# Representing nature in the context of the climate emergency: an incomplete survey of concerns and entanglements
## – Stephanie Black and Luise Vormittag

*How is illustration interwoven with our understanding of the natural world?*

Stephanie Black and Luise Vormittag contemplate our discipline's potential to explore, understand and represent nature.

Academic publications that present an overview or survey of a field often begin with disclaimers concerning their incompleteness. This article is no different. What follows is obviously fragmentary and partial. It represents an opening, rather than an endpoint for our investigation, and we hope that it invites conversations and constructive scrutiny from readers with greater expertise and knowledge.

We chose the selection of examples discussed here for their differing approaches to exploring, understanding and showing aspects of the natural world through image making. Our investigation is underpinned by the belief that illustration embodies different perspectives on the relationship between the human illustrator and the non-human object of study. We consider this instructive for reflecting on larger questions about how us humans relate to the ecosystems we are embedded in, a particularly urgent concern at this moment of climate emergency and ecocide[1]. Unsurprisingly we have also come across perspectives we rigorously reject: The outright racism of many of the historical natural history scientists and illustrators is mirrored in strains of eco-fascism[2] amongst some contemporary thinkers. This made for uncomfortable reading and we wish to emphatically distance ourselves from these highly objectionable views.

We are aware that this article almost exclusively considers Western examples, and we plan to remedy this one-sidedness in subsequent iterations of the research. Arguably it is the Western anthropocentric orientation towards nature as our "resource" that has brought us to the perilous situation we find ourselves in. Many of the practices surveyed here suggest alternative ways of relating to the environment, and we plan to extend this with knowledge derived from a broader range of examples in future.

[1] WEB-LINK *Stop Ecocide International* [https://www.stopecocide.earth]

[2] WEB-LINK *The dark side of nature writing*, New Humanist [https://newhumanist.org.uk/articles/5331/the-dark-side-of-nature-writing]

We have arranged the work we looked at into loose categories. These became helpful organising principles as our list of examples threatened to become unmanageable, and served us as a guide to the different forms of knowledge production we identified in the illustrations we were studying. Perhaps unsurprisingly our guiding questions – how does illustration express our varied and fluctuating attitudes towards the natural world – and – how does illustration intervene in and contribute to these debates – have led us to multiple converging, intersecting and contradictory answers. You will find them sketched out below.

## Traditions: Historic

In their chapter on *Natural Science Illustration* (1450-1900) for the *History of Illustration* (Doyle et al., 2019), Shelley Wall and David M. Mazierski, both scholars of biomedical communication, suggest that natural history became a distinct discipline in the mid 16th century. While defining the beginning of anything as broad and amorphous as natural history will always be tricky, the 1500s certainly brought about a paradigmatic shift in how humans relate to the world. The increased prominence of the scientific method (including observation using sensory data, hypothesis testing and inductive reasoning) impacted on the role of illustration in the advancement of knowledge of the natural world. Advances in print technology that facilitated increasingly high-quality reproduction of images also reinforced the prominence of illustration in the sciences.

Wall and Mazierski describe how during this period illustration was able to perform several important functions, such as question received wisdom or lead new scientific developments. But there is also another way in which illustration played a key role during this time of deep-rooted paradigmatic change: as a means of integrating the differing worldviews that were wrestling for prominence at the time.

Wall and Mazierski cite herbariums that were drawn directly from life[1] as an example of illustration challenging existing works of botany. They explain how this empirical approach provides evidence of the earlier version's falsehoods, where its contents had become removed from what the plants looked like[2] by virtue of having been copied so many times.

In terms of illustration leading scientific development the authors describe Leonard Fuchs' and Albrecht Meyer's De historia stirpium commentarii insignes[3] from 1542 as an important example of images leading the advancement of taxonomic principles: the curation of Meyer's pictures comprised a classification system before such a thing had been standardised for plants. The sequential demands of the book form

[1] WEB-LINK *Otto Brunfels: Herbarum vivae eicones*, The Met [https://www.metmuseum.org/art/collection/search/338754]

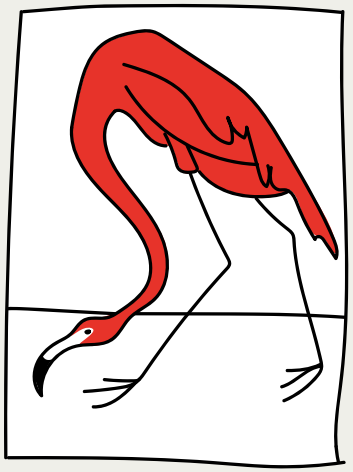
[2] WEB-LINK *Hortus Sanitatis*, Wikipedia [https://en.wikipedia.org/wiki/Hortus_Sanitatis#Illustrations]

[3] WEB-LINK *De historia stirpium commentarii insignes* (Fuchs, Leonhart), Smithsonian Libraries [https://www.metmuseum.org/art/collection/search/338754]Sanitatis#IllustrationsSanitatis#Illustrations-Sanitatis#Illustrations]

forced decision making on the order in which images are presented. In discussing this works[1], science historian Sachiko Kusukawa (2012) finds illustrations doing much of the heavy lifting within the project of elevating the status of botany to that of scientific enquiry. Kusukawa argues that the role of images was pivotal in making the arguments presented by Fuchs and his contemporaries in botany and human anatomy, by arbitrating in disagreements between classical sources and contemporary challenges to their authority.

Researcher Lucile Roche also offers an intriguing example of illustration acting in a diplomatic role, to soften the blow of the challenge posed by new perspectives. Roche (2015) analyses illustrations by Nicolas Blakey and Edmé Bouchardon produced to accompany Comte de Buffon's 1749 *Histoire et théorie de la Terre/Natural History of the Earth*[2]. Here, Roche sees illustration holding together theological and scientific explanations for the creation of the universe, thereby smoothing over the challenge posed to religious authority, as well as enabling the idea to meet a wider audience by accommodating the sensitivities of those opposed to the book's publication.

The foregrounding of sensory data which is at the root of much of this historical work can nevertheless take many forms, thus suggesting different relations between the human illustrator and the natural world as the object of study. For example, Edward Lear and John James Audubon both worked from observation. However Audubon's *Phoenicopterus ruber, the Greater American Flamingo* (1827-1838) and Lear's *Macrocercus ararauna, blue and yellow macaw* (1832) suggest different traditions of study, representation and rhetoric. Although championed for his lifelike representations (see Male 2017, p.135) Audubon's bird is weirdly floppy, whereas Lear's is alive and full of macaw character.



Wildlife artist John Busby (2004, p.14) attributes the difference to the former drawing from dead specimens posed to show the defining plumage of species, whereas Lear spent time with the parrots of London Zoo to produce his images from observation of live creatures where possible. That

[1] WEB-LINK
*Picturing the Book of Nature* (Sachiko Kusukawa), The University of Chicago Press [https://press.uchicago.edu/ucp/books/book/chicago/P/bo11947789.html]

[2] WEB-LINK
*Histoire Naturelle*, Wikipedia [https://en.wikipedia.org/wiki/Histoire_Naturelle]

IMAGE LEFT
Artist's impression of *Macrocercus ararauna Blue & Yellow Maccaw* by Edward Lear, from Illustrations of the family of Psittacidae, or parrots, 1832

IMAGE RIGHT
Artist's impression of *American Flamingo* by John James Audubon, from *Birds of America*, 1827-38 [https://fitzmuseum.cam.ac.uk/learning/look-think-do/american-flamingo-from-birds-of-america]

dead birds led to slightly dead pictures is remarked upon by Busby (2004, p. 10):

> "This practice led to rather static poses where a bird was painted as part of the quest for knowledge of species classification."

Busby also considers the bird spotter at the other end of this process of defining and organising the natural world through images, noting that field guides full of illustrations of generalised, isolated birds are not only, perversely, unfit for the purpose of identification in the field (due to the removal of context that greatly aids recognition), but they also encourage a limited approach to their subjects:

> "[They …] reinforce the idea that the sole purpose of watching birds is to identify them", an approach to the natural environment comparable to collecting or hunting, resulting in an assumed sense of mastery once identification is "complete".

Besides his talent as a draughtsman, Lear is also known for his irreverent humour, so it comes as no surprise that besides his influential natural history illustrations he also produced work that challenged established systems for the representation of the natural world: Linnaean binomial nomenclature[1], the two-word naming system developed by 18th century Swedish scientist Carl Linnaeus, and his system of scientific classification still in use today.

Linnaeus thought that language possessed greater precision and clarity in describing the natural world than images, declaring:

> "Who could ever deduce a firm argument from a drawing? But from written words, it is easy" (Reeds, 2004, p. 257).

Karen Reeds, curator and Fellow of the Linnean Society of London, proposes that Linnaeus' preference stemmed from his inability to draw, supported by a rather damning claim from his biographer and her analysis of his inexact field sketches and their subsequent misinterpretation (or rather tidying up) for publication. That such a position was held by "the founder of modern botany" has tangible effects in the world. Reeds observes that by establishing binomial nomenclature Linnaeus shifts the emphasis in the study of botany from images to text (Reeds, 2004, p. 249).

Lear's delightful *Nonsense Botany*[2] invokes classical botanical illustration with their linear representations of isolated specimens before departing sharply into caricature. The work mocks the Linnean systems of classification by combining the sensible and the daft while operating within the established visual conventions of the discipline. In the comparison between Lear and Linnaeus where two proponents of different communicative modes come together, Lear emerges from the comparison with a richer toolkit. In contrast to Linnaeus' sulky

[1] WEB-LINK
*Linnaean taxonomy*, Wikipedia [https://en.wikipedia.org/wiki/Linnaean_taxonomy]

[2] WEB-LINK
*Edward Lear's Nonsense Botany* (1871–77), The Public Domain Review [https://public-domainreview.org/collection/edward-lears-nonsense-botany-1871-77]

claim to “express by words all marks just as clearly – if not more clearly – as others with their splendid drawings”, Lear is equipped with a broader range of investigative tools and rhetorical strategies by which to convince us of his findings.

Of course we disagree with Linnaeus – drawings, splendid and otherwise, can clearly teach us about the natural world, and they can also teach us about the human illustrators who made them. Illustrators such as Lear are of particular note as representative of the questions we’re asking in this instalment of *Colouring In*: How do illustrators investigate natural phenomena, and what modes of rhetoric are used within the resulting images to convey their findings? Further to that, how do both of these activities (exploring, showing) embody differing perspectives on human/nature relationships at different points in time?

## Traditions: Contemporary

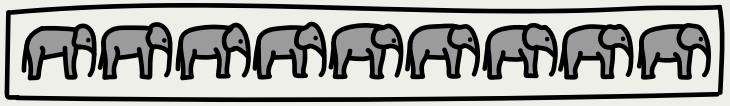
Contemporary US illustrator Walton Ford references the tradition of natural history illustration directly in his work. His highly detailed, large scale watercolour images of animals rendered with an exceptionally high degree of technical skill openly draw on the work of John James Audubon and other 19th century natural history illustrators. The images he produces often depict extinct species of wild animals in violent encounters with each other. Ford’s images tend to be interpreted as a critical commentary on history, colonialism, and the precarious relationship between man and animal (Katz and Kazanjian, 2002). For example his 2009 triptych *The Island* shows a writhing pile of thylacine (a now extinct  Tasmanian carnivorous marsupial) attacking defenceless lambs. This image could reasonably be interpreted as an anticolonial revenge fantasy: thylacine suffered at the hands of colonial settlers intent on defending their livestock, and they were eventually hunted to extinction. This image shows them settling the score.

IMAGE Artist’s impression of *The Island* by Walton Ford, 2009 [https://museumpublicity.com/2010/01/22/the-crystal-bridges-museum-of-american-art-acquires-new-work-by-walton-ford/]

While this interpretation might hold sway, the overall image of nature presented by Ford is a savage one: violence, domination and destructiveness are the

common themes running through much of his work. The grand scale and the almost hyper-realist style of the work combine with the macabre brutality of the images to suggest a youthful delight in fantasies of 'wild beasts' and a pleasure in the intensities of carnal spectatorship, rather than critical positioning.

A completely different approach is evident in the work by Australian illustrator Andrew Howells. Like Ford he builds directly on the traditions of natural history illustration, however Howells' interest lies in the continuation of the original intention of this kind of work: the contribution to and dissemination of knowledge for the sciences.



The accurate and faithful depiction of species here serve a specific scientific purpose. In his doctoral research he worked with a veterinary science researcher to produce a visual reference system to support health assessments of Asian elephants living in captivity. Howells (2014) describes how this work developed out of a combination of fieldwork, including observational drawing of live animals (as with Lear's macaw discussed above), cross-disciplinary exchanges about methods of assessing elephants' health as well as studio-based enquiry. The interpretive work in the studio led to the development of visual techniques that were most appropriate in the context of the veterinary research objective.

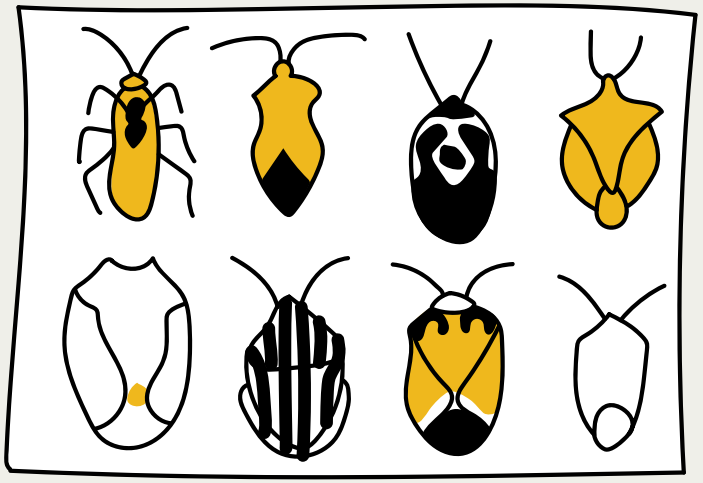
The resulting illustrated *BCS Reference Set* (2014) (BCS stands for body condition scoring) reveals illustration to be a powerful tool to communicate nine standardised levels of muscle-fat conditions for the animal. A photographic reference system would suffer from potentially distracting empirical particularities of the individual animal in the photo as well as the many variables introduced through image capture, such as background, angle and lighting. In contrast, illustration can show us nine idealised and standardised elephants, all shown from the same angle and in the same system of visual representation, that can serve as a generic template when assessing individual animals.

Howells' *BCS Reference Set* echoes the processes of inductive reasoning which came to prominence during the 16th century, where one derives general principles through the synthesis of specific observations. The elephants in his Reference Set are not actual, embodied animals, they are generalised, atemporal and aspatial, transcending any particular elephant we might encounter. However, these generalisations are not just

IMAGE Artist's impression of *Illustrated BCS reference set* by Andrew Howells, from *Varoomlab* online journal issue 3: Interpretation, 2015

given, Howells constructs them from a plethora of epistemological data (many actual elephants that were observed and recorded).

In contrast to Howells, Swiss natural history illustrator Cornelia Hesse-Honegger is not concerned with the distillation of generalisations but with documenting  the particular, focusing on anomalies and deviations from the norm. She has been illustrating insects in areas that are contaminated by artificial radioactivity for more than 30 years. Hesse-Honegger paints beetles displaying morphological disturbances with painstaking detail: underdeveloped antenna or legs, deformed wings, unusual colouring and cysts.



Her research has taken her to areas affected by nuclear disasters such as Chernobyl and Fukushima, nuclear bomb-testing sites in the US, but also to places surrounding nuclear power plants in Europe. Underpinned by the work's rigour and scope, Hesse-Honegger puts forward a scientific claim through illustration. The scientific community is unsure about the dangers of low level radiation, in the environs of nuclear power stations for example, and generally assess the risks to be negligible[1]. Hesse-Honegger's work suggests otherwise.

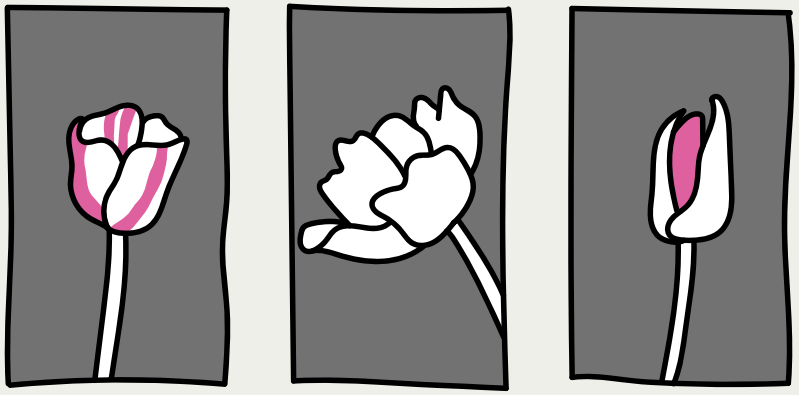
Contemporary artist Anna Ridler draws on a different tradition of representing nature: Her work on tulips is partly inspired by dutch still life painting from the 17th century[2] where pictures of lush bouquets often contain botanical impossibilities: the flowers in the painting actually bloom at different times of the year and would not have been available at the same time. The images were constructed by the painter, made up of separate instances of observation and botanical knowledge. Similarly Ridler's video installation *Mosaic Virus* (2019) displays continuously morphing tulips that are not representations of existing flowers. These fluctuating images are created by an algorithm that generates plausible but fictitious flowers based on a dataset of 10,000 photos of actual tulips, that Ridler carefully selected at flower markets, bought and photographed during one tulip season in the Netherlands. Dutch still life paintings of flowers are

[1] WEB-LINK *Low-level radiation less harmful to health than other lifestyle risks*, University of Oxford [https://www.ox.ac.uk/news/2017-09-13-low-level-radiation-less-harmful-health-other-lifestyle-risks]

[2] WEB-LINK *Flowers in a Glass Vase* (Ambrosius Bosschaert the Elder), The National Gallery [https://www.nationalgallery.org.uk/paintings/ambrosius-bosschaert-the-elder-a-still-life-of-flowers-in-a-wan-li-vase]

IMAGE Artist's impression of *abnormalities in insects* by Cornelia Hesse-Honegger [https://doi.org/10.1002/cbdv.201800099]

often interpreted as an allegory for life's transience. Ridler's work also uses flowers as a metaphor: the algorithm creating new images is tied to bitcoin's fluctuating value, where a rise in the price of the cryptocurrency generates images of more desirable tulip varieties, and Ridler describes her work as a commentary on the boom-and-bust cycles of speculative bubbles (Critical Media Lab, 2019). So if this work isn't at all about nature at all, why include it here?



*Mosaic Virus* alongside Ridler's online auction project *Bloemenveiling* (2019) that sells her artificially generated tulip images both rely on an abundance of energy to sustain the computer systems required for their operations[1]. The artist herself has commented on the contradiction of using vast amounts of natural resources to create something artificial that appears natural. While foregrounding this tension is not Ridler's main interest in the work, perhaps this too can be understood as a metaphor for aspects of our current condition. Do we over-invest in generating the appearance of 'naturalness'[2] to the detriment of actually relating to the biosphere?

## Relational

So far our discussions have mainly focused on representations of individual species of plants or animals. A trawl of the digitised resources curated on Flickr by the Biodiversity Heritage Library[3] (based at the Smithsonian Libraries and Archives) shows many historic examples following the convention of visually isolating animal and plant species. Another tradition is for artists to draw on taxonomic conventions to group specimens by type according to scientific classification structures, for example the much-reproduced plates by Ernst Haeckel[4]. While these images are able to cut across continents, by grouping like with like they don't help us to consider multispecies relations embedded in an ecosystem.

In contrast, in the BHL digitised collection the work of Ellis Rowan[5] stands out as unusual (Lounsberry & Rowan, 1899), and reminds us of several other

[1] WEB-LINK *The Guardian view on cryptoart: caution is necessary*, The Guardian [https://www.theguardian.com/commentisfree/2021/may/21/the-guardian-view-on-cryptoart-caution-necessary]

[2] WEB-LINK *Farmed Salmon Is Naturally Gray, Has Color Added to It* (Erin Mosbaugh), First We Feast [https://firstwefeast.com/eat/2015/03/farmed-salmon-is-naturally-gray-has-color-added-to-it]

[3] WEB-LINK *Biodiversity Heritage Library* [https://www.biodiversitylibrary.org/]

[4] WEB-LINK *Kunstformen der Natur*, Wikipedia [https://en.wikipedia.org/wiki/Kunstformen_der_Natur]

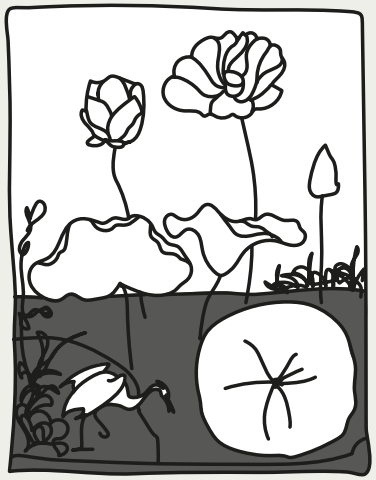
[5] WEB-LINK *A guide to the wild flowers*, Biodiversity Heritage Library [https://www.biodiversitylibrary.org/]

IMAGE Artist's impression of *Mosaic Virus* by Anna Ridler, 2019 [https://annaridler.com/mosaic-virus]

outliers noted by Wall and Mazierski (in Doyle et al., 2019) who included details of their specimens' habitat in their illustrations. Maria Sibylla Merian[1], Mark Catesby[2] and William Bartram (all active during the 18th century) represent varying attempts to grasp the complex systems within nature. This is an approach common to many of our contemporary examples, where practitioners acknowledge these systems and our own entanglement with them through their methods of enquiry and the images they produce.

In the case of the American natural historian William Bartram, we can see a temporal, situated and relational approach. In American Lotus (1767) Bartram represented his botanical subject at various stages in its lifecycle and included contextual details (such as a very small heron) to situate it within and in relation to its local ecosystem and other species encountered there. Judith Magee (2014), the author of a book on Bartram, notes that this reflected Bartram's perspective on nature, explaining that "Bartram viewed the earth as an oraganic whole, a living unity of diverse and interdependent life forms." This is a sharp departure from the worldview embedded in taxonomic plates or images primarily concerned with classification. It presents a more comprehensive overview of its subject by locating it within relational and temporal systems.

Bartram's drawing can also be read as a comment on the systems of botanical knowledge production of his time. Art historian Elizabeth Athens (2015) proposes that it is a critique of the different representational conventions which Bartram presents here together in one image.



The specimen-like leaf and Linnaean flowers are combined with the visual convention of the vignette, that was starting to enjoy popularity at the time in order to make natural history illustration appear more "natural" by introducing narrative and contextual elements. However in Bartram's disruptive composite the result is a bewildering "spatially indeterminate world". Athens interprets the work as a challenge to the myth of "representational transparency" inherent in much of the natural history illustration of the time, where "knowledge might be presented as self-evident truth, rather

[1] WEB-LINK *Maria Sibylla Merian: metamorphosis unmasked by art and science* (Kerry Lotzof), Natural History Museum [https://www.nhm.ac.uk/discover/maria-sibylla-merian-metamorphosis-art-and-science.html]

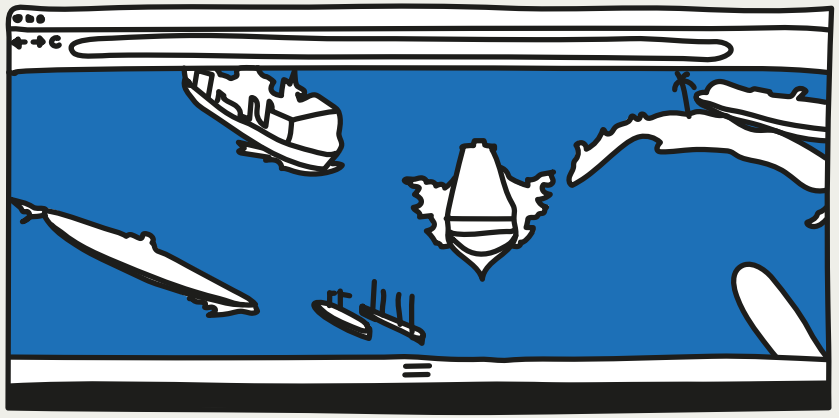
[2] WEB-LINK *Mark Catesby*, Wikipedia [https://en.wikipedia.org/wiki/Mark_Catesby]

IMAGE Artist's impression of *Nelumbo lutea, American lotus and Dionaea muscipula, venus fly-trap* by William Bartram, from *Botanical and zoological drawings* 1756-1788 [https://www.nhm.ac.uk/resources/nature-online/online-exhibitions/art-nature-imaging/large/15929-bartram-nelumbo.jpg]

than a process of empirical observation and rational synthesis." In contrast Bartram's illustration

> "indicates that natural knowledge is neither self-evident nor the product of a distant and disinterested curiosity, but is the result of one's own physical and intellectual investment in the living world."

Similar to Bartram's American Lotus, *Feral Atlas*[1] (2020) uses multiple disciplinary perspectives but is a more complex proposition in structure and modes of rhetoric to reflect the more varied forms of knowledge available today. Essentially a publication concerned with human/non-human relationships it is a tremendously ambitious take on an academic text best described as a multimodal transdisciplinary e-book, published by Stanford University Press on a freely accessible, bespoke website. Its editors and contributors come from diverse fields, including anthropology, architecture, art, film, music, and more. The publication is concerned with the Anthropocene, which in this context is defined as the "world condition of human-caused environmental challenges" (Tsing in Vann, 2021). Co-editor Anna Tsing explains how *Feral Atlas* examines the effects of human interventions on the earth, focusing on the ecologies produced when non-human entities coincide with human infrastructure. These ecologies are uncontrolled and unanticipated, hence being 'feral'. As an academic source, it offers a substantial overview of the concerns shared by many of the examples surveyed in *Colouring In*, ranging from specific case studies to overarching concepts, as well as proposals for teaching opportunities. It is included here for its use of visual materials such as drawings, films, and other graphic elements in constructing the 'atlas' concept as a performative form.



The visitor to *Feral Atlas* lands on an introductory page and is then free to roam the complicated and layered architecture of the site. The structure of the piece is difficult to describe and probably best experienced, with meaning derived at least partially from the complexity of the encounter. The editors note that disciplinary blinkers limit both our understanding of the problems emerging with the Anthropocene and the steps we can take to

[1] WEB-LINK *Feral Atlas* [https://feralatlas.supdigital.org]

IMAGE Artist's impression of *Feral Atlas*, curated and edited by Anna L. Tsing, Jennifer Deger, Alder Keleman Saxena and Feifei Zhou, 2021 [https://feralatlas.org]

address them. Therefore the site embraces the complexity, contradictions, and different critiques of the term ‘Anthropocene’, and uses illustration as the glue to hold together multiple ideas from different fields. The natural history convention of isolated specimens is used as a navigational aid, with the visitor able to click on small drawings of natural entities to take them to one of four ‘anthropocene detonator landscapes’ where the specimen can be located within human systems such as capital, migration and politics, with further resources available for additional analysis. The ‘detonator landscapes’ are an illustrated composite of places and times and visualise the ‘atlas’ concept structuring the site. They offer a topological vision that holds disparate ideas, examples, and disciplinary perspectives in one place so as to encourage the visitor to make links between them as they repeatedly visit each landscape.

*Feral Atlas* eschews a visual approach that simplifies the concepts discussed, it doesn’t boil down ideas into snappy and easily-grasped visual summaries. Instead it revels in heteroglossia, adopting various visual and textual approaches to each topic. These include the aforementioned landscapes (illustrated maps linking specific phenomena caused by feral entities), films (‘video poems’) showing the specific qualities of these phenomena, concrete poetry, explosions, and more-or-less illustrated essays. All of this adds up to a rich experience of a multifaceted representation of the Anthropocene where the form and the authors’ intentions to draw on multiple disciplinary perspectives are intertwined, enabling the visitor to consider the Anthropocene as “both planetary and particular” (Tsing in Vann 2021). The site also includes meta-analysis of the different modes of rhetoric used within it, for example reflections on what maps and diagrams can achieve and the anthropocentric views they may represent. Overall, *Feral Atlas* is a meticulously considered, ground-breaking achievement that could not operate in print, but it is also hectic and confusing… until the section entitled ‘*How to read the Feral Atlas*’ is located. Delaying the discovery of these instructions is a deliberate strategy, but one fraught with the risk that visitors to the site

IMAGE Artist’s impression of *Entangling* by Georgina Hounsome, 2018 [https://georginahounsome.co.uk/about-2]

prematurely abandon their exploration. The internet doesn't usually ask us to commit in the manner required for this form and content, and therefore some might miss this opportunity to enrich their understanding of the world and of the different communicative modes available to discuss it.

Georgina Hounsome's book *Entangling* (2018) also deals with the intertwined concerns of the human and non-human worlds. While *Feral Atlas* is committed to reflecting on this through multiple perspectives, Hounsome offers us a more manageable, individual point of view. *Entangling* adopts the understanding of systems found in Bartram's image and adds the human, situating us within nature, rather than as a detached and disembodied observer.

Hounsome describes *Entangling* as a collection of "fleeting and unassuming moments" captured in drawings and snippets of text that offer an attentive, embodied and poetic approach to being-in-the-world. The book brings together views of and ruminations on natural phenomena, urban contemporary life, and vast shifts in scale and time, using visual resonances and a seasonal structure to arrange the materials. It is image-led and meditative, in order to promote slowing down and appreciating the difference between our daily experience of time and Earth's time. The imagery is persuasive, offering a way of using visual autoethnography to give us a singular anchor for some of the mind-boggling large-scale ideas introduced. For example, drawings of lichen are accompanied by references to cellular processes as well as vast colonies of ants, offering the specifics of Hounsome's experience to make links to the general theme of climate change. The point-of-view of the human is acknowledged through emotive language and personal imagery, which acts to refute the dispassionate objectivity of the specimen-focused illustrations discussed previously. This book reminds us that nature isn't just 'over there'. Hounsome demonstrates how we are embedded within it and proposes we adjust our perspective accordingly.

## The Thing Itself

The work of Sophie Morrish adopts a similarly 'entangled' approach to nature, but uses different forms to communicate her findings. Her exhibition *Island Time* (Bermondsey Project Space, 2018) draws on the years spent on North Uist, a remote island in the Outer Hebrides of Scotland, and emphasises the role of fieldwork in (or perhaps, as) daily life. In her catalogue essay Morrish describes her process as a "wordless 'being-there', in that place, at that time" (2018), the encounter offering the raw data of the place that she then reflects on through a variety of image-making practices, such as drawing, photography, sculpture, and assemblages.

The exhibition featured many of Morrish's collections displayed as 'arrays': pieces of bone, feather, and suchlike arranged in groups according to the artist's own principles. On first glance these arrangements might bear visual similarities to displays of taxonomic classifications derived from Linnaeus. However curator Mel Gooding notes that the artist's array is a challenge to taxonomic traditions (obviously in a markedly different register to Lear's *Nonsense Botany*). Morrish employs both visual and material logic in a process informed by tacit knowledge. She disrupts the binaries of "subjectivist-artist" and "objectivist-scientist" and suggests that the work is an "appeal to the heart and the head to value the natural world for its own sake" (Gooding in Morrish, 2018).

The artwork she produces is the result of her attention and immersion within a location, where the investigator fuses with the phenomenon of interest to reflect what Gooding describes as the contemporary artist's desire to

> "dissolve the existential dichotomy of the human versus the natural, and to identify the subjective human experience of nature as itself a term of the natural."

In practical terms, the outcomes capture time in a way that echoes Athens' description of Bartram's drawing as an account of his process of "empirical observation, discovery, and synthesis": They speak of the time Morrish has spent with her material – collecting, cleaning, arranging, drawing and experiencing them. Materials are presented in a manner that reflects a slow and embedded set of methods, utilising groups and series as organising principles that go beyond a momentary, singular snapshot of their subjects.

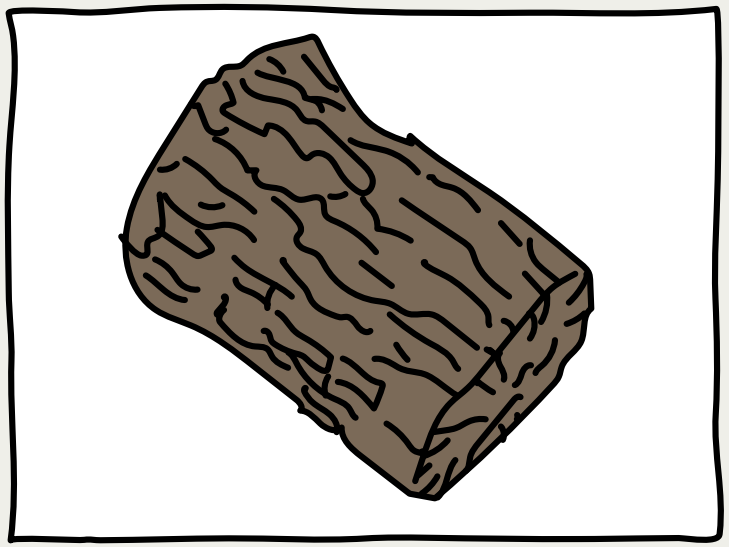


IMAGE Artist's impression of *Resurrection* by Sophie Morrish, 2001 [https://www.sophiemorrish.net/earlyobjects/reserrection]

She also employs shifts in scale effectively to offer a way of recalibrating our perception of the natural world. Her large-scale graphite drawings of generally overlooked details in the landscape such as tidal traces, coral pieces, and a close-up view of a whale skull present a greatly enlarged rendering of these details. These drawings suggests an

alternative viewpoint of these phenomena, in contrast to our common approach to perceive the world in relation to our own scale. The effect is to momentarily reposition the viewer, offering a glimpse of a flatter and less hierarchical structure, situating us within and perhaps dwarfed by nature.

Morrish also intervenes within her collected materials, entering into conversation with her finds: casting objects, drawing on others, editing and combining materials as sculptural forms. These assemblages show Morrish being an active participant within the natural world she investigates, leaving a trace of her engagement. In one example from Island Time she uses fire to damage bones. This targeted destruction functions as a creative intervention enacted upon a scientist's collection of specimens, intended to liberate them from their rigid taxonomic positions. Elsewhere Morrish makes a touching, reparative gesture: In the piece *Resurrection* (2001) she covers a log with bark stripped from saplings by grey squirrels, meticulously pinning shreds of new carapace to a lump of birch wood.

In an excerpt from his book[1] *Climate: A New Story* (2018) US author Charles Eisenstein explores various perspectives on the ameliorative role of humans in response to problems facing the natural world. He invites us to consider the human as a responsible custodian, using their skills and tools to benefit nature. Eisenstein suggests adopting a mode of being in the world that mirrors Morrish's immersion in her environment:

> "It means forging intimate, respectful relationships with nature in its specific, local embodiment. Through extended close observation and interaction with nature, we can begin to hear answers to questions like 'What does the river need?'" (Eisenstein, 2018)

Here human intervention is recognised as necessary in effecting positive change. Regeneration may tolerate or even be dependent on human-led alterations such as introduced species. Reading Eisenstein's words in conjunction with Morrish's *Resurrection* adds layers of complexity to our response to the grey squirrel invoked by her piece. What is to be done about this "invasive species"[2] brought to Europe from North America in the 19th century? We are forced to consider complicated questions concerning what responsible human agency means, what and when our baselines are calibrated to, and what we are prepared to defend.

Similar to Morrish, the photographer and illustrator Anna Atkins used the real thing-in-the-world to produce the images in her *Photographs of British Algae: Cyanotype Impressions* (1843).

Atkins used the newly-discovered technique of cyanotype printing, and synthesised this with

[1] WEB-LINK
*Tending the Wild* (Charles Eisenstein), Kosmos [https://www.kosmosjournal.org/kj_article/tending-the-wild]

[2] WEB-LINK
*Invasive Species*, Wikipedia [https://en.wikipedia.org/wiki/Invasive_species]

her background as a botanical illustrator, making use of her own collection of preserved botanical specimens to produce the first ever book illustrated using photographic images (Lotzof, no date).

Gooding explains how Morrish's arrays offer us a direct experience of "the things themselves", so that each find "speaks for itself through itself" (Morrish, 2018). By comparison, Atkins' work presents a slightly increased distance between message and object by virtue of the photogram process, but the resulting print still captures the specificity of the unique example in much the same way as Morrish's work does. Similar to Hesse-Honegger's mutated beetles discussed above, Atkins' cyanotypes do not offer a generalised and idealised representations of species. Her images present us with a ghostly, auratic trace of a single incidence of that specimen, as collected and composed by Atkins.

The pressed specimen is a representational convention referenced by Bartram in his inclusion of a flat leaf with its full face to the viewer. Athens (2015) gives a historical example of naturalist Mark Catesby treating the pressed specimen's "flat, matter-of-fact presentation" as a convincing knowledge object that "could speak for itself", posting it to a colleague with only minimal text to explain it[1]. The question of trust hovers over Athens' description of the role of pressed specimens. She suggests that there is colonial snobbery at play, in that European scholars in receipt of these direct representations could trust that they hadn't been meddled with or misrepresented by their American colleagues in the field.

Both Morrish and Atkins produce artwork that relies upon them having been there in the presence of what they subsequently display for us, and both offer us a temporal trace of the artist's engagement[2]. These examples, where things themselves are made to powerfully communicate about their own existence, stand in notable contrast to another commonly employed rhetorical strategy: metaphor. Dr Marco Caracciolo, a scholar of literary theory, examines the use of metaphor in relation

[1] FOOTNOTE
The broader question of what constitutes a believable knowledge claim made by the visual outputs of "subjectivist-artists" is one that informed pivotal discussions of artistic research, such as Christopher Frayling's much-cited 'Research in Art and Design' paper from 1993.

[2] FOOTNOTE
Although we generally don't wish to foreground artists' biographies as a major key to interpreting their work it is worth noting how Atkins' book represents a challenge to gendered gatekeeping. She combined art and science at a time when neither were freely accessible to women, a problem that continued to limit Beatrix Potter 50 years later in 1897 when she was unable to present her work on fungi in person at the Linnean Society (V&A, no date).

IMAGE Artist's impression of *Cystoseira granulata* by Anna Atkins, from *Photographs of British Algae: cyanotype impressions*, 1843 [https://digitalcollections.nypl.org/collections/photographs-of-british-algae-cyanotype-impressions#/?tab=navigation]

to Anthropocene fiction. He argues that it helps to bridge the gap between the human and non-human by offering us a shift in perspective, making it a "formal, stylistic site of negotiation of human–nonhuman entanglements in narrative" (Caracciolo et al., 2019). He and his co-authors summarise metaphor as drawing upon a concept from a source domain (something we are familiar with and have sensory experience of) and using it to frame the target domain (for example difficult to grasp, vast and complex phenomena such as climate change). For example, by using the term 'the greenhouse effect' we can grasp climate change as (notionally) we are familiar with the experience of being sweaty in a glass hothouse.

But there is an inbuilt bias within this method. As Caracciolo et al explain:

> "The mapping from an animal (source) to a human (target) […] is demeaning and disempowering [for example 'that man is a dog'], while mapping with the opposite orientation (human source, animal target) works towards collapsing the difference between human and animal life [for example 'that dog is a man']" (2019, p. 224).

We are framing the target domain (the natural world) within human experience and speaking for it rather than allowing things to "speak for themselves and through themselves". Therefore metaphor doesn't quite collapse the distinction between the human and non-human domain in the same way as the artwork shown here does. Asking us to see things in terms of something other, rather than for what they are, pulls us away from the realm of experience, perception and attention, and into practices of interpretation and a reliance on existing frameworks.

## New Imaginaries

In *Being Ecological* (2018) philosopher Timothy Morton suggests that the way we currently communicate about ecology and the climate crisis is stuck in "horror mode": we keep "dumping" data on ourselves and each other, which makes us feel bad, anxious and powerless. They liken our collective situation to living through trauma: we are finding ourselves in the middle of something horrendous, and we are desperately trying to anticipate and control what is about to happen. Morton suggests that instead of continuing to "dump" the data, we should try to "live the data" instead. What might that look like in the context of illustration?

*It's Freezing In LA!* (*IFLA!*) is the name of a critically acclaimed print-magazine, launched in 2018, that publishes articles related to the climate crisis. The writing is well researched and rigorous, articles are medium length – enough to give a thoughtful and intelligent analysis of the topic being discussed,

but not requiring specialist knowledge or expecting an excessive commitment of time from the reader. The tone of the writing is measured and nuanced, acknowledging complexity without losing sight of the overall urgency of the climate emergency.

Editor Martha Dillon and art editor Nina Carter have commented on the limited range of rhetorical strategies, and in particularly visual strategies, that are generally in use in relation to the climate crisis (Carter and Dillon, 2021): scientific reports are highly specialised, and from a visual point of view tend to use mainly statistical graphs and other forms of data visualisation, leaving the ordinary reader alienated and overwhelmed. Research in psychology confirms that data and information driven communication on climate change is generally ineffective (Roosen et al., 2017). By contrast, Carter and Dillon note how activist communication, which is geared towards instantaneous, maximum impact, elicits a strong emotive reaction. However, it does not allow for much detailed information, nor does it give an audience much room for reflection. Another common approach, namely the use of visual tropes such as globes, polar bears and rising graphs, ultimately creates disconnect and fatigue, a visual version of the increasingly desperate “data dump” mode.

What alternative forms of rhetoric might be more successful for drawing us in and enabling us to “live the data”? *IFLA!* use nearly exclusively illustration as the pictorial content of their publication[1]. From the point of view of commissioning practices this functions in a traditional way as editorial illustration: the written piece takes the lead, the illustrator is commissioned afterwards to enhance, extend and illuminate the writing. But the sensitivity that is evident in selecting and guiding the contributing illustrators and positioning their work alongside the journalism reveals a determination to make this publication stand out amongst climate communication: the images, although they are diverse in appearance and technique, create a contemplative atmosphere that is probably more commonly found in illustration accompanying literary writing.

What does it mean to describe the illustration in *IFLA!* as “literary”? The work doesn’t teach us anything factual. We don’t learn anything definitive about the natural world by looking at these illustrations: Landscapes are often rendered without much detail, plants are indistinct. In contrast to the horrifying numbers and graphs that usually accompany climate communication, here we have ambiguity, fuzziness, mood. Similarly to the work by Hounsome and Morrish discussed above, these illustrations remind us that relating cerebrally to the natural world is not the only way.

As one possibility for “living the data” Morton suggests a concept they call ‘tuning’ (2018, p.108):

[1] FOOTNOTE
Other innovative and progressive visual strategies are outlined on the website [https://climatevisuals.org/], but this resource refers only to photography.

attempting to go beyond our anthropocentrically scaled concerns and temporalities and "acknowledging in a deep way the existence of beings that aren't you, with whom you coexist". This acknowledgement does not arise from the production and digestion of data. Morton points towards the epistemological gap between data and objects, and proposes that objects are generally much more mysterious and varied than data suggests. "Tuning" involves being open to the world in an experiential and self-reflexive way. Achieving this kind of sensorial, ecological intimacy depends upon allowing for not-knowing, allowing for strangeness, and allowing for ambiguity.

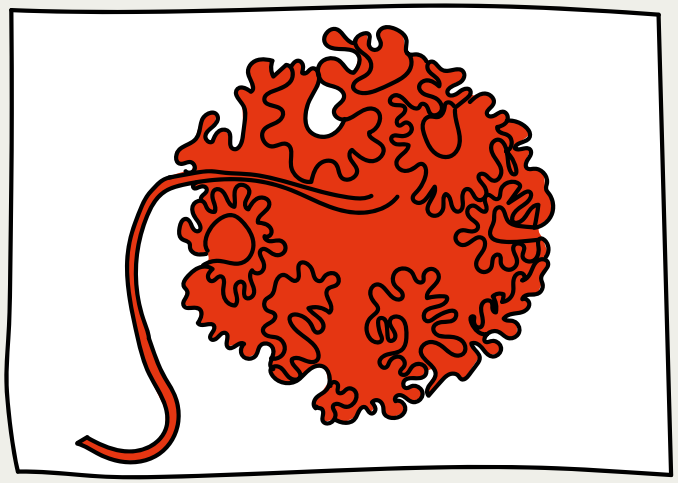
All of these qualities are abundant in Hounsome's and Morrish' work. Creating an atmosphere of immersive ambiguity is probably easier when operating outside the constraints of editorial practices: Hounsome's *Entangling* (2018) is wholly self-authored and has over 180 pages. Morrish' *Island Time* (2018) was presented as a solo exhibition, with the work spread over three gallery rooms. It is impressive that *IFLA!* manage to achieve a similar effect within their magazine. Not only is there much less actual square footage for the illustration to occupy, it also is commissioned to respond to the rigorous environmental journalism that takes the lead. Furthermore the images are produced by multiple, separate practitioners, rather than a single author. Nevertheless the overall result is a body of illustrative work that proposes a shift in your perception of the world, an invitation to feel your way around your own mucky immersion in the biosphere.

A different method for "living the data" is evident in *Crochet Coral Reef*, an ongoing project (started in 2005) by sister-duo Christine and Margaret Wertheim and their California based Institute of Figuring[1]. The basic idea of this project is relatively straightforward: an ever-expanding exhibit of crocheted coral reefs, crafted by mostly female volunteers around the globe. However this simple premise gives rise to a plethora of interpretive possibilities. The work is rooted in the fields of mathematics, marine biology, feminine handicraft and environmental activism, and speaks to ideas of collective making, embodied knowledge and intersecting temporalities: that of the life-time of a coral reef (around 10,000 years), the long hours of manual labour, and the sense that time is running out – for the reefs, and many other life-forms too. What do we do with the time that remains? Why do something as seemingly pointless as crochet?

It is well known that coral reefs are particularly sensitive to rises in sea temperatures, and many reefs are in a critical state of disintegration. The Wertheims chose crocheting as a medium to honour reefs as there is a direct link between this craft and the possibilities of representing the kind of geometry that coral reefs exhibit: hyperbolic surfaces – exemplified by the frilly shapes of

[1] WEB-LINK The Institute For Figuring [https://www.theiff.org]

reefs – can most successfully be modelled using crochet (Wertheim, 2009). The Wertheims initially produced simple, mathematically "perfect" models of hyperbolic shapes, but these basic patterns were soon modified and embellished, and then developed even further by the rapidly growing number of contributors. The project has generated a dynamic of its own.



This work questions the idea of authorship in multiple ways; not only because there are so many people contributing to and modifying the work, but also because it recalls the status of feminine handiwork as a generally overlooked activity in the arts canon, one that has often not been considered important enough to warrant acknowledgement of its maker. Beyond this, the Covid-19 pandemic has reminded us that bounded individualism is an unsustainable construct. We are, for better or for worse, interrelated and interdependent. *Crochet Coral Reef*'s connecting threads and mutating patterns illustrate how we are all quite literally entangled with each other. In terms of scale, labour and sheer inventiveness this project goes way beyond singular capacity; the act of passing on and modifying patterns is a mirror of the evolutionary process. The work is endlessly relational and expansive in its making process. For viewers it operates both as a memorial of something we are on the cusp of losing (coral reefs) as well as a reminder of the potential joyfulness of being and making together.

Philosopher Donna Haraway suggests sympoiesis, 'making-with', as one of the key concepts necessary for survival in our times (2016). How can we team up to make each other capable of something new? She uses string figures (also known as 'cat's cradle') as metaphors to describe the importance of "giving and receiving patterns, dropping threads and failing, but sometimes finding something that works" (2016, p.10) and "[...] becoming with each other in surprising relays" (2016, p.3). *Crochet Coral Reef* proposes that we allow ourselves to get tangled up with sensory, embodied and relational knowledge in a continual process of becoming with each other. The project is, theoretically at least, endlessly generative, endlessly abundant.

IMAGE Artist's impression of *Crochet Coral Reef* by Margaret and Christine Wertheim and more, 2005-present [https://crochetcoralreef.org]

Another re-imaging of our current situation is offered by Annalee Davis, a visual artist from Barbados. Her *Wild Plant Series* (2015) is comprised of drawings on old plantation ledgers, which the artist found in an abandoned room of her family's former sugar plantation. Barbados' history as a wealthy British colony and a centre of the African slave trade has been well documented. How might Davis' gentle drawings of 'wild plants' speak to these traumatic histories of slavery and displacement?

IMAGE Artist's impression of *Wild Plant Series* by Annalee Davis, 2016 [https://annaleedavis.com/archive/wild-plant-series]

The works in the series are made up of two layers: individual sheets of plantation ledgers and the overlaid drawings. The ledgers bring up a plethora of associations: slavery, sugar cane, bureaucracy, accountancy, profit. Sugar cane, the main crop grown on Barbados' plantations, is not native to the Caribbean, it originates in the tropical regions of Southeast Asia and New Guinea. Anthropologist Anna Tsing (of *Feral Atlas*) describes sugar cane cultivation in the colonies of the New World: it was planted by sticking a cane in the ground and waiting for it to sprout. All the plants were clones (2015, p.39). She goes on to consider how both the plants, and the enslaved labour force lacked local social relations in their new surroundings. This isolation is mirrored in the logic of accountancy, where each "unit" is abstract, standardised and supposedly interchangeable. The second layer of Davis' work, her drawings of 'wild plants', are native species that were cast aside in agricultural progress narratives. Unlike sugar cane, these plants are embedded in local ecologies, but have been confined to the edges.

Davis *Wild Plant Series* was exhibited as part of her solo show in Texas (2016/17) called *This Ground Beneath my Feet – A Chorus of Bush in Rab Lands*. 'Rab lands' in Barbados refer to areas of land that were formerly cultivated for sugar cane, but have now been left to grow wild. They represent the liminal spaces beyond the violent agricultural project that was the colonial plantations. Tsing draws attention to these "uncultivated" verges – both literally and metaphorically – and suggests that we think of these interstitial territories as "the latent commons", spaces that allow for collaborative, multispecies assemblages

that operate outside of unsustainable progress narratives. She reminds us that

> "latent commons are not good for everyone. [...] [but] [t]he best we can do is aim for 'goodenough' worlds, where 'good-enough' is always imperfect and under revision" (2015, p.255).

Davis' *Wild Plant Series* is an example of narrative illustration, where two frames of a sequential image series have been superimposed on each other to tell the story of a modest, local plant, reclaiming territory from practices of brutalising and profit-driven crop production.

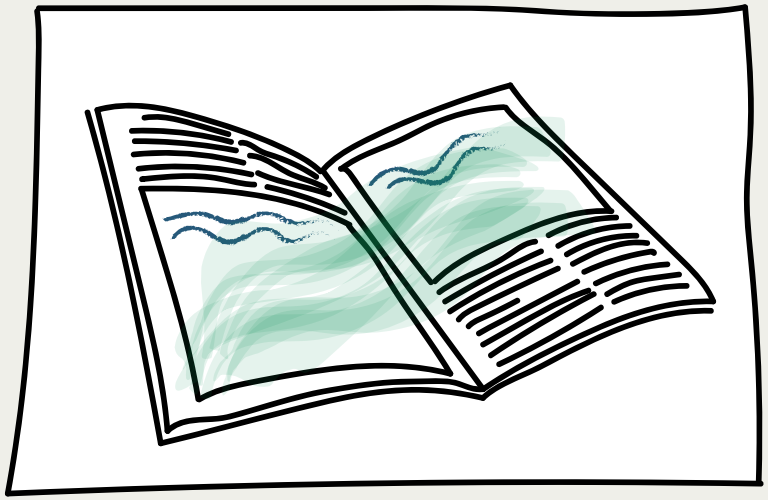


IMAGE Artist's impression of *It's Freezing in LA!* Magazine, 2020 [https://www.itsfreezinginla.co.uk]

While this narrative does not purport to undo the multiple and intersecting traumas of colonial landscapes, it can nevertheless suggest notions of salvage and resurgence. Looking in the cracks, looking in the verges, we can still find possibilities for new life.

## Concluding Remarks

In these pages we have focused on how illustration creates and communicates knowledge of the natural world, and how it thereby embodies more general attitudes of humans towards the ecosystems we are embedded in. We believe that close attention to these attitudes is vital in understanding and addressing the complex upheavals and threats of our ongoing ecological crisis. Ideas of transcendent objectivity and disembodied knowledge (evident in historical natural history illustration) are giving way to more relational forms of sense-making, with illustrators acknowledging their embodied and located subjecthood (see Hounsome's *Entangling* and Morrish' *Island Time*). Exactitude (for example Howells' elephants) and ambiguity (for example the editorial illustrations found in *It's Freezing in LA!*) play different, but equally important roles in communicating aspects of our current condition. Illustration can create connections (*Feral Atlas*) and highlight difference (Hesse-Honegger's beetles). These examples demonstrate how illustration

can meaningfully contribute to global debates at a time of far-reaching paradigm shifts, perhaps comparable to the role of illustration in the 1500s with the emergence of the scientific method. As indicated in at the beginning of this article we look forward to building on these initial findings with a greater range of more diverse case studies as we continue to expand upon this research.

Towards the end of *Being Ecological* Morton advances the thought that "[e]cological politics is about expanding, modifying and developing new forms of pleasure […]" (2018, p.210). The case studies in our final section – New Imaginaries – present opportunities for us to reflect on possibilities for ecological intimacy, generative abundance and narratives of resurgence. Obviously these gestures towards pleasure, joy and renewal should not detract from the seriousness and urgency of our situation. We believe that rather than minimizing the gravity of the climate and ecological crisis, they offer a productive way of engaging with it and serve as a reminder that another world is possible[1].

SB, LV

[1] WEB-LINK *Luisa Neubauer*, Twitter [https://twitter.com/Luisamneubauer/status/1373015246693105666]

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