my perspective this object classifies for various reasons as an anthropocenic object as its preserved condition is only made possible by modification by humans as well as it relates to questions of collection practices, particularly to colonial contexts.

I selected this object based on my research interests in participatory science and knowledge transfer. The object was created using the techniques and the best knowledge of the expert in charge at the time. It was intended to represent the animal lifelike and show people in Berlin how nature looks in South America. Even today, we often base our ideas of nature on what others present. I, for example, know this animal only from museums, zoos and documentaries. That means always mediated by the selection and design of others. These questions of where and by whom knowledge was produced and transferred in the past and will be in the present and future are, for me, an important part of an Anthropocene object.

**The whirlpool refrigerator: An emblem of the American Anthropocene - Eric Dorfman**

The object is a Whirlpool 25 cu. ft. Side by Side Refrigerator in Fingerprint Resistant Stainless Steel, fabricated in the United States in 2022. Its double doors thrown wide, revealing ample contents, because it is not just the machine, but the machine and contents, that demonstrate the overabundance of calorific, plastic-wrapped food that drives the market for the object and, with it, the progression of the new geological era. This unwitting artwork captures the Zeitgeist American culture, arguably the greatest contributor to the Anthropocene.

In providing this chilling service, the Whirlpool Side by Side contributes in many ways to the Anthropocene. Refrigerants like HFCs have 1,000 to 9,000 times greater capacity to warm the atmosphere than carbon dioxide. The raw materials from the fridge will end up, eventually, in a landfill, even if they're recycled or reused in the meantime.

Western consumption habits are at the heart of the Anthropocene. The Standard American Diet: pizza, meat, pasta, sugar, artificial sweeteners is causing a crisis in obesity and diabetes. More than two-thirds of adults in the United States are overweight or have obesity. The plastic the food comes in accentuates the Whirlpool's Anthropocene contribution. There are now 5.25 trillion macro and micro pieces of plastic in our ocean & 46,000 pieces in every square mile of ocean, weighing up to 269,000 tons. In the next 50 years, it is estimated that the mass of marine plastic will exceed the biomass of fish.



Finally, this lifestyle-enhancing object is accentuating and spreading cultural disparities. Refrigerators, like so many things in the West (or in the wealthy middle class) are status symbols. The global refrigerator market is forecast to grow to almost 22 billion U.S. dollars in value by 2025, putting this refrigerators, and what goes inside them, on the scale of a true global phenomenon.

**The *Young crocodile without forefeet* from the virtual Berlin Kunstkammer** - Sarah Wagner

This is the *Young crocodile without forefeet*, a virtual object that represents a historical one that was once part of the Brandenburg-Prussian Kunstkammer. This collection was located in the Berlin Palace (ca. 1600-1850s), and its holdings belong to the oldest of several collections today, including the Museum für Naturkunde, the Staatliche Museen or the Humboldt Universität zu Berlin. Our [DFG-funded project](#) is investigating this historical collection that was completely dissolved in 1875. We reconstructed the [Kunstkammer virtually](#) in a research environment using historical archival records such as inventories. Since we also do not have an image of those objects that are no longer preserved, we have assigned them a substitute picture.

So what makes this object special for the anthropocene to me?

First, it represents the debate about technical reproductions of collection objects since the 1930s, which gained renewed attention since the increasing digitization of collections, as people, and museums in particular, have begun to question whether artifacts and the institutions that hold them will become obsolete if they are available digitally everywhere.

Second, this object symbolizes the collection and provenance research that has been increasingly going on since the 1990s. As for the provenance of the *Young Crocodile without Forefeet*, we cannot say where the object came from. There are simply no sources on this. And this is not an isolated case. Currently, there is an increasing demand to research objects from, for example, colonial contexts. But often information is missing, and some provenances cannot even be rudimentarily reconstructed. Thus, this virtual object also represents the loss of information about things and collections that the Anthropocene is trying to restore.

**Wasps' nest built in a chair** - Anna-Lisa Dieter

The object I have chosen for today is a wasps' nest built in a chair which was offered to BIOTOPIA by a Bavarian woman who found it in her attic. It is a fascinating object because of several reasons:

1. The Form: It combines the known, familiar materiality of an armchair, with the unknown, unfamiliar materiality of the nest.
2. The Story: This object immediately tells a story. What we see is the co-presence of two different times. This hybridity raises questions: What is the relation between the agency of the humans (who were building and using the chair) and the agency of

- the wasps (who are building the nest)? Is the non-human colonizing the human? Or are the wasps co-creating with the humans?
3. The wasps' nest in the chair invites one to look at the chair from the perspective of a wasp. What made the queen wasp choose this chair? What material did they use to build it? Where did they take it from?
  4. Against the very nature of an object which is static, this wasps' nest in the chair makes a movement, a dynamic visible: the process of building. Therefore, it is a very precious object for us at BIOTOPIA because we are exactly interested in this: the dynamics, processes and behaviors that all living beings share and have in common.
  5. This object represents a META level. It can be interpreted as an interplay of different disciplines and cultures: Design and biology, humanities and natural sciences. It thus demonstrates how we work together at BIOTOPIA, in an interdisciplinary curatorial team, divided into tandems, always pairing a curator with a background in natural science with a curator who has been trained in the humanities.

### **Wooden elephant key chain - Mareike Petersen**

The keychain originates from Benin. Its producer, a wood carving villager, gave it to me as a present in 2006 and it is since then a constant companion. The man was selling wooden figures and other souvenirs close to a beautiful waterfall not far from the Pendjari National Park where I started my career as a researcher. The wooden keychain reminds me of my first encounter with elephants in the wild in this park: a single elephant bull walking slowly and silently through the savannah just before sunset. With this memory in mind, the phrase "under natural conditions" of many zoos or other conservation organizations keeping animals in locked-up can only be a lie. Keeping wild animals in captivity might help to conserve the species itself, but never in concert with all its behavioral facets nor its beauty in its natural habitats like the endless savannahs. Whether animals like elephants will survive the era of the anthropocene in their natural habitats is not only our decision, but also our responsibility.

## **Recommendations**

Several projects and publications were recommended in the workshops as resources for ideas and further research.

## **Projects**

- [Art project on Anthropocene Chicken and its geological materiality](#)
- [Andreas Greiner's Monument to the 380, broiler as a technofossil](#)
- [Commodity Flows seminar at "Mississippi. An Anthropocene River" Campus, New Orleans, 2019](#)
- [Annual Anthropocene Conference \(German language\)](#)
- [Taking care project](#)

- [Anne McClintock - Monster: A Fugue in Fire and Ice](#)
- [Object Journeys](#)
- Celine Angbeletchy: [The Prophecy | Fabrice Monteiro's New Apocalyptic Work Urges The World To Wake Up](#)
- David Brooks: [Repositioned Core](#)
- [German Maritime Museum: Special exhibition "Room for Conjecture"](#)
- Project: [Changing Natures. Collecting the Anthropocene Together](#)
- ["Seeds of Empire"](#) (2021), first in a series of exhibition projects by the artist Joy Gregory and composer Philip Miller
- [Exhibition "our broken planet" \(NHM London\)](#)
- [Berlin Cabinet of Curiosity Project](#)
- [Open Up](#) (includes common names)
- [Wellcome Collection on mental health, infectious disease and climate](#)
- [Transcribathon Europeana 1914-1918](#)
- [artigo](#)
- [The Labelling Matters project at the Pitt-Rivers Museum](#)
- [Hidden in Plain Sight](#), Weltkulturen Museum, Frankfurt

### Further reading

- J. Ashby (2021). The political platypus and colonial koala – decolonising the way we talk about Australian animals. *Journal of Natural Science Collections*, 9, 35-45.
- J. Ashby & R. Machin (2021). Legacies of colonial violence in natural history collections. *Journal of Natural Science Collections*, 8, 44-55.
- M. Bal (1992) [Telling, Showing, Showing off](#). *Critical Inquiry*, 18(3), 556–594.
- Etienne S. Benson (2020) [Surroundings A History of Environments and Environmentalisms](#).
- Elizabeth Callaway ["Eden's Endemics. Narratives of Biodiversity on Earth and Beyond"](#).
- Sebastian Chan (2007) Powerhouse Museum, Australia: [Tagging and Searching – Serendipity and museum collection databases](#).
- Max Liboiron (2021) [Pollution Is Colonialism](#).
- [Peaking of fugue](#): resource for understanding nature/culture „objects“/ objectifications/understanding nature/culture in pre-modern Europe.
- Mathilde Pavis and Andrea Wallace (2019) [Statement: Response to the 2018 Sarr-Savoy Report](#), 10 JIPITEC 115 para 1.relevant to the digitization and restitution of African Cultural Heritage and associated materials. *jipitec*.
- Zoe Todd (2015) [Indigenizing the Anthropocene](#). In H. Davis, E. Turpin (Eds.), *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*, Open Humanities Press, pp. 241-254.
- Winesmith, K. & Anderson, S. (2020) [The Digital Future of Museums. Conversations and Provocations](#).
- [Tate Britain director defends museum against accusations of 'cancelling Hogarth'](#).

- [Newsartikel in The Sun \(2016\)](#): NEW ERA FOR HUMANITY. Earth in new geological era called the Anthropocene thanks to impact of nukes, plastic rubbish... and chickens.
- [UNESCO Lexicon of the Anthropocene](#)

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## Hosting institution

This series of workshops is linked to the institutional transformation of Museum für Naturkunde - Leibniz Institute for Evolution and Biodiversity Science, Berlin, Germany. Within the project *Collection discovery and development*, the museum's collection will be sustainably transformed and developed, i.e. by securing the objects in terms of conservation, by object digitization, and by providing access to them for innovative (re)use (Berger et al. 2021). In doing so, the collection will develop into an open, digital-analog research infrastructure that will meet future scientific, societal, and technological requirements. In the project *Knowledge transfer* the museum and its exhibitions will be further development into a place of living knowledge and open information making the museum's collections and research accessible and tangible. This includes new collaborations between the museum and partners, developing forward-looking formats of interdisciplinary and participatory science, and promoting social debate on the relationship between humans and nature based on scientific findings.

The workshops are connected to and provide input to the project "[Changing Natures. Collecting the Anthropocene Together](#)" by Museum für Naturkunde Berlin, Germany and Muséum national d'Histoire naturelle in Paris, France. Funded by the Federal Ministry of Education and Research (BMBF) and Ministère de l'Enseignement supérieur et de la Recherche (MESR). Taking an open science approach to collection development, members of the public are invited to contribute their own perspectives to a digital collection on the subject of environmental change by sharing personal objects and the stories and

memories linked to them. The aim is to encourage experimentation with new collecting practices, narratives and representations of the Anthropocene and open opportunities for a broader dialogue that engages actors from society and science.

## References

- Arends B (2020) Decolonising natural history museums through contemporary art. In: Rossi-Linnemann C, Martini Gd (Eds) *Art in science museums. Towards a post-disciplinary approach*. Routledge, London, 213–223 pp.
- Berger F, Glöckler F, Hermann E, Hoffmann A, Hoffmann J, Petersen M, Quaisser C, Schuster F, Tata N (2021) Digitalisierung für alle / Digitization for everyone. [Dataset]. Data Publisher: Museum für Naturkunde Berlin (MfN) - Leibniz Institute for Evolution and Biodiversity Science. <https://doi.org/10.7479/8h2v-4040>
- Carroll SR, Herczog E, Hudson M, Russell K, Stall S (2021) Operationalizing the CARE and FAIR Principles for Indigenous data futures. *Scientific Data* 8 <https://doi.org/10.1038/s41597-021-00892-0>
- Dorfman E (Ed.) (2017) *The Future of Natural History Museums*. Routledge <https://doi.org/10.4324/9781315531892>
- Ghosh A (2021) *The Nutmeg's Curse: Parables for a Planet in Crisis*. John Murray Publishers <https://doi.org/10.7208/chicago/9780226815466.001.0001>
- Haff P (2014) Humans and technology in the Anthropocene: Six rules. *The Anthropocene Review* 1 (2): 126-136. <https://doi.org/10.1177/2053019614530575>
- Harrison R, Sterling C (Eds) (2020) *Deterritorializing the Future: Heritage in, of and after the Anthropocene*. Open Humanities Press CIC
- Hinchliffe W (2022) Damage to the Edinburgh collection. Storm Malik and Corrie. <https://stories.rbge.org.uk/archives/36080>. Accessed on: 2022-6-05.
- Jonker C, Olivier J (2019) Mineral contamination from cemetery soils: case study of Zandfontein Cemetery, South Africa. *Int J Environ Res Public Health* 9 (2): 511-520. <https://doi.org/10.3390/ijerph9020511>
- Kasparov G (2017) *Deep thinking: where machine intelligence ends and human creativity begins*. Hachette UK, London.
- Klose A, Steininger B (2020) *Erdöl. Ein Atlas der Petromoderne*. Matthes & Seitz, Berlin.
- Mitman G, Armiero M, Emmett R (Eds) (2018) *FutureRemains: A Cabinet of Curiosities for the Anthro-pocene*. University of Chicago Press, Chicago.
- Modest W (2012) WE HAVE ALWAYS BEEN MODERN: Museums, Collections, and Modernity in the Caribbean. *Museum Anthropology* 35: 85-96. <https://doi.org/10.1111/j.1548-1379.2011.01124.x>
- Moerland TM, Broekens J, Plaat A, Jonker CM (2018) A0C: Alpha zero in continuous action space. arXiv preprint arXiv:1805.09613 URL: <https://arxiv.org/pdf/1805.09613>
- Morton T (2013) *Hyperobjects: Philosophy and Ecology after the End of the World*. University of Minnesota Press
- Odumosu T (2020) The Crying Child: On Colonial Archives, Digitization, and Ethics of Care in the Cultural Commons. *Current Anthropology* 61: 289-302. <https://doi.org/10.1086/710062>

- Oliveira G, Dorfman E, Kramar N, Mendenhall C, Heller N (2020) The Anthropocene in Natural History Museums: A Productive Lens of Engagement. *Curator The Museum Journal* 63 (3): 333-351. <https://doi.org/10.1111/cura.12374>
- Renn J (2020) *The Evolution of Knowledge: Rethinking Science for the Anthropocene*. Princeton University Press <https://doi.org/10.2307/j.ctvdf0kpk>
- Tsing AL (2015) *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press
- Wark M (2015) *Molecular Red: Theory for the Anthropocene*. Verso Books, New York.
- Yusoff K (2018) *A billion black Anthropocenes or none*. University of Minnesota Press, Minneapolis. <https://doi.org/10.5749/9781452962054>
- Zalasiewicz J, Williams M, Waters CN, Barnosky AD, Palmesino J, Rönnskog A, Edgeworth M, Neal C, Cearreta A, Ellis EC (2017) Scale and diversity of the physical technosphere: A geological perspective. *The Anthropocene Review* 4 (1): 9-22. <https://doi.org/10.1177/2053019616677743>
- Zalasiewicz J, Waters C, Williams M, Summerhayes C (Eds) (2019) *The Anthropocene as a Geological Time Unit*. Cambridge University Press. <https://doi.org/10.1017/9781108621359>

## Supplementary materials

### Suppl. material 1: Flyer: What is an Anthropogenic Object? Transdisciplinary Perspectives on Natural, Cultural and Hybrid Objects [doi](#)

Authors: Elisabeth Heyne, Elisa Herrmann, Ulrike Sturm

Data type: pdf

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### Suppl. material 2: Flyer: How to collect, store and curate objects in the Anthropocene? On participatory and digital collections. [doi](#)

Authors: Elisa Herrmann, Elisabeth Heyne, Ulrike Sturm

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### Suppl. material 3: Flyer: Perspectives for the future of conservational institutions and collection practices [doi](#)

Authors: Elisabeth Heyne, Elisa Herrmann, Ulrike Sturm

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**Suppl. material 4: Keynote Exhibiting the Anthropocene - and the Technosphere - means breaking away from established knowledge orders** [doi](#)

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