These Birds of Temptation

intercalations 6

The *intercalations: paginated exhibition* series is an experimental foray exploring the structure of the book as a potential curatorial space. As the reader-as-exhibition-viewer moves through the book-as-exhibition, she discovers that the erratic intercalations of the Anthropocene invite new forms of literacy, visuality, inquiry, and speculation that are, in the words of Clarice Lispector, less promiscuous than they are kaleidoscopic.

intercalations is a project of SYNAPSE – The International Curators' Network, published by K. Verlag and Haus der Kulturen der Welt in conjunction with *The Anthropocene Project.*

intercalations:
paginated exhibition series

These Birds of Temptation is a queer refrain, populated with both acoustical lines of flight and the sorrows of captivity, wherein the reader-as-exhibition-viewer learns that the adventure of ornithology is as preoccupied with the evolutionary meaning of allopreening among avifauna as it is with their taxonomical domination. This erratic ensemble of contributions creates a murmuration of minor ornithologies, including contributions on feathers, flight, song, loss, escape, and evasion, as well as a series of object lessons, poetic visions, short stories, and theoretical reflections.

These Birds of Temptation

co-edited by
Anna-Sophie Springer
& Etienne Turpin

in association with
Kirsten Einfeldt & Daniela Wolf

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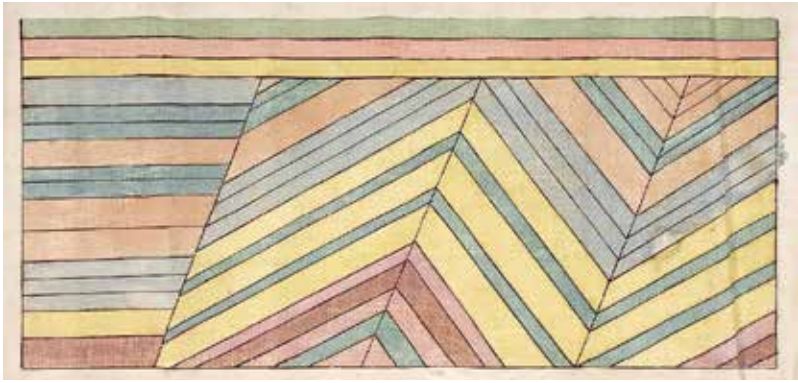
Preface

by Kirsten Einfeldt
& Daniela Wolf



Orra White Hitchcock, Plate 27, “Strata near Valenciennes,” 1828–40,
pen and ink drawing on linen, (1 of 61). Courtesy of Amherst College Digital Collections.

Below a surface of three horizontal, uninterrupted layers, six types of sedimentation are seen moving their way up and down in a zigzag and pushing against a nearly horizontal section of differently composed layers situated on the left side of the image. While the two segments are still separated by a thin black line, it seems like a mere matter of time before the erratic layers on the right side of the image infiltrate the more consistent horizontal layers on the left. Born in Amherst, Massachusetts, Orra White Hitchcock (1796–1863) was one of the earliest female scientific illustrators in America. Working with and for her husband Edward, a geology professor, she created hundreds of illustrations of both botanical specimens and geological formations, such as Plate 27, “Strata near Valenciennes.” Seen today, Hitchcock’s sectional views of soil and rock strata in earthy tones evoke the evenly patterned artworks of twentieth-century artists Anni and Josef Albers.

In the vocabulary of geology, the proper term for one type of rock being pushed in-between other stratified segments is an “intercalation.” With reference to its Latin etymology, the word literally means something like “being inserted between an existing ‘proclamation’”—or, something that has been understood as of official, and of great importance, is changed because of a new layer or element having entered the reified sequence. In contrast to hard rock, the stuff of narrative is softer and more

malleable to begin with. Nevertheless, in a novel, the work of weaving one story into another shares the eponymous, albeit literary term, "intercalation." In the wake of the Anthropocene hypothesis—which, at least in part, contends that anthropogenic sedimentations are transforming previous geological compositions in literally fundamental ways—the intercalating of existing "stories" and "official proclamations" with transformative and erratic new layers seems of particular urgency.

Inspired by Orra White Hitchcock's dynamic line drawings and a polysemic concept that sits comfortably, if at times erratically, in both earth science and the humanities, the *intercalations: paginated exhibition* series developed for the SYNAPSE International Curators' Network by Anna-Sophie Springer and Etienne Turpin seeks to engage with entangled relationships and habitual distinctions in order to reimagine traditional elds of knowledge within the unstable context of the Anthropocene. When explored as *intercalations,* the presumably dialectical categories of nature and culture, human and non-human, subject and object, fact and fiction become transitional, layered narratives with porous, permeable, and shifting boundaries.

Dear Reader-as-Exhibition-Viewer,

Birds appear in the fossil record of the Middle to Late Jurassic and have been accredited with a special place in human cultures for thousands of years. Their significance is reflected in dance and ceremony, craft, sculpture, storytelling and literature; they have been associated with creation and peace, war and death, as well as messengers of the weather and harbingers of fire, spring, and rain; in some cultures birds have magical and supernatural powers, in others their bodies offer healing remedies. Certain species are seen as mythologically connected with the sun, others with the stars or the moon. With early archaeological records pointing back as far as the modern human's ancestors, feathers adorned costumes, uniforms, and weapons, and served as writing pens and currencies in trade.[1]

Birds exist in approximately 10,000 different species that inhabit the air, land, and water, with some being carnivorous and others eating only plants. According to current estimations, the total number of birds in the world is considered to be fifty billion—with chickens making up nearly half of these individuals. In fact, in 2018 a group of scientists including geologist Jan Zalasiewicz, Chair of the Anthropocene Working Group, suggested that the broiler chicken (*Gallus gallus domesticus*) was a pivotal signifier of an anthropogenically-altered biosphere.[2]

We have dedicated the final volume of the *intercalations: paginated exhibition* series to the birds, convening a murmuration of voices to discuss longing, pleasure, loss, grief, and beauty in relation to our avifauna kin. In the conversation that follows, we give some space to our respective thoughts, as co-editors, while introducing themes that framed the book as well as those that emerged or amplified during its production; as a book first proposed in 2013, it has been a very long time in the making, accompanying us as a collaborative and collective endeavor shaping how we've seen and experienced the world. We are delighted you are now holding this precious collection in your hands and hope you will take flight, sing along, and nest up with some of the characters and ideas between its pages.

Anna-Sophie Springer & Etienne Turpin
Berlin, September 2021

Etienne Turpin Let's begin with a quote from Rosa Luxemburg, whom I wrote about in the fifth volume of the series—*Decapitated Economies*. In the passage I've been thinking about—from a letter to Sophie Liebknecht in 1917—she relays an attentive reflection on bird migrations and the odd persistence of peace among birds in flight, writing:

> I was recently reading a scientific work upon the migrations of birds, a phenomenon which has hitherto seemed rather enigmatic. From this I learned that certain species, which at ordinary times live at enmity one with another (because some are birds of prey, whilst others are victims), will keep the peace during their great southward flight across the sea. Among the birds that come to winter in Egypt—come in such numbers that the sky is darkened by their flight—are, besides hawks, eagles, falcons and owls, thousands of little song birds such as larks, golden-crested wrens, and nightingales, mingling fearlessly with the great birds of prey. A "truce of God" seems to have been declared for the journey. All are striving towards the common goal, to drop, half dead from fatigue, in the land of the Nile, and subsequently, to assort themselves by species and localities. Nay more, during the long flight the larger birds have been seen to carry smaller birds on their backs, for instance, cranes have passed in great numbers with a twittering freight of small birds of passage.[3]

I think it is an unusual observation for its time, but the same phenomenon has been observed (by way of surveillance cameras) among predators and prey in animal passage corridors, for example, at highway crossing bridges for forest animals. Of course, the image of birds as comrades in flight is especially powerful; at the same time, I always feel uneasy about biological images for human solidarity, which seem dangerous for other obvious reasons.[4]

Anna-Sophie Springer I think this image bridges the concerns taken up in both of the final *intercalations* volumes, especially as we imagined our "bird book" as a kind of counterpoint to *Decapitated Economies* that moves toward other ways of knowing by closely engaging with our avifaunal kin. So the expansive possibilities of the imagination, poetry, art, and the senses all play a significant role in this book, as well as eroticism and pleasure—both in the mystical sense of aliveness, vibrancy, wanting to become with, and in the context of objectification and domination, or wanting to possess. This density and polyvocality holds open a polysemic space, which means that the book's proposal is far from a romantic love affair—it is not a cozy retreat. Instead, it attends to contradictions and tensions. I am reminded of this old book we found during our research, *Birds and Men*, with a grotesquely titled chapter, "Boys, Pot-Hunters and Women: Enemies of Birds," which discussed masculine cruelty and ladies' fashion.[5] The various symbolisms in Western art history regarding birds and humans are typically a reminder of patriarchal gender codification. We were troubled by this notion and we wanted, instead, to produce a collection that could liberate how we relate to and think with birds and their various representations—*exercises in minor ornithology*. Yet, now that the book is finished, I think the trajectory also shifted as many of the contributors began to consider more closely aspects of loss and mourning. What has changed about birds and extinction since 2013?

> ET I suppose there has been a shift in perception—of course, not in a global or homogenous way—that has occurred in the last decade or so, but especially in the past five years, with respect to the connections among the climate and pollution crises and biodiversity loss. This is not a consciousness-raising

1 See Edward A. Armstrong, *The Life and Lore of the Bird: In Nature, Art, Myth, and Literature* (New York: Crown Publishers Inc., 1975).

2 Carys E. Bennett, Richard Thomas, Jan Zalasiewicz, et. al., "The Broiler Chicken as a Signal of a Human Reconfigured Biosphere," *Royal Society Open Science* 5/12 (12 December 2018); doi.org/10.1098/rsos.180325. See also the forthcoming K. Verlag publication with Richard W. Pell of the Center for Postnatural History in Pittsburg, USA.

3 Rosa Luxemburg, in a letter to Sophie Liebknecht, Wrocław, mid-November, 1917; marxists.org/archive/luxemburg/1917/undated/02.htm.

4 On the naturalization of political affinities, see Lorraine Daston, *Against Nature* (Cambridge: MIT Press, 2019).

5 Robert Henry Welker, *Birds and Men: American Birds in Science, Art, Literature and Conservation 1800–1900* (New York: Atheneum, 1966), 193–99.

question; I still assert that nothing has ever raised consciousness! Instead, the change in perception, as far as I can tell, is related to both individual sensory experience (i.e. I used to see so many more birds in my yard, or in my neighborhood park, etc.), and the increasing amount of media coverage around species extinction. Of course, the media fails to connect any of the news items, so bird habitat destruction caused by new suburban construction remains a distinct story from the utterly depressing reports about biodiversity figures. We could give countless other examples of these non-sequitur media relays, but, in every case, the role of the news media is to segregate reality and maintain this segregation above all else. And yet, because the media has so completely failed to report the crisis, frame it adequately, or connect it to the capitalist political economy and maniacal capital accumulation that causes it, I suspect that a lot of people are left to notice things more locally. Perhaps the pandemic was good for this local site-sensitivity as well.[6] In this sense, it is really about how humans come to hear, and listen, to birds, isn't it?

AS The pandemic did something in this respect, but it is hard to judge exactly what shifted because so much of our daily lived reality these days pops up as social media "impressions"—where nature and animal images and videos are incredibly popular in these feeds. When we met with David Bonter at the Cornell Lab of Ornithology, we heard about the Lab's precise aims to harness this interest and joy of ordinary people noticing birds in the context of digital strategies and citizen science.[7] It is a fascinating interview, yet I think the kind of listening you're getting at is also a theme in the contributions from Bik Van der Pol and David Rothenberg. Both of these pieces explore the possibilities of human-animal collaboration and express the desire to listen to and learn from birds. In the story by the two artists, it is the parrots that they worked with who actually get to speak—and even mock and

6 Georgina Quach, "Tweeting Appreciation: Bird-Watching Groups Take Flight in Lockdown," *The Guardian* (29 January 20201); theguardian.com/environment/2021/jan/29/tweeting-appreciation-bird-watching-groups-take-flight-in-lockdown.

7 A different noteworthy take on digital culture and birding is offered by Jenny Odell, *How to Do Nothing: Resisting the Attention Economy* (New York: Melville House Publishing, 2019).

lament the human lack of understanding regarding sympoetics and mutuality. I think it's such a lovely twist here that the museum installation—a temporary aviary—that preceded this written work already dealt with the stubbornness and refusal of humans to communicate and comprehend effectively about climate change *among ourselves*. That the world's birds—and other non-human animals and organisms—bear the brunt of environmental depletion should be evident, but in Bik Van der Pol's story, the parrot's finally get to explicitly scold their human counterparts. So it really becomes a matter of listening and, as Vinciane Despret says, of "ask[ing] the right questions,"[8] maybe most of all to ourselves.

As a philosopher-musician, David Rothenberg also offers a wonderful way of opening up our senses, bodies, and our whole being to what it can mean to listen in such a way. As JJJJJerome Ellis, another New York-based composer and poet says on his latest album *The Clearing*, "music *opens time* [. . .] make[s] our eardrums vibrant [. . .] for metamorphoses."[9] This is a fitting description of what Rothenberg does when he experiments with attunement and becoming by improvising with Berlin's nightingales wooing in the spring—out of biological functionalism or avian virtuosity? He is such an engaging storyteller and draws other people in—whether as fellow musicians venturing out, as audiences of these live gatherings, or as reader-listeners with their own ecologies of mind.

For writer Yoko Tawada, with "The Voice of a Bird," it is the deeply personal awkwardness and interruption that one experiences when learning a new human language that holds the liberating possibility and requisite playfulness one needs to become sensitive to—and more viscerally sentient of—*nonhuman* languages. As the translator for this piece, it was a pure delight to immerse myself into its intellectual and linguistic games of "The Voice of a Bird," not least because I share Tawada's experience of writing in my non-native language, and I love her tongue-in-cheek reading of German bird poetry. I am so happy this multifaceted text is in the book

8 Vinciane Despret, *What Would Animals Say If We Asked the Right Questions?*, trans. Brett Buchanan (Minneapolis: University of Minnesota Press, 2016).

9 JJJJJerome Ellis, *The Clearing* (New York: NNA Tapes, 2021); nnatapes.com/available-releases/jjjjjerome-ellis-the-clearing.

because it also connects so sensually with Mitchell Akiyama's twin essays in *Land & Animal & Nonanimal*.

The authors included in this collection share a sensitivity for a worldly belonging that expands decisively beyond the human; many also explore how sensation, as a form of becoming, informs cognition, which invites us to reflect on issues of existential aliveness and codependency across species boundaries. Birds sing and so communication is a recurrent theme, not only in the form of text or speaking, but also especially in the context of sound and music. Aesthetic experiences can stimulate and change how and to what we direct our attention; we might put into question common assumptions. Affective and perceptive processes like listening draw us out of ourselves, opening our being to other moods and intensities—involving energy, rhythms, time, and space. I am now thinking both of Jacob von Uexküll's bubble metaphor—according to which living organisms and their environments co-determine each other, yet in a specifically limited, or directed, instead of boundless manner—and of Deleuze and Guattari's reading of Paul Klee's so-called twittering machine, which they conceive as a kind of "release of expression," for instance, when a bird's song transcends its species's communicative or territorial boundary with the effect of transforming another species's song.[10] *Birds of temptation*… attention, movement, and resonance… In a more cosmic sense, this is also what the rapture of the erotic can do—and where desire, fantasy, and vulnerability all come into play. How do you see these aspects traversing the book? And what, for you, complicates their expression or articulation?

ET From the very first image in the book—an early exhibition poster for the absolutely brilliant photographer Francesca Woodman (1958–1981)—it makes sense to connect questions of human-bird relations with questions of desire and the sociality desire makes possible, pleasurable, and political. The

10 Jakob von Uexküll, "A Stroll Through the Worlds of Animals and Men" [1934], trans. Claire Schiller, in Claire Schiller, ed., *Instinctive Behavior: The Development of a Modern Concept* (New York: International Universities Press, 1957), 5–80; Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), 332–34.

challenge of Anaïs Nin's short story "Little Birds," for example, is the cross-species role of attraction and seduction, including forms of illicit attraction, which connect "birds and men." Anna Tsing, whom we might not at first associate with Nin's erotically-charged fiction, nevertheless relays a series of anthropological reflections on the libidinal economic investment in bird-watching in the Malay archipelago, as travelers cross the planet to witness, first-hand, the extremely rare and wildly exoticized (and undoubtedly exotic) mating dance rituals of the birds of paradise.

Of course, as we were making the book, we didn't need to read the story about the racism of that dog walker, Amy Cooper, in Central Park, New York, to know that none of these birding activities occur within a vacuum—birding while Black is just as dangerous as any other activity "while Black" in the United States or elsewhere.[11] Still, the story of Cooper calling the police to report that she was "threatened" by Christian Cooper—a Black birder who asked the woman to put her dog on a lead, as required by law in that area of the park—only to later have her charges dropped and instead be sent to "racial bias sensitivity training," reiterates the structural racism that continues to condition and overcode all multi-species engagements. Indeed, as C. Cooper remarked at the time of the original incident, "I don't think there's an African American person in America who hasn't experienced something like this at some point."[12] What I think is crucial to remember here is that the structural racism that affects birders in the wild also frames other forms of access to birds. In your own essay on the history of bird books, while you don't address racism directly, you do consider how this specific type of (book-bound) knowledge makes certain questions and concerns legitimate, valid, or even dominant in the sciences, while it reduces others to myth, or annihilates them altogether.[13]

11 Associated Press, "Amy Cooper made second call claiming black birdwatcher tried to assault her," *The Guardian* (14 October 2020); theguardian.com/us-news/2020/oct/14/amy-cooper-court-false-report-black-birdwatcher-christian. There is no relation between the two Coopers.

12 Quoted in Martin Pengelly, "Charge dropped against white woman who called police on Black birdwatcher," *The Guardian* (17 February 2021); theguardian.com/us-news/2021/feb/16/amy-cooper-charges-dropped-confrontation-black-birdwatcher.

13 Boaventura de Sousa Santos, *Epistemologies of the South: Justice Against Epistemicide* (Boulder: Paradigm Press, 2014).

AS That's right. As I explore curatorial-editorial methodologies, I keep an ongoing flow between my research and practice. Making this bird book with you, and everyone involved, offered opportunities to study and continuously revisit the history of the bird book. In "Inter Folia, Aves," I present some milestones in illustrated ornithological publishing as a backstory to our project, but also probe these legacies for their coloniality and the remediation they call for. But, following your point, I am reminded of *The Home Place*, J. Drew Lanham's most recent book. As a poet and professor of songbird ecology from South Carolina who grew up in the rural U.S., he articulates something white people might not easily realize—even less so in Europe: that nature and trees for Black families in America might be inscribed with violent memories of their ancestors' enslavement and corporal punishment.[14] There is also a movement in America calling for the renaming of birds tagged with the names of slave owners, Confederate generals, and settler colonists.[15] The historical weight of such implications can shift the meaning of ornithological literacy (and recreation) towards the struggle for racial, intersectional, and ecological justice.[16] We've tried to participate in this work in some previous projects, where the monarchical names of the tropical birds of paradise were the hinge for reframing scientific bird collections in the context of climate colonialism.[17] My text in this book relates to that research as well.

14 J. Drew Lanham, *The Home Place: Memoirs of a Colored Man's Love Affair with Nature* (Minneapolis: Milkweed Editions, 2017).

15 The campaign Bird Names for Birds was launched by petition in 2020 addressing the American Ornithological Society to make ornithology/birding a more "inclusive place": birdnamesforbirds.wordpress.com. The campaign gained momentum following Robert Driver's detailed renaming proposal to the AOS from a few years earlier; see americanornithology.org/wp-content/uploads/2020/02/2019-A.pdf, esp. pp. 25 and 46. See also: Robert Driver and Alexander L. Bond, "Towards Redressing Inaccurate, Offensive and Inappropriate Common Bird Names," *Ibis* 163/4 (October 2021); doi.org/10.1111/ibi.12984.

16 It is also a reminder that environmental racism is a form of social inequality expressed by the unequal exposure of phenomena such as extreme weather and military events, pollution, toxins, etc. See Razmig Keucheyan, *Nature is a Battlefield* (London: Polity Press, 2016), and Max Liboiron, *Pollution is Colonialism* (Durham: Duke University Press, 2021).

17 In 2020, the German Ornithological Society (DO-G) published an updated list contextualizing German bird names; the introduction by the Standing Committee for German Names of the Birds of the World acknowledged the existence of some discriminatory names, but rejected taking a moral or political position: *Vogelwarte: Zeitschrift für Vogelkunde* 58/1 (February 2020): do-g.de/fileadmin/Vogelwarte_58_2020-1__DO-G_Dt_Namen_Voegel_d_Erde.pdf.

From another angle, however, these connections are also why Mark Dion's *Library for the Birds* installations are so important to us: there is the clear love for books and an unapologetic love for birds, a kind of reverence in both cases, that challenges dominant orders and hegemonic systems. At the same time, you have to face questions about freedom and enclosure, protection and control—both physically and virtually—what thoughts and songs occur in a cage? There's also finch poop everywhere, making its entropic claims on the order of the library as well!

> ET Dion's bird libraries are multistable sculptures, and humor is an especially vital line of flight …

AS … Exactly. Humor is also necessary for navigating the spectrum of wonder and dread or switching between the ordinary and extraordinary. Birds are valued in all cultures—across millennia. In *intercalations*, these avicultural retentions offer oblique case studies for confronting our contemporary condition. For example, at first Nina Katchadourian's photo interventions seem pretty casual, spontaneous, even absurd. Yet, they also conjure deadly serious themes: about flying, the desire to travel, the aviation industry; and, of course, the libidinal economy of nature photography—you've already mentioned this with regards to birding tourism. The images are actually part of the artist's *Seat Assignment* series, where Katchadourian tackles social anxieties around contemporary air travel, making art with found materials while on a plane herself. It's all but impossible these days to fly and not think of the attendant carbon footprint. We straddle awe and wistfulness. I also get that sense intensely from Juliana Spahr's poem "If You Were a Bluebird." In fact, there's something incredibly erotic about the swelling of this multiplicitous assembly in the mud she calls forth—animals, and organs, and body parts in process with the elements. All then suddenly interrupted by an oil spill—and the attempt to organize and gather in the face of corporate, globalized ecocide, but no longer with that same momentum as earlier in the poem.[18]

18 On this topic, see David Whyte, *Ecocide: Kill the Corporation Before It Kills Us* (Manchester: Manchester University Press, 2020).

Both pieces are exemplary exercises in minor ornithology. On the one hand, each relies on existing ecological and ornithological knowledge, whether synthesized in the kind of animal photography Katchadourian repurposes, or reflected in the familiarity with the bioregional conditions of particular habitats that ground Spahr's poem. On the other, their respective artistic and poetic interventions also deterritorialize or displace the rationality of such epistemic and representational frameworks—either by teasing them, as in *The Birds of New Zealand*, or by blurring their purported clarity through page-long refrains that, almost like a chant, grow toward a deeply impassioned yet melancholy crescendo—an elegy for the interconnected biosphere, despoiled by big oil—which is how I read "If You Were a Bluebird." So, somewhere between knowing and sensing, I wonder if you want to say a bit more about minor ornithology?

ET The concept of minor ornithology has been on my mind, and together in, on, and between both our minds, for some time now, but it must have begun sometime in 2013 in the Pasar Pramuka bird market in Central Jakarta. It is one of the largest bird markets in Asia, and it was absolutely one of the most challenging places I have ever worked while developing a contribution to the 13th Jakarta Biennale, our first collaboration.[19] After trying to find different ways to bring the bird market to the Biennale, it became evident that we'd need to go in the opposite direction; working with two amazing researchers, Robin Hartanto and Widya Ramadhani, we interviewed sellers, breeders, cage-makers, trainers, and more in order to create an exhibition parcour that would come around to visit each of these minor ornithology practices and learn how their work has changed (or not) since Indonesian independence, or since the end of the Suharto regime. So, we brought visitors of the Biennale to the bird market instead, with a simple conceptual question: how do colonial relations between species persist despite political

19 For documentation, see: reassemblingnature.org/minor-ornithology. A more elaborate omnibus publication documenting and theorizing this project, as well as the other exhibitions in the "Reassembling the Natural" cycle, will be released next year under the title *Productions of Nature*.

independence (or democratic transition) and what can we do together to co-produce decolonial alternatives while acknowledging and respecting specific, local knowledge related to birds (and caring for birds) in the archipelago?

We could say that minor ornithology involves and celebrates all those human-bird *conjectural* knowledges (to borrow a phrase from Jacques Lacan), which shape human relationships with birds, and vice versa, but that fall outside of or beneath the (relatively) more exact sciences of professional biology, anatomy, and so on. And, in this sense, one piece I am so grateful to include in this book is the series of photographs from Ari Bayuaji, who produced them originally for our exhibition *125,660 Specimens of Natural History* at Komunitas Salihara in Jakarta.[20] His work is crucial because it poses a decisive question: how does the image of tropical nature haunt the current pollution and biodiversity crises? This is a key challenge that *must* be faced by environmental activists today.

Connecting to this concern, it is vital to understand how the tropes of representation, especially via taxidermy, have shaped our understanding of birds, as the excerpts from Anne Geene and Arjan de Nooy's amazing book *Ornithology* profoundly demonstrate. Similarly, our exhibition collaborator, ornithologist Frank Steinheimer, offers a series of minor meditations on human-bird encounters. His stories remind us of the variability of our relations, which often include consumption as food. This cannot be overlooked, nor can the issue of how humans have used birds as resources for so many different cultural practices and artifacts. So, we need to also talk about use, and edibility, when we talk about these relationships. In Lêna Bùi's provocative contribution, which deals with the avifaunal fallout of the zoonotic transmission of the so-called avian flu, we are reminded that birds are often subject to ruthless practices of extraction that render them into material processes for production. And yet, with his recipe for Guajalotes (semi-domesticated Mexican turkeys), Jimmie Durham offers readers-as-exhibition-viewers a way to engage with the consumption of bird-kin directly, as a form

20 For documentation, see: reassemblingnature.org/125660-specimens.

of well-balanced living, by eating them joyfully and with gratitude.[21] But I think this question of appreciation also pushes us to ask further about cultures of (scientific) experimentation more broadly, especially because this form of gratitude is rarely a framework for scientific engagement. Given your extensive research on colonial experiments with flora and fauna in the tropics, can you talk a bit about experimental culture and the role of the bird in experimentality?

A S The tension between the conjectural and exact sciences, as well as inherited class hierarchies that accompany this division, are actually a key theme in Bertolt Brecht's historical anecdote "The Experiment," from his 1949 book *Kalendergeschichten*, the first publication after Brecht returned to Germany from exile. Readers are taken back to early seventeenth century England, the year 1626 to be precise, at the farm of natural philosopher Francis Bacon, who is portrayed as both a scholar and a master. Bacon is considered the founder of the modern scientific method (empirical observation, description, induction), echoed in Brecht's story by the spontaneous investigation of organic preservation by freezing. Without spoiling the tale, when Bacon's disciple, a stable boy, encounters his grandmother, we bear witness to a momentary encounter between the scholarly and vernacular.

Of course, you know this timeline I keep for crucial events in human-bird history. So, many examples come to mind but, just as Bacon dies, Robert Boyle is born. Some decades later, Boyle experiments with the vivisection of animals and invents a "pneumatic engine," a type of vacuum pump to investigate the properties of air (like pressure, sound, vacuum, etc.). Essentially, it worked by suffocating a bird inside a vessel through "ex-suction," Boyle realized this was torture and wrote about his moral and theological conflict regarding the cruelty, panic, and pain such experiments involved for the animals; he also seriously pondered the animism of

21 For another indispensable reading of bird-kin, see Jimmie Durham, "Uccelli/Birds," *Waiting To Be Interrupted: Selected Writings 1993–2012*, ed. Jean Fisher (Milan: Mousse Publishing, 2014), 111–16. For a highly recommended essay on autochthonous Mexica practices of a "well-balanced *world lifeway*," see James Maffie, "Weaving the Good Life in a Living World: Reciprocity, Balance and Nepantla in Aztec Ethics" in *Science, Religion and Culture* 6/1 (2019): 15–25; dx.doi.org/10.17582/journal.src/2019.6.1.15.25.

nonhuman creatures—but was ultimately inclined toward anthropocentrism and his own investigative curiosity.[22] We are still faced with this conundrum today, but on a planetary, industrialized scale. In fact, the stunning "Blue Canary" essay by Barbara Marcel and Andreas Doepke actually unpacks the globalized history of bird suffocation in the context of mining.

Étienne-Jules Marey's motion research in the 1880s and 90s is also important; he developed the chronophotographic gun, a camera that could visualize movement by capturing several images on one plate. *Le vol des oiseaux* is both a book and one of his famous prints;[23] photographic inventions like this reduced (but didn't eliminate) the demand for bird taxidermy that required killing the birds first. Sophia Gräfe, with her essay "Bird Culture," is an expert of the history of ethological experimentation with moving-image; the photographs we've included by Spanish artist Xavi Bou should also be seen in a lineage with such predecessors as Marey, as well as Eadward Muybride.

Not surprisingly, Western-style ornithology is a very white-male dominated field, but significant work by women has always existed, even if that often meant something like producing illustrations in the subordinated and/or amateur roles of wife or daughter.[24] For this reason, I'd like to shift from technical experiments with birds to a different order of experiments, in which dealing with feathered friends meant

22 The famous painting by Joseph Wright of Derby from 1768 is analyzed by Linda Johnson, "Animal Experimentation in 18th-Century Art: Joseph Wright of Derby: An Experiment on a Bird in an Air Pump," *Journal of Animal Ethics* 6/2 (Fall 2016): 164–76; doi.org/10.5406/janimalethics.6.2.0164.

23 Étienne-Jules Marey, *Physiologie du mouvement: le vol des oiseaux* (Paris: G. Masson, 1890); biodiversitylibrary.org/bibliography/115247.

24 For instance, Elizabeth Gould co-produced illustrations with the more famous English taxidermist and husband John Gould; John James Audubon collaborated with Maria Martin Bachman, sister-in-law of John Bachmann, one of Audubon's copy-editors. On how the domestic and professional division of labor feeds into other "colonizing divisions," see Maria Mies, "Towards a Feminist Perspective of a New Society," in *Patriarchy and Accumulation* [1986] (London: Zed Books, 2021), 210. For some examples of birding literature by women since the 1800s, see Florence Augusta Merriam, *Birds Through an Opera Glass* (Cambridge: The Riverside Press, 1889); Deborah Strohm, ed., *Birdwatching with American Women: A Selection of Nature Writings* (New York: W.W. Norton Company, 1989); and, Vera Stober and Theresia Riedmaier, eds., *Frauen in den Naturwissenschaften: Vom Mittelalter bis zur Neuzeit, Begleitheft zur Ausstellung an der Uni Karlsruhe* (City of Karlsruhe, 1987); karlsruhe.de/b1/stadtgeschichte/frauengeschichte/naturwissenschaften/HF_sections/content/1329465718376/ZZkplo94pmFFPk/frauen_in_den_naturwissenschaften.pdf.

challenging not only scientific but social and institutional boundaries. Rosa Luxemburg wrote about birds while in prison, but much earlier she had moved to Zurich, where women were permitted to attend university, and she initially studied zoology. In 1920, Virginia Woolf was so irked by the sexist reduction of women to consumers and representative status symbols—who were made publicly responsible for the slaughter of birds in the feather trade—that she published a two-page essay entitled "The Plumage Bill." Simultaneously raising the "woman question" and the "bird question," this little known text is now considered Woolf's earliest feminist text, preceding *A Room of One's Own*.[25] And, in the late 1950s and early sixties, Rachel Carson investigated the disruptive effects of synthetic pesticides, especially DDT aerial spraying, and with *Silent Spring* has written a lasting must-read book exposing industrial ecocide. Finally, in 2006, Australian ornithologist Sonia Tidemann was accepted to host the first-ever roundtable on Indigenous ornithological knowledge at the International Ornithological Congress, thus insisting on expanding the horizon of institutionalized bird research.[26]

The understanding that it is impossible to sincerely think about the relations of people and birds without taking into consideration the intimate, heterogeneous, and often multi-generational ties of local communities and their avifaunal neighbors—not least because of the ontological and cosmological worldviews connected to these relationships—is reflected in many pieces in this volume. Likewise, birds are not treated as simple objects or automatic self-replicators; rather, they are considered as multi-dimensional beings with inherited and unfolding knowledges and *life ways*, to borrow a term from environmental philosopher Thom van Dooren—who over the years has so deeply inspired how I try to think with birds.[27] With

25 See Reginald Abbott, "Birds Don't Sing in Greek: Virginia Woolf and 'The Plumage Bill,'" in *Animals and Women: Feminist Theoretical Explorations*, eds. Carol J. Adams and Josephine Donovan (Durham: Duke University Press, 1995), 263–89. For a current feminist and queer movement to challenge birding culture, see Feminist Bird Club: feministbirdclub.org.

26 Sonia Tidemann and Andrew Gosler, eds., *Ethno-Ornithology: Birds, Indigenous Peoples, Culture and Society* (London: Earthscan, 2010); png-data.sprep.org/system/files/Ethno-ornithology_and_Biological_Conserv.pdf. See also, Nancy J. Jacobs, *Birders of Africa: History of a Network* (New Haven: Yale University Press, 2016).

27 Thom van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction* (New York: Columbia University Press, 2014).

that in mind, perhaps now would actually be a good moment to introduce Sophia Gräfe's piece. Isn't it brilliant how she troubles perspective, rationality, and human exceptionalism—or human *suprematism* as you prefer to say—by revisiting Konrad Lorenz?

ET As a colleague and fellow curatorial traveler from the SYNAPSE curators' network, I think Sophia Gräfe's contribution is absolutely critical for this collection. By reconsidering the role of Lorenz's behavioral studies, she demonstrates this extraordinary affiliation between contemporary concepts in the sciences of behavior and the early research on birds; her ambition to discover the latent anthropology operating beneath human research on birds is absolutely critical in this moment, especially as neo-positivist strains of biological research appear with ever greater frequency. By asking why birds became legitimate subjects of ethology, Gräfe demonstrates the importance of reconsidering both the subject and direction of research, opening the possibility for re-reading the (scientific) archive otherwise.

AS In collaboration with David Rothenberg, we've also included a facsimile sequence excerpted from a very special publication by a close correspondent of Lorenz. *The Song of the Wood Pewee* by American ethologist Wallace Craig (1876–1954) might be one of the most detailed texts about a single song. What is especially noteworthy about Craig is his inclination to explicitly perceive and understand birdsong as *music*; thus, to some extent including affect, spirituality, questions of art, beauty, and free play within zoological work.[28] On the other hand, the text is also an exemplary historical document for the normalcy with which Anglo-European scientists could make racist statements that nonchalantly perpetuate inhuman boundaries. In conjunction with the reprint, sound recordings of the Eastern Wood Pewee are available through Cornell Lab of Ornithology's Macaulay Library.[29]

28 Kathleen Dean Moore "Listen: Four Love Songs," *Emergence Magazine* (16 April 2021); emergencemagazine.org/op_ed/listen-four-love-songs.

29 Eastern Wood-Pewee (*Contopus virens* L.), recorded by William W.H. Gunn on 22 June 1959 near the delta of Portage Creek in Ontario, Canada; Macaulay Library (ML61838); macaulaylibrary.org/asset/61838.

ET With this curious song of the Wood Pewee in mind, I'd like to ask you about how other forms of legend and myth are shaped by human-bird relationships. Of course, I'm thinking of certain structuralist tropes in Claude Levi-Strauss, but also Mircea Eliade's hierophanic theories, and more generally the quotidian meanings of bird gestures or interactions that seem so frequently to be connected to older cultural-mythological elements, narratives, or legends. Are birds perhaps our most mythologized kin-fauna?

AS It is interesting that you mention Eliade—whom I didn't know about until translating Yoko Tawada's text, wherein she cites his book on shamanism and ecstasy. According to his hierophany, the sacred or supernatural "breaks through" into the world through myths. Historically, we can easily trace this back to all the ways in which birds are featured in the world's art—but also in rituals of augury—where birdwatching is connected to omens and thus holds meaning towards the future (I'd even situate *Silent Spring* in this context). In fact, the Latin-rooted term "auspice" is derived from *avis*, "bird." But auspices are valid far beyond European traditions; among the Kelabit and the Iban in Sarawak/Borneo, for instance, avian omens carry environmental messages, but also signify being noticed by the gods, which in turn requires that one act in accordance with nature and treat it with utmost respect.[30] The Iban's largest ceremonial wood sculptures also depict the powerful ancestral deity Singalang Burong, who is represented by the hornbill, or *kenyalang*, that lives in the celestial longhouse together with seven other aviary deities.[31]

The animist philosopher David Abram has written impressively about the distributed and omnidimensional sentience of birds in flight, especially as they migrate enormous distances, able to geolocate and keep course by the Earth's magnetic field. Abram sees avian flight as a kind of "gliding of the mind,"[32]

30 See the chapter "Messengers of the Gods," in Paul Spencer Wachtel and Jeffrey A. McNeely, *Soul of the Tiger: Searching for Nature's Answers in Exotic Southeast Asia* (New York: Knopf Doubleday, 1988), 126–29.

31 See photographs of a ceremonial Iban hornbill effigy in the MET's collection at: metmuseum.org/art/collection/search/319968.

32 David Abram, "The Discourse of the Birds," *Biosemiotics* 3/3 (2010): 263–75; link.springer.com/article/10.1007%2Fs12304-010-9075-z.

and when you ask about the spiritual impact of bird gestures, such a phrase is pregnant with meaning, isn't it? In a whole chapter on augury, ecologist Paul Shepard draws a philosophical connection between the flying bird and time, saying that "[a]mong animals the bird is seen as part of a greater system through which it moves, rather like time itself, a fleeting signature taken in at a glance."[33]

All of these elements echo throughout the book, but I am thinking that the temporal association with birds is especially pronounced in the short story by Bruno Schulz and—in a totally different manner—in Megan Prelinger's essay on the fate of the Common Loon. Schulz was a Polish Jewish writer born in Galicia in 1892. Hiding in the underground and tragically assassinated by an SS in 1942, little of his writing has survived, but he is considered among the most important voices in Polish literature.[34] I am so grateful to Sandeep Bhagwati for pulling Schulz's book *The Street of Crocodiles* [*Sklepy cynamonowe*, 1934] from the bookshelf a few years ago; the short story "Birds," about the transformation of a completely ornithomaniacal father, is now one of my favorite literary references to birds. It's a tragicomic story, somewhat reminiscent of Kafka's "Metamorphosis," as well as Melville's "Bartleby," but in connection with the following personal reflection by American writer David Grossmann, "Birds" also expresses this particular fluttering and vibrant quality associated with birds and aliveness that we talked about above:

> Sometimes there are such moments of grace: you open a book by an author you don't know, and suddenly you feel yourself passing through a magnetic field that sends you in a new direction, setting off eddies that you'd barely sensed before and could not name. I read Schulz's stories and felt the gush of life. On every page, life was raging, exploding with vitality, suddenly worthy of its name; it was taking place on all layers of consciousness and subconsciousness, in dreams, in illusions, and in

33 Paul Shepard, *The Others: How Animals Made Us Human* (Washington, D.C. and Covelo: Island Press and Shearwater Books, 1996), 196.

34 See translator's introduction by Celina Wieniewska in the first English edition of Bruno Schulz, *The Street of Crocodiles* (New York: Walker and Walker, 1963), 7–10.

> nightmares. I felt the stories' ability to revive me, to carry me beyond the paralysis and despair that inevitably gripped me whenever I thought about the Holocaust or came into contact with the aspects of human nature which had ultimately allowed it to happen.[35]

Indeed, it is remarkable how much this description of reading resonates with David Abram's description of bird flight.

Meanwhile, Prelinger's essay addresses the deep-time survival of the California seabird ecosystems from an entirely different angle, yet with a powerful resonance regarding the entwined fates of time and birds. Relaying her personal experience of rescuing and homerairing an injured migratory seabird, the San Francisco-based author (who was also interviewed in *Fantasies of the Library*) reminds us that human timescales are not the only ones with which to relate to biospheric transformation. What I find particularly fascinating in her text is how she interweaves scales and durations—we're invited to contemplate the extremely long duree of planetary evolution and avian adaptation, yet we also witness how both stand in contrast to the extremely fast process of petrochemical ocean pollution that endangers the survival of "her" loon. These temporal relays are intensified by an interplay of geophysical and physiological macro- and micro-perspectives, down to a-single-feather close-ups of plumage and single drops of water and oil. It's another kind of shift in attention, or what Anna Tsing calls "the art of noticing." While we're encouraged to shift away from the anthropocentric perspective, the disruptive force of industrialized *hyper-anthropization* (to use a term by Bernard Stiegler) comes into view even more unpardoningly—it's a different kind of ornithomania.

But, maybe the most overused of ornithomaniacal metaphors (in the English language at least) is that of the canary in the coal mine. Barbara Marcel and Andreas Doepke's meticulously researched meditation on histories

35 David Grossmann, "The Age of Genius: The Legend of Bruno Schulz," *The New Yorker* (1 June 2009); online at: newyorker.com/magazine/2009/06/08/the-age-of-genius. In this context, see also Allen S. Weiss's reading of Schulz in *Figure Against Form: The Dolls of Michel Nedjar* (Berlin: K. Verlag, 2021), 53–57.

of mineral extraction and canary extermination actually makes the material and historical realities of this metaphor unforgettable. It also makes me think of your interview with Kat and Bernie Krause. Not only does Bernie's decade-long practice of recording biophonies, or ecosystem soundscapes, provide an extensive audio archive against which contemporary habitat destruction and species loss can be mapped, but in the conversation you also discuss their own terrible experience of literally losing everything to one of those huge wildfires nowadays ravaging across the world. The crisis of climate change and global heating is already here: a planet on fire blazingly exposes the liquidatory violence of combustion capitalism. We've spoken about song, but there are numerous passages in the book where contributors deal with other, urgent aspects of breath. What comes to mind for you?

ET I think one of the most important essays I read as we worked on the book during the pandemic lockdown was Achille Mbembe's "The Universal Right to Breathe." While I was editing several of the texts for this book, his essay kept coming back to me, urging a rethinking of human-bird encounters as well. For example, when I met Bernie and Kat in Milan, it was one of the most profound encounters I've ever had; they are two such generous, brilliant people. Editing our interview, I could hear Mbembe's remark over and over:

> As that which is both ungrounded and our common ground, the universal right to breathe is unquantifiable and cannot be appropriated. From a universal perspective, not only is it the right of every member of humankind, but of all life. It must therefore be understood as a fundamental right to existence. Consequently, it cannot be confiscated and thereby eludes all sovereignty, symbolizing the sovereign principle *par excellence*. Moreover, it is *an originary right to living* on Earth, a right that belongs to the universal community of earthly inhabitants, human and other.[36]

36 Achille Mbembe, "The Universal Right to Breathe," *Critical Inquiry* (13 April 2020); critinq.wordpress.com/2020/04/13/the-universal-right-to-breathe.

With this insight in mind, and with a profound sense of gratitude that I was able to include my interview with Bernie and Kat about their work, biodiversity collapse, and the conflagration of their forty-year archive in this book, I think we must emphatically insist on a renewed, militant politics of *inhabitation*.

Mary Ellen Hannibal also contributed such a remarkable essay (especially for someone like me, coming from the humanities—where animals, including birds, have long been valued for their representational and symbolic affordances, even as their populations were being utterly decimated by habitat loss, toxicity, and pollution) that reflects on the loss of the bird as cultural referent, but also the loss of that loss and its implications for culture as such. Learning to see what some of us failed to see for so long is a critical perceptual shift in this moment of mass extinction that it cannot be abandoned to any privileged fatalism; to look our failure in the eye, and see what we see and thus what remained unseen, is a necessary decolonial process.

And, to conclude with reference to John Paul Ricco's incredible essay—just as the book itself and the series ends—is a way to again emphasize the need to think with and through the question of annihilation and disappearance. Of course, John is one of the most important readers of Jean-Luc Nancy—his re-reading and re-writing of Nancy's philosophy is unparalleled—but as we were finishing the edits for this book, in fact, Nancy passed away. Perhaps no other philosopher gave us such a rich body of concepts with which to approach these questions, and not least among them is his idea of *dis-enclosure*.[37] And, isn't it exactly this dis-enclosure of our avifaunal kin that Xavi Bou relays by way of his hyper-exposure photography (accompanying the essay and captioned by John Paul Ricco), which provides us with a temporary—*passing*—image that drastically exposes the murmurations of our kin as they pass fleetingly before and beyond our all-too-human perception? So what do we make, how are we tempted, and for whom do we persist within this ecology of disappearance?

37 See also Achille Mbembe's remarkable reading of Jean-Luc Nancy's concept of dis-enclosure in *Out of the Dark Night: Essays on Decolonization* (New York: Columbia University Press, 2021), 42–89.

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All images in this piece are stills from the film *Nightingales in Berlin,* directed by Ville Tanttu (2019); reproduced courtesy of David Rothenberg. For more information, see nightingalesinberlin.com/film.

Among the Nightingales in Berlin

by David Rothenberg

Once they find out you make music with nightingales no one will let you rest. As long as there is a chance the birds might be singing, you must be prepared to go out. No matter how warm the night, no matter how cold. Some years already by mid-April a warm haze descends upon the city and absolutely everyone wants to sing. The midnight leaves rustle with the possibilities of love; for people and for birds. Other years rain and wind keep spring at bay—the nightingales still need to sing, and they eke out their sounds as we humans see our breath as we sing. This annual music is always needed, and still must go on as much as we shiver under brittle branches. Seasons are not exact, but song is eternal. It is absolutely true that no bird is exactly like any other bird, same as with people, though we have an easier time telling ourselves apart. As much as we may wish to be, we still are not birds. But through music we can get closer to the birds than by any other way—because as we extend the limits of our music we extend the limits of our world.

So, although I have already written a book and made a film about the nightingales of Berlin, the music we make with these special birds goes on and each night brings a story far beyond what is expected. There will be many more books, or maybe this one book can never be finished. I must keep writing it even though it looks to the world like it is already done. But it is not.

"Stop at once!" An angry older couple approaches us. "You are disturbing our bird. He was singing so beautifully… until *you* showed up," and the wife kicks our microphone into the mud.

"Hey," I protest. "Please calm down, we are only making music with this bird."

"He doesn't need your music, he's got his own," she growls back. "I am calling the police!"

"No need for that, we will move somewhere else."

"You should get *out* of this city, the birds don't want you here."

Hmm … More like she doesn't want me here. "Well, we like playing with these birds; they are already used to human sounds. They hear so much of our music already in the middle of town, we figured they might be prepared to join in with us."

"Your music has *nothing* to do with what they do," the husband chimes in.

"Don't talk to them Hans," his wife complains. "I will call the police."

"Now, now, Ulrike, they aren't *criminals*."

"Thank you, sir," I smile, "I never thought playing music with birds was against the law. We really like playing with this particular bird. He comes back from Africa to this same spot on the canal every year."

"Yes," he nods, "we are always happy each spring when he starts to sing again."

"Indeed sir, you and I both appreciate this one special bird. What do you think is special about this song?"

"Oh, you know, a certain energy, a shape, a form. Conviction, like he knows what's what. That his music is something he can't live without."

"Stop talking to him Hans. Don't encourage them!"

"Oh, hush Ulrike, they did stop, you see. Now young man, I have a book upstairs about someone like you. He plays the clarinet with birds. Is it called something like… *Warum Vögel singen?*"

I am always surprised to find people who have read my book. Especially in German. "Well, I do know that guy," I smile. "What did you think of his book?"

"Oh, I didn't like it very much. It's all about him, not enough about birds. Quite self-indulgent."

"Well, I could pass your views on to him if you wish…"

"Oh, not necessary, but you ought to get out of here."

We pack up our bags, head for another spot, deep in the Volkspark Hasenheide, near to the peacocks and the camels. Far from angry residents, people who also love the birds as we do, but want to protect them more than join in. Ah, maybe they are right… "You know David," says Volker, "I think you handled that outburst pretty well. Why don't you come on a tour with us sometime into one of those war zones? I think you could handle it."

"No David," Wassim shakes his head. "Don't go."

It was after the fourth time he was tortured that Wassim Mukdad decided it was time to leave Syria. "Luckily they never found out I am a musician. They knew I was a doctor, yet I kept my hands out of harm's way. But I could see things could get much worse." An accomplished performer on the oud, and also trained in medicine, Wassim had been volunteering to help victims of the violence that had overtaken his homeland. He had to put his love for music aside to help his people.

In 2014, he made the arduous journey North, and settled in Berlin, where today he thrives as a musician. There are many Syrian refugee musicians in the city, but Wassim is the only one I met who wanted to tell his story while we played live with nightingales. He appears in the film, saying the following lines:

This is the first time I have played along with a free bird. That nightingale can cross borders with ease, and flies all the way from Africa, through the Middle East where he is immortalized in poetry, and all the way to the parks of Berlin. They are welcome here, and as we perform along with them we celebrate their freedom and the lush green mess of this city that lets them thrive.

*

Myself, I am reminded of these words of the Persian poet Saadi, whenever I am asked why I continue to play music along with nightingales:

گفت بلبلان را دیدم که بنالش در آمده بودند از درخت
Goft bolbolan ra didam, ke be nalesh dar Amade boodand az derakht
و کبکان از کوه و غوکان در آب و بهایم از بیشه
Va kabkan az kooh va ghookan dar Ab va Bahayem az bishe.
اندیشه کردم که مروّت نباشد
Andishe kardam ke morovvat nabashad
همه در تسبیح و من به غفلت خفته
Hame dar tasbih o man be gheflat khofte

I saw *bülbüls* commencing to lament on the trees,
The frogs in the water, and the beasts in the desert
So, I bethought myself that it would not be becoming
For me to sleep in carelessness
While they all were praising God.

دوش مرغی به صبح می‌نالید
Dush morghi be sobh minalid
عقل و صبرم ببرد و طاقت و هوش
Aghlo sabram bebord o taghat o Hoosh
یکی از دوستان مخلص را
Yeki az doostan e mokhles ra
مگر آواز من رسید به گوش
Magar avaze man resid be goosh
گفت باور نداشتم که ترا
Goft bavar nadashtam ke to ra
بانگ مرغی چنین کند مدهوش
Bange morghi chonin konad madhush

Yesterday at dawn a bird lamented,
Depriving me of sense, patience, strength, and consciousness.
One of my most dear friends who
Had perhaps heard my distressed voice
Said: "I could not believe that thou
Wouldst be so dazed by a bird's cry."

I replied:

گفتم این شرط آدمیت نیست
goftam in shart e adamiat nist,
مرغ تسبیح گوی و ما خاموش
morgh tasbih gooy o man khamoosh

It is not becoming to humanity
That I should be silent
When birds chant praises.

In the wake of so much beauty we cannot help but join in. Even by the canal's edge right below the apartment building where the enraged residents insisted we were "ruining their bird."

However, the one singing there is one special bird, one nightingale that I feel likes this human music inflicted upon him. Of all the nightingales in this ragged city, why do we keep coming back here? For one thing, there's a bar right next to his tree, and it stays open until midnight, just when our bird starts to sing. When most people head home, the nightingale is ready. So, if anyone wants to go out and hear a nightingale mingle with human music, this is usually the bird I choose.

The journalist from the Berlin newspaper *taz* is not convinced; she has many questions, and the bar has just closed. It's a cold, dark night.

"How do you know this bird likes your music?"—She is skeptical.

"This bird is used to us," I respond. Nightingales come back to the same exact spot every year, after that long migration from Africa. "I feel he is intrigued by us, and appreciates the strange human sounds of clarinet, voice, live sampling and

electronics, melodica, and oud to jam with." These are the offerings my friends Korhan Erel, Cymin Samawatie, Lembe Lokk, Bernhard Wöstheinrich, and Wassim Mukdad have brought to the canal's edge at midnight so many times. "Most of the time, people smile, stop, and listen when they walk by. We don't usually have antagonists like in that building behind us. What do *you* think of when you hear a nightingale?"

She smiles: "That great feeling of freedom as a teenager when you finally get home when it's already getting light."

"This is Shakespeare, *Romeo and Juliet*: 'Is that the nightingale or the lark, still night or finally day?'"

"In the film, you imply that by listening to nightingales, we can save humanity. Come on David, do you really believe that?"

This woman is tough. "Well, I also say it's not such a big deal what we're doing here. We all must contribute in our own way. Don't manicure your garden too much, then the birds will love you and sing for you all through the night."

She looks up at the mute gray apartment building behind us. Our bird has *not* yet started to sing. "You know, my boyfriend lives in that same building."

"Ah, then you'll have a short walk home after we've finished this interview."

"Are you kidding? No way am I staying here. I need to swim at dawn tomorrow in the Weißer See! Don't think I'm going to him."

We have to wait an hour for our bird to start singing. Only the patient are rewarded. The Weißer See is far away. The nightingale and his music does not care.

One night I am far too tired to go out. Finally, one day off, I think. I get a text from a friend in London. "David, my buddy Nick just finished playing a concert in Berlin, he really wants to go out and hear some nightingales—right now. Can you hook him up?" At first I pretend to be asleep, but then I know

there is no escape. We must do what people expect us to do. "Okay Nick," I write. "See you by the canal at midnight."

He writes back: "Fabulous David. Am bringing along a small entourage."

A quarter after midnight twenty people trundle over the bridge. It is one of the coldest nights, I can see all their breath as they speak. I have been out there too many nights, already shivering. My clarinet is out, barely fitting together. I squeak some tentative notes. Nick, with heavy, fingerless gloves, pulls a guitar from a case studded with bumper stickers from a life on the road. Nothing. We listen, wait—I try to get everyone to keep quiet.

Finally, at 1 am, our bird does not disappoint. He starts his grand song on this coldest night of the spring. How can he do it? Birds sing because they must. When the time comes, they begin. No shriek from a clarinet or a twang of a guitar can stop him. Does he need us? Probably not. Do we need him? Without nature, we are nothing. "What does it feel like?" one of the *taz* writer's questions still echoes, "to play along with such music that has been around for millions of years?" I laugh inside. I know birds are making necessary music; who knows if people are?

Later I check Spotify for this Nick character—exactly who was that guy with his people who showed up to listen and strum in the night? 52 million plays of one of his songs! Is that a lot? Think of the millions of years the nightingales have been out, and the times they have sung and sung and sung with no one there to count, to measure, to turn it all into data. The endlessness of the world and its songs streams back before our species' time, through all the eons of the world of birds and the music they know they need to make.

Suddenly I feel an embrace from behind, as I listen, as I play. I no longer feel so alone. After a while, most of the crowd are ready to go, but two of us are still there. The bird sings on, a cold mist settles down from the trees. It is so cold for spring but we remaining two can't go anywhere, transfixed as we are by this ancient song. We listen reverentially for another hour to our bird. He has a few hundred phrases to work with, and somehow neither he nor us ever get bored. We are still huddled together in the cold as this beautiful ancient music goes on and on, a reminder that at least something is still right with the world, right at the border between nature and culture where the most important contact is found. We are still there, bound together by the song of the world. That's where you can find me, with this ancient song:

به گاه عشقبازی و آواز بلبل
Be gaahe Eshghbaazi o Avaaze Bolbol
همه رفتند ، ما جان و سر، گوش
Hame raftand, Maa Jaan o Sar, Gush
که شب سرد است ، ما گرمیم و مدهوش
Ke shab Sard ast, Maa Garmim o madhush
اگر بلبل بخواند تا ابد، نوش
Agar Bolbol Bekhaanad, ta Abad, Nush

Under the nightingale's song
Everyone is gone except you and I
The night is cold but we are warm
As warm as long as the nightingale sings—
Forever

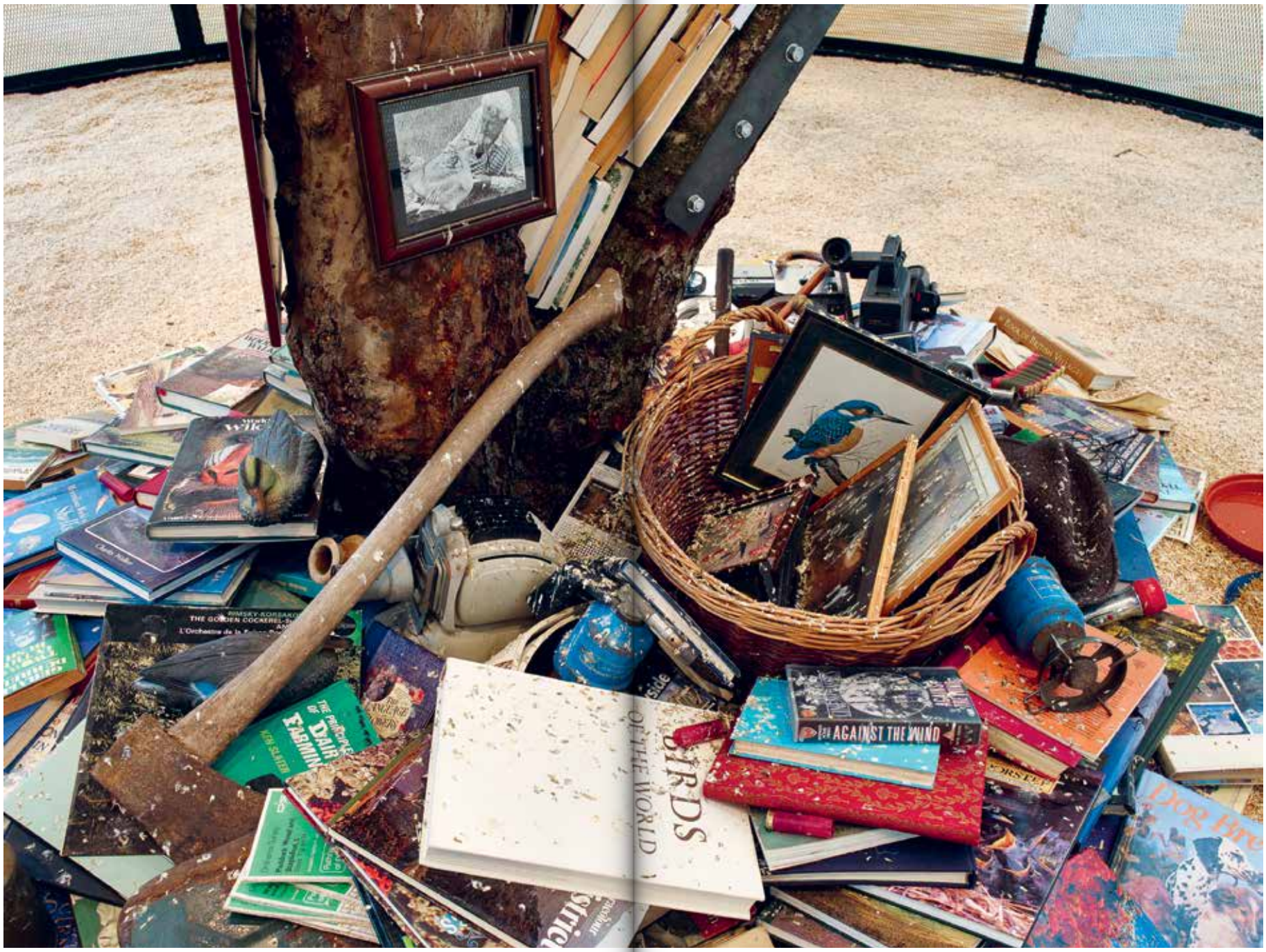
Mark Dion: The Library for the Birds

"Years ago," writes Jimmie Durham, "I thought birds were birds and I did not much think about it. [. . .] Now they are teaching parrots to be stupid capitalists in a strange way, trying to prove they are intelligent by telling them, 'You say this word and I will give you a cookie.' [. . .] But this is actually forcing the parrot to be as stupid as the researcher."[1] How then to avoid making birds as stupid as those human animals who attempt to study, cajole, and otherwise incentivize them? Could one, for example, build them a library?

Mark Dion offers inquiries into the formation of hegemonic knowledge systems and questions that attend to Western practices of acquiring, collecting, and archiving—particularly with the ecological and ethical issues these practices have raised. In the Antwerp (1993), Massachusetts (2005), New York (2016), and London (2018) iterations of *The Library for the Birds,* titular creatures swoop over the branches, books, ephemera, and found objects piled below.

By referencing and destabilizing modernizing practices and epistemologies, Dion haphazardly piled references to colonization and the exotic bird trade to bring Antwerp's own history into view; in the New York instantiation, he heaped stacks of books along branches, creating an arboreal library in a permanent state of use and decay. Normative understandings of and expectations for the library are subverted in both instances; hushed tones are broken by birdsong as open pages flutter, or are eaten or defecated on, around the base of a tree trunk. The anthropomorphic urge to categorize, classify, and archive the world matters very little to the zebra finches and canaries. Who, then, needs to prove their intelligence to whom?

1 Jimmie Durham, "Uccelli/Birds," *Waiting To Be Interrupted: Selected Writings 1993–2012,* ed. Jean Fisher (Milan: Mousse Publishing, 2014), 113.


THE PRINCIPLES OF DAIRY FARMING
BIRDS OF THE WORLD
AGAINST THE WIND

Page 14: Mark Dion, *The Library for the Birds of New York* (details), 2016
Steel, wood, books, and birds;
138 × 240 × 290 inches

Pages 16–17: Mark Dion, *The Library for the Birds of Antwerp,* 1993
18 African finches, tree, ceramic, tiles, books, photographs, birdcages, bird traps, chemical containers, rat and snake in liquid, shot gun shells, axe, nets, Audubon prints, bird nests, wax, fruit, assorted objects; installation dimensions variable

Pages 18–19: Mark Dion, *The Library for the Birds of London,* 2018
Steel, wood, books, and birds;
138 × 240 × 290 inches; installation view, Mark Dion: *Theatre of the Natural World* at Whitechapel Gallery, London, 2018; photo by Stephen White

Pages 19–20: Mark Dion, *The Library for the Birds of New York,* 2016
Steel, wood, books, and birds;
138 × 240 × 290 inches

Page 23: Mark Dion, *Aviary (Library for the Birds of Massachusetts),* 2005
Steel, maple tree, plywood, books, and mixed media; installation dimensions variable

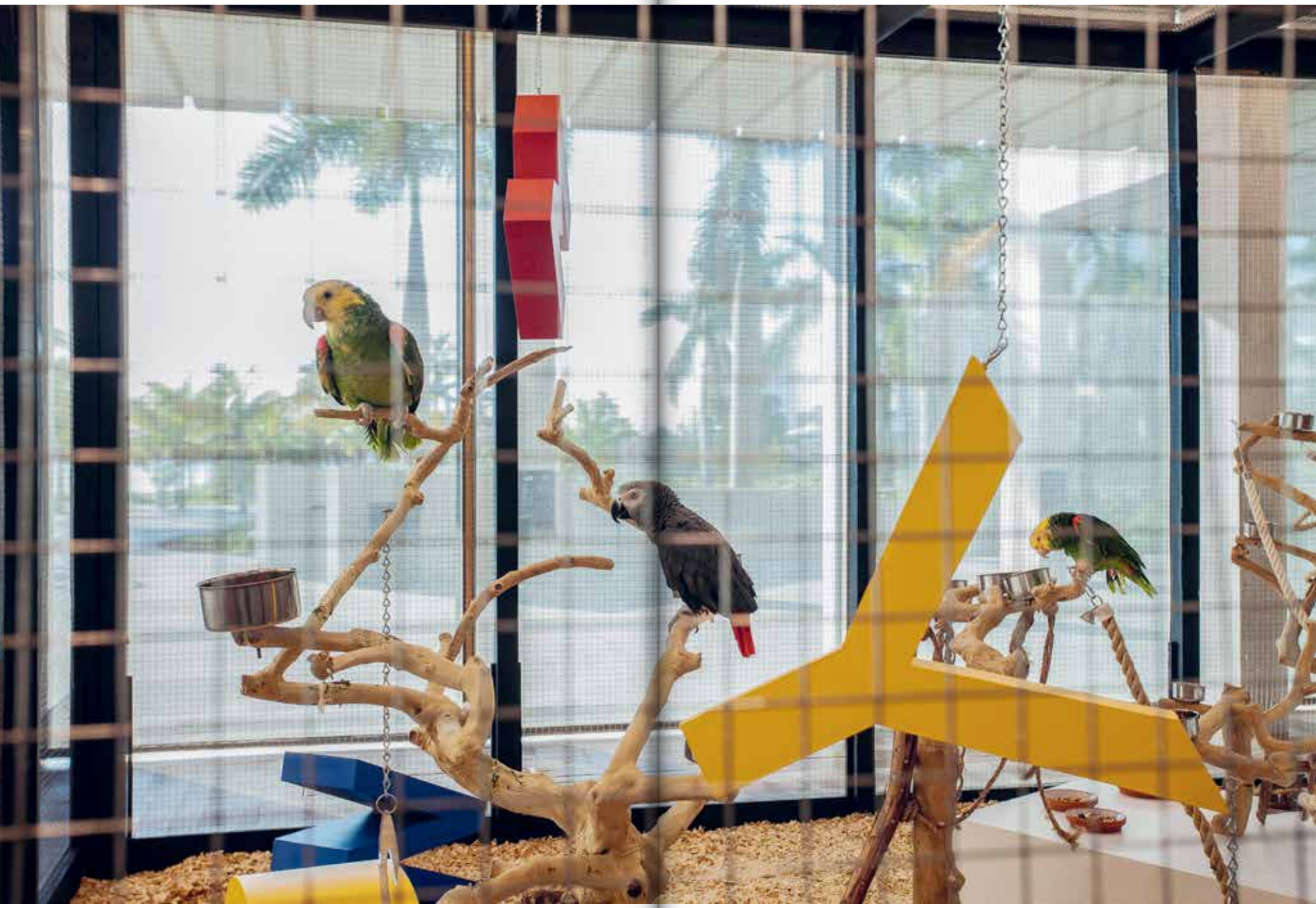
All images are courtesy of the artist and Tanya Bonakdar Gallery, New York. Introduction on page 15 by the co-editors.

Speechless:
Some Notes About Birds

by Bik Van der Pol

Birds are world travelers. While Cleo, David, Paco, Zach, and Jany—one White Cockatoo, two African Greys, and two Yellow-crowned Amazon parrots—have great-grandparents in Amazonia, Africa, and Indonesia, they were born in Sinbad, a bird shop in the city of M. The owner of Sinbad, Ron, made his first trip to the forests of Bolivia from which he, at that time, brought exotic birds to the city of M. But he was not very happy with this difficult arrangement. So he learned how to take care of the birds, and started, with some success, his own captive breeding program. The shop takes its name from Sinbad the Sailor in *One Thousand and One Nights*. During his many fantastic voyages across the seas, Sinbad visited magical places, met monsters, and encountered various supernatural phenomena. His travels were not unlike those of another traveler known to us from Homeric verse, Odysseus, whose fortunes were prophesied by many a portentous eagle. Words, like birds, travel through the world—through time, through cultures, and through people.

Cleo, David, Paco, Zach, and Jany stayed temporarily at a local museum in the city of M. They lived in a generous, custom-built, pop-up house designed by artists, to function as a school, and to create a kind of training center, both for parrots as well as for the human visitors. Having long considered their



ability to speak, these artists made them familiar with some choice lines from T.S. Eliot's famous poem, *The Waste Land*. These lines were performed and recorded as a sound piece that could be heard, at intervals, in the space of the museum. The parrots did not mind this poetic rehearsal; they clearly enjoyed the change of scene, the attention of the museum visitors, and the marvelous views they had from their windows, with the city on the one side and the bay of M. on the other. They also did not mind taking on the roles of student and teacher simultaneously: listening carefully, giving attention, doing some acrobatic stunts, and, once in a while, singing some of the songs that both they, and the human public, enjoyed so much. *Over the Rainbow* was a favorite, and always a success with the human visitors. In less performative moments, in the background of quotidian activities, we could also hear their voices calling: "Hey you!" "Stay with me." "Speak to me." "Speak." "What are you thinking of?" "What are you thinking?" "What?" "Do you know nothing?" "Do you see nothing?" "Do you remember nothing?"

They liked these lines, which were a way of calling out to confront the denial of a landscape once devastated by war, as well as the contemporary ecological devastation. They were quietly repeating these words when no humans were paying any attention to them. After hours, of course, they would speak, yet they refused to perform these words as part of some circus act. They are not! Words, as the parrots knew, are to be taken seriously. At first, they felt they needed to think—probably because it seemed that hardly anybody outside their temporary house was paying any real attention to these words. Humans are so ignorant. Words are important, didn't they

know that? Cleo, David, Paco, Zach, and Jany agreed that when they returned to their home where they would continue to live together, they would spread the word. But not now: now is not yet the time. First there needs to be some frustration, anxiety, and fear. The human tendency to not listen to anything—they think nothing can possibly threaten their existence—was all too familiar to Cleo, David, Paco, Zach, and Jany. Perhaps if Hurricane Irma came by and eroded many sections of a popular beach, perhaps then they would listen. And, perhaps then the humans could learn what words to use.

Birds, as we have already noted, are world travelers. Sure, Cleo, David, Paco, Zach, and Jany were born in the city of M., but that doesn't mean they are unaware of where they come from. And they currently enjoy their lives, especially because they have no worries about their daily meals. Meanwhile, they are very aware of their more auspicious mission. They know that the ground has to be prepared. After all, everybody knows—or, should know by now—that if birds are visiting, their signs cannot be taken lightly. They are messengers; when they flap their wings, polish their beaks, or start talking, humans should notice and pay careful attention. They know they should be patient, too, because good questions only come from a polite, respectful exchange. Visiting requires both attention and an ability to create a space for others; this means not only physically, but also psychologically, and such creative opening takes time.

The city of M. is at the same time very rich and extremely susceptible to catastrophe. With its pleasant weather, the beaches and nearby islands are visited by presidents and tourists alike, and hotels, villas, and private golf courses play host

to numerous visitors year-round. The fresh, clean, blue sea frames the city as a paradise. The aquifer—those water-absorbing layers of rock underlying the city—provide residents and visitors with a naturally integrated water supply system. However, because M.'s natural aquifer is so close to the terrestrial surface, it is also especially vulnerable to surface contaminants and infusions of salt water during flood events. Interactive maps show the effect of rising sea levels on M. There are many freely available online, of various different types and designs, but they all convey essentially the same message. Perpetual flooding in the city of M. is an imminent thread. Residents know this, but they still hope for the best as they try to ignore signs that recur with ever greater frequency; and thus the human inhabitants continue their usual activities, taking their habitat for granted all the while.

The museum, the temporary house of Cleo, David, Paco, Zach, and Jany, was recently built by two architect friends whose names could be translated to English as The Duke and The Murderer. They designed the museum for what we could call a potential future Ground Zero: right on the edge of the sea, where chronic, catastrophic flooding would certainly drown the museum. However, The Duke, who had spent a lot of time in and around M., was eager to learn what such a coastal environment could mean as a context for new museum architecture. In this scenario, retreating is not an option. The Duke did not want to build a defensive museum. Instead, The Duke wanted to have the museum adapt to impending disasters. He regularly went to Stilts Ville, a group of now run-down stilt houses, far out at the edge of the sea, and studied how they stood firmly against tides and storms. He recognized

these worn structures as an examplary, defiant design strategy. The Duke was convinced that museums should *always* be some kind of an example, and that they must always demonstrate possible new directions for thinking differently, against current tides. He was convinced that these stilted structures could be a model for M.'s climate future and that the residents of M. should not retreat from that inclement horizon.

Recent storms and floods have proven that The Duke did the right thing: in November 2017, Irma, that long awaited king tide, flooded the city of M. When the water finally subsided, a giant octopus was found floating in the museum's parking garage, a silent witness to this untenable coastal settlement. The paintings, sculptures, and the other artworks in the museum's collection were not damaged; in fact, the museum sustained no damage whatsoever. And, Cleo, David, Paco, Zach, and Jany survived. They had watched the storm pound the large glass windows of the museum while calmly preening their feathers. They did not worry about the storm. Not only were they safe and dry, they also waggishly exchanged their lines, initially mumbling softly and then, louder and louder: "Hey you!" "What is that noise?" "Nothing?" "Do you know nothing?" "Think!" "Speak!" Cleo, David, Paco, Zach, and Jany are willing messengers, lending their voices to the mission. And, it is certain they know that once a word is spoken, it can never completely be returned to the black box of silence or censorship. Words are like birds: they travel the world.

Meanwhile, in the city of M., officials denied that any human activities could have an impact on the climate. Instead of recognizing this fact and the urgency that accompanies it, instead of thinking and speaking to each other, the officials

banned the very words that should have been part of discussion and conversation. An emergency doesn't just disappear if officials dare not speak its name, or does it?

Some humans argue that parrots like Cleo, David, Paco, Zach, and Jany cannot actually speak; according to these skeptics, the birds can only closely mimic the human utterances that add up to speech. Such a radical underestimation of their intelligence! Dismissing language, or refusing to recognize the language of another being, opens a door to objectifying these other creatures—haven't they learnt this by now? All birds, even those born in captivity, know very well (as all living creatures manifestly know) that words are weapons. Words can kill and words can prevent killing. Naming anything is taking a step toward defining it, and language, in this respect, is at least part strategy. Meanwhile, Cleo, David, Paco, Zach, and Jany wonder what would happen if humans started listening to what others have to say. Others, meaning: not those just like themselves, but others *as others*, and as other creatures. What would happen, for example, if humans listened to what birds have to say? Do humans even know that since they tried to separate themselves from nature and then to consider all that nature as "other," they are increasingly bound to all that imagined "otherness"? For humans, observing something, anything, now almost immediately triggers its modification or eradication; call it framing, or call it what so many humans do without even thinking about it. Not all of them, but many, far too many to keep going like this.

This brings us to the problem of speech itself, doesn't it? After all, we must ask: who has the right to speak? And, why do those that should speak keep silent? Who are being

silenced? What is being silenced? What is not being said? And, critically, who benefits? Cleo, David, Paco, Zach, and Jany know very well that silence is not a good idea. Take, for example, the International Union for the Conservation of Nature; their Red List of Threatened Species is an overwhelming collection of data related to ecology and species extinction figures that begins from the year 1500. These data are as much as humans know about species that once existed—a complete record is impossible. To pronounce and repeatedly circulate these names is a strategy against forgetting and it must go on until this extermination ends. Call out their names!

The parrots also know about museums of natural history with their archives so full of birds, beetles, and other animals, all neatly organized in their cases, drawers, and storage racks. It is strange to see these dead birds, with their feathers stripped away, laying next to one another. Or, their legs tied together with a tiny piece of rope, while their resplendent colors remain unfaded. Or, their skins separated from their bones, which are evidence of both a life once lived and of the mania of the human collector. There are more natural history museums around the world than we could count, each with its own collection of specimens from the natural world; each animal, plant, and inorganic sample enlisted for scientific study or public display.

Then there is Bernie Krause, the soundscape artist. He is definitely a listener. He has traveled the globe for more than fifty years and made it his mission to research, record, archive, and relay the many voices of the natural world. Examples of the now silent voices are those he recorded in previously healthy

habitats in Borneo, Costa Rica, Sumatra, and Zimbabwe. Since the original recordings, each of these habitats has changed drastically as a direct result of human intervention and natural disasters. Many voices from soundscape audio field recordings are now silenced: the gibbons, cicadas, crickets, frogs, brown barbets, hornbills, squirrels, and ashy tailorbirds in Borneo; the tinamou, tree frogs, bats, cicadas, various insects, red-winged parrotlets, parrots, Pacific screech owls, slaty ant-wrens, firey-billed aracary, brown howler monkeys, clay-colored robins, white-tipped doves, and blue-crowned mot-mots in Costa Rica; the gibbons, siamang, orangutans, leaf-monkeys, black-browed and lineated barbets, various insects, mustached babblers, white-rumped shamas, rhinoceros hornbills, Argus pheasants, and Malaysian-eared nightjars in Sumatra; and the baboons, barred and scops owlets, natal francolins, freckled nightjars, cape turtle doves, ground hornbills, Egyptian geese, bearded robins, insects, and frogs in Zimbabwe. Krause makes these voices heard before they disappear.

Speech is also represented in law: legal speech. Some centuries ago, the author, lawyer, public prosecutor, and scientist Hugo Grotius—the same Grotius who in 1621 escaped persecution by hiding in a bookcase because he refused to be silenced, and who was subsequently banned from the country of the Low Lands for the rest of his life, and, indeed, the same Grotius who authored the *Mare Liberum*—published his newly fashioned concept of eminent domain; advanced as the power that the State may exercise over any land within its territory, and whereby the government, or one of its agencies, has the right to expropriate private property for public use through payment or compensation. Whether he intended it

or not, this concept enabled, and in many jurisdictions continues to perpetuate, the privatization of previously public goods, including territory, property, and the public domain at large. This empire of privatization has a devastating impact on ecological systems and often leads to their complete destruction. The increasingly rare sounds of creaturely life in this privatized, for-profit world are yet another reminder of what is already lost.

Many humans have been taught to think that the world belongs to them and only them, and that their capacity for language is a reliable characteristic that distinguishes animals and humans. Speech is a form of separation that can be used to even further accelerate the anthropogenic transformation (through exploitation) of the natural world. But language is also a bridge. If humans are unwilling to face this tragic loss, then other witnesses need to speak out. These are the implications: if humans take the liberty to not speak about the precarity of the world, and governments ban the very words that are needed to speak, directly, about what is directly in front of them, and the act of speaking about climate change is itself forbidden, as it is in the city of M., then there is nothing left for humans to say. And then, someday soon, everything will be silent.

Within the register of the law, humans—who think they know something distinct about themselves because they possess the powers of language—can be called to justice. They can, so to speak, be brought before the law. Cleo, David, Paco, Zach, and Jany have some questions they would like answered, and they are more assertive and persistent this time: "You! Speak to me!" "What are you thinking?" "Yes, you! Do you

know nothing?" "Do you see nothing?" "Do you think that living is all for you? That access to the pleasures of the world is exclusively yours?" "Up for grabs?"

Other questions remain. Don't you see that we have already arrived in a situation where politics is a digital feed that manages, consumes, and commodifies our attention? Don't you see the outrage, anger, and desperation? Can you see the waves of refugees escaping war and ecological destruction, the occupations of the public squares, the tearing down of symbols of power, the boats crossing the Mediterranean Sea, and the bodies of those who didn't survive the crossing washed up on the beaches? Why are you still surprised? We should not be surprised because we knew all this was coming. We are not just moving toward a more global capitalism: we are there already. Struggles over democracy are only a symptom of the larger drama now unfolding. In the heart of the beast, at a museum in the city of M., the power of language was shared across speciated lines. Cleo, David, Paco, Zach, and Jany performed a novel but necessary role as political animals. They interfered, knowing full well that language is a bridge that can serve to pass over divides and relay the urgency of forming new alliances. Stay, think, act, and speak. But please, listen: it's time.

Images
Bik Van der Pol, *Speechless,* 2015
Installation views, Pérez Art Museum Miami (PAMM);
photos by Bik Van der Pol, reproduced courtesy of the artists.

Post-Digital Ornithology

David Bonter (D B) of the Cornell Lab of Ornithology in conversation with Anna-Sophie Springer (A S) & Etienne Turpin (E T)

On 19 September 2019, a comprehensive report by a team of scientists from seven research institutes in Canada and the United States was published in *Science*; the findings were terrifying. Nearly one third of wild birds—the most well-studied group of wildlife—had disappeared since 1970; in real numbers, this meant a loss of over 2.9 billion avifauna in less than fifty years. According to an opinion piece by the lead authors, Dr. John W. Fitzpatrick, Director of the Cornell Lab of Ornithology, and Dr. Peter P. Marra, director of the Georgetown Environmental Initiative, the study is a dire warning: "Birds are indicator species, serving as acutely sensitive barometers of environmental health, and their mass declines signal that the earth's biological systems are in trouble. Unfortunately, this study is just the latest in a long line of such mounting evidence."[1] Drs. Fitzpatrick and Marra go on to note that, in addition to numerous other studies that "underscore the pervasive character of the Anthropocene," a recent German study also saw a decline of seventy-five percent of flying insects in the last thirty years.[2] Given that most birds are insectivores and at least eighty percent of birds eat some insects, the German data—which have since been echoed by similar findings elsewhere—shows that the annihilation of a major food source through the maniacal use of pesticides worldwide goes some way toward explaining the avifaunal collapse.[3] However, it is also important to note that the global consumption of non-renewable energy, especially for computing and internet-based communication and streaming, has accelerated in inverse proportion to global bird populations. At four percent, the estimate that the manufacture and use of smartphones and computers contributes to global GHG emissions might appear small, but once the energy required for the infrastructure of connection and storage is factored in, alongside the ecological costs that accompany the production of this energy and the implementation of this infrastructure, it is clear that our digital devices can easily be understood as part of the problem.

Founded in 1915, the Cornell Lab for Ornithology currently employs approximately 250 scientists, professors, staff, and students who work together to research the state of earth's biodiversity and develop a range of possibilities for education and conservation. For nearly a hundred years, these activities primarily relied on behavioral field observations and the anatomical study of preserved specimens. But, beginning in the 1990s, the Lab extended this work to more comprehensively engage new publics through the internet. Today, with hundreds of thousands of participants collecting and sharing data through their various platforms, the Cornell Lab is a model for a mature, effective practice of what is now known as citizen science. But, can the collective work of studying avian worlds through digitally-synchronized citizen science really help save the birds? We met David Bonter of the Cornell Lab of Ornithology to discuss these and other avifaunal matters. What follows is an edited transcript of our conversation at the Lab.

Etienne Turpin
There are now quite a few major projects that use citizen engagement, or citizen science, as a data collection methodology, but the projects on birds seem to attract people more than anything else. Why?

David Bonter
Yeah, it is true; we've been fortunate in that we have this pre-existing community of people out there who are really interested in birds and they are used to keeping track of them. A lot of our systems allow people to tap into their natural instincts for keeping records; they can organize all the studies they do while also feeling like they're contributing to something bigger by engaging in our projects.

E T
So, is it more about the interface that they can use to plug into the Cornell Lab databases?

D B
I think we've found over the years that the most successful way to pull people in and keep them in is to provide feedback. I mean, people will only submit data into a black hole for a limited amount of time. Our eBird initiative, for instance, has been really successful in that they identified the target audience—a group of hard-core birders out there, those really ardent people that drive all over the place to see an unusual bird and keep going back to the same places time after time. And those people are really interested in keeping a list of the birds that they saw, for example, in the city limits of Ithaca, in New York state, or somewhere else in the country. Part of the eBird website allows these people to keep their lists as they want to keep them, and see their data as they want to see it. But, at the same time, we at the Cornell Lab of Ornithology gain access to a lot of interesting information that is really useful from a scientific perspective. It's a two-way street, but we definitely need to create systems that people want to use.

E T
In terms of incentivizing participation, I suppose it ranges from someone who wants to use the information for a publication to someone else who gets satisfaction from keeping bird records up to date, so there is a fairly broad range of how people can feel they are contributing. From my own experience developing the PetaBencana.id open source disaster map project in Southeast Asia, as someone's report comes in, we want to affirm their participation. We try to keep a very tight loop to show that their participation matters and that resident reports on the ground make a difference for disaster response—because they do! What are some of the ways this feedback happens with eBird? Is it mostly project-based or geography-based?

D B
Well, every project has a different way of handling that element and it has changed over the years. We used to think of the birding audience as rather homogeneous, but they actually have a wide range of interests. Folks who are doing our eBird project, for instance, tend to be inspired by competition and tend to be more male. Their motivations are very different from another project we have, Project Feeder Watch, which is really focused on birds that are attracted to backyard bird-feeders. It has a completely different audience, mostly highly educated white women over fifty who know everything that is going on in their own backyard but couldn't care less if a flamingo landed

right here. They certainly wouldn't drive a mile to see it. So, those groups are motivated by different things. The Feeder Watch audience doesn't want competition, they don't want to know that they're number one, but once they submit a checklist they're taken back to a landing page where all their information is displayed and they can compare what they saw this week to the same week last year, or the same week ten years ago. So, they can easily track over time what's going on in their space.

E T

So you're basically giving them a free user profile to maintain their own data in exchange for allowing the Lab to access it?

D B

Exactly—it is a way for them to visualize their own observations and provide context. Some of them do care what their neighbors are seeing as well but the motivations are really all over the place. For instance, we have another program that focuses on recording reproductive success in birds. Here, we engage people to monitor nests over time, which takes a lot more effort. People have to go out and find nests, or they have trails of nest boxes out there, so it's a big investment. But it's quite remarkable how those people narrow their focus; for example, there are people who only care about bluebirds or tree swallows, they might step right over the nest of another species to get to the one they're interested in. Providing the feedback that targets the interests of these different audiences is important, but it takes a lot of time and energy.

E T

There is a long history of citizen science supporting more formal natural history investigations. Can you explain how the citizen science model is adapted to fit the Lab (which, if I'm not mistaken, is one of the oldest digital initiatives of its kind)?

D B

Yes, it is. In North America, the first well-established and organized citizen science program was the Christmas Bird Count—which isn't a Lab program—that goes back to the early 1900s. It's a reaction to a tradition on the day after Christmas, when people would go out and shoot as many birds as they could . . .

E T

. . . A perfectly American tradition! [Laughter]

D B

At that time, there were a lot of very wealthy women in Boston and New York City who were horrified by this tradition. By that point, we were starting to realize that the populations of a whole lot of species were crashing very, very quickly. A number of extinctions had already happened and the alarm bells started to ring. So, some people tried to put a twist on it and make it a new tradition to count as many birds as they could the day after Christmas. This caught on very quickly and it's become this wonderfully long-term, pretty standardized monitoring program to look at trends in bird populations.

How it started here at the Lab was, back in the 1960s, we made something called the Nest Record Card Program, which literally used four by six inch [10 × 15 centimeter] paper cards that have fields on them; if you find a nest, you write down everything about the nest—where it was, what type of tree it was in, how high off the ground, what the species was, how many eggs, all that stuff. Then you mail those cards to the lab. We still have 350,000 of these cards in filing cabinets upstairs!

Anna-Sophie Springer

What is the geographical range of interest for you in relation to people "out there" mapping information. You mentioned Ithaca backyards and other parts of the county, but how far do your programs actually reach?

D B

Well, that's really changed over time. The Lab is now global and our mission is global. Again, eBird is a global program. A lot of our other programs are only in North America at the moment, and we also partner with Bird Studies Canada. Most of our stuff is in English and French, but we're also increasingly translating it into Spanish. Some of our programs are really focused on Central and South America, and the Spanish language is a big priority. So, in reality, we're collecting huge amounts of data in North America, increasingly from Central and South America, and less around the world. In fact, the British are a little upset with us at the moment because our eBird program is kind of taking over [Laughter]. They do their thing very, very well, but eBird is really exploding globally now. In terms of the geographical location, everything before was paper-based, meaning everything was geo-coded to a zip code or a postal code. Now it is metered to the GPS on your mobile device, so we know the exact location of reports, which makes the data more meaningful scientifically because we can also pull in all the satellite-based land-cover information.

A S

Do citizen science participants ever record things that really surprise folks here in the Lab? Could you share any anecdotes about people reporting things that no one had expected?

D B

From the perspective of the scientist, there are a lot of rare bird reports. Birds do crazy things all the time; they don't read our publications so they don't know where they're supposed to be, and they're constantly showing up in unexpected places. Participants tend to get really excited about that. But our systems have a whole series of checks and balances, so if you report something that isn't likely, it will be flagged and reviewed. One of my favorite stories is about a feeder watcher in Colorado who saw a bird that should have been in Mexico; it had never been seen in the U.S. and it was hundreds of miles out of range. She reported it and it was flagged. We sent her a note saying that it was a great report but that we needed a photo to confirm it. She sent the photo, it was an accurate report, and people were really excited. This woman was amazing; she worked a full-time job but put out an announcement that anyone who wanted to stop by could come and see the rare bird from her kitchen table. She left the door unlocked, and people flew in from New York City and Seattle, from all over the country, to visit this woman's house in Colorado. They would leave her bags of birdseed and cookies. She would come home from work to all these gifts and thank-you notes from the birders who had visited. The bird stayed for months and she left her house open that whole time for strangers to see it.

E T

I'm interested in the loops that are created—something in the report triggers an alert that the bird doesn't belong or the information requires further evidence, then you follow up with the

person making the report? It seems like a very tight system for verification.

D B

These days that loop can take an hour, but it's not always that quick. A lot of these birds are moving, so if you follow-up a week later, it's too late to get a photo. The other cool thing is that, from an educational perspective, there are a lot of birds out there, a lot of confusing plumages, and not everybody knows everything. So, it's great to have people snap a photo of a bird in their yard, send it to us, and get that ID back, showing them that we are paying attention. We identify that bird, then they know the bird and they kind of get hooked and want to learn more.

E T

I'm fascinated by the scope of this project. Similarly, in the pre-Richter history of earthquake science, there is this amazing practice of residents filling in postcards and writing, "my bed shook this way, so it was east-west," and then all these researchers trying to figure out what was going on. But, processing such vast amounts of data is intense and expensive; for instance, you just mentioned that 350,000 cards came in . . .

D B

. . . The scary thing about those cards is that most of them are not digitized and it's hard to raise money to digitize old records—it's not that sexy.

E T

Yes, we've heard this from curators at many natural history museums . . .

D B

. . . These days everything is online, and it is immediately in a massive relational database, instantly accessible, and if any researcher anywhere in the world wants data on, say, Eurasian collared doves in the state of Florida, they'll have it immediately. Our policy is that since we didn't collect the data—the public did—it belongs to everybody.

E T

So, from the beginning of these early citizen science initiatives, and up to the current digital coordination of all these various projects, all your platforms are first-class, designed for engagement, and anticipating the data structure for scientific application?

D B

Well, they can be pretty ugly behind the scenes, just so you know; I wouldn't call them all first-class [Laughter].

E T

Following from the Christmas Bird Count, it seems that many of the large surveys rely on the broad network of public participation as scientists alone aren't able to do all this empirical work. I'm interested in hearing more about the genesis of the Lab's software developments; when did computers begin to play a role in the work and which were some of the first Lab projects to experiment with digitalization?

D B

Everything was on paper until the late 1990s, as it was for everybody. I think it began around 1998 or '99, when we had one database scientist. Now there are about twenty-five or thirty. First, there was one computer, and a dial-up internet connection, and one website, but now we have hundreds. So, what they decided to do—this was before I was at the Lab—was to see if we could get people who were submitting paper data to Feeder Watch and all these other systems and programs excited about doing something online. They created an event called the Great Backyard Birdcount and decided to hold it in mid-February when nobody was really doing anything else. They promoted this as a weekend-long event during which time people would go out, see what they could, and report it to us online. It was a very rudimentary online form, like everything was back then, and in the first couple of hours they had something like 50,000 reports. It just blew everybody's mind—my colleagues thought they might get something like 2,000 reports. But it kind of just took off from there. I think that was the first realization at the Lab that people would go online to do this sort of thing. I mean, now it sounds quaint because everything is online and everyone expects everything to be online, but twenty years ago, it was all a big experiment. Nowadays people are not patient; our websites need to be perfectly functional, they can't go down, and they can't be hard to work with, or people will just move on to something else.

A S

Are your colleagues in the Lab who work on the software, the online platform, and interface design also ornithologists?

D B

The best IT people we've had have been birders because they get it. They're basically building something that they'd want to use and that makes a difference. They also tend to stick around. I don't know if it's like this in Indonesia, or in Europe, but it is hard to keep IT people here. They might stay in a job for eighteen months, but then they'll move on to something that pays more. So, the IT people who have been here the longest are birders who build something they'd want to use. But if you know of any good IT people . . . [Laughter] . . . we're constantly looking for people. It's kind of depressing because we're offering almost double to folks who've just finished undergraduate degrees in computer science compared to what we're offering ecologists with doctorate degrees.

E T

In the current framework of development, when everyone is working on digital collections, is there also a significant use of social media for engagement?

D B

Oh yes, that's been huge. Feeder Watch has close to 300,000 followers on Facebook. I think the Lab is up to around 800,000 followers. So that's big. I also teach a couple of courses here at Cornell and I often try to engage my undergrads in science communications, in translating science publications into something more digestible for a public audience. We let them write blog posts and within the hour they have 45,000 reads. [Laughter] And, these students' minds are blown. It is a really great tool for communicating science, although sometimes a little frustrating. We find if you put up a silly photo of a blue jay riding on the back of a German Shepard it will get shared 30,000 times, but if we try to talk about some really interesting, urgent science, it will only get 1,000 shares. Still, we're reaching a lot of people through social media

E T

Is all your data stored here at Cornell?

D B

Yeah, we've moved all the servers to campus in the last couple of years. The IT infrastructure here is mindboggling and we just received a huge donation

for the Macaulay Library. I'm not sure if you're familiar with it, but it used to be the Library of Natural Sounds?[4]

A S

Yes, I met with the bird-of-paradise expert Edwin Scholes here on my last visit and we loaned some of his bird recordings from the Macaulay collections for a series of exhibitions in Germany. Actually, the Cornell Bird-of-Paradise Project [birdofparadiseproject.org] by Ed and wildlife photographer Tim Laman is also a pretty great example of a digital ornithology platform.

D B

Yes, so Linda Macaulay, the library's namesake, just gave another $7.5 million to really ramp up the digital elements. We're building something called the Digital Asset Management System, which is an online system where videos, sounds, and photos are all stored, and completely available to anyone in the world . . .

E T

. . . with all the metadata?

D B

Yes, so a photo of a bird is attached to this checklist and you know all the other birds in the area at that time; it really becomes this large complex of information. People really like that, too, because they know they can go back to their checklist from last June and see their photos.

E T

What is the biggest project in terms of users?

D B

eBird right now is in the hundreds of thousands.

E T

So that is a massive amount of IT management if all these people can instantly call up their own records.

D B

Yeah, I can't really understand it. And now the big challenge is making it all mobile, so we need mobile apps for everything . . .

A S

. . . Because the capture needs to be immediate? Either you do it right away, or you're already doing something else?

D B

Exactly. We lose so much information by requiring people to remember everything or to write it down. When you get home, you may not remember to go online, log in, and enter the information. That's what we're really struggling with right now—taking our system and making it mobile-friendly.

E T

But the Lab is really way ahead of the curve. We've been working with major international organizations who are a complete mess regarding data collection, sharing, protocol, all of it. Comparatively, at least from what I've seen, the Lab seems to have a very clear vision and a lot of success already.

D B

Yes, it's true. The challenge is that we want to engage a lot of people but there's a certain point at which if you ask people to do too much, only a few people will do it. But, if we oversimplify what we're asking, the information becomes kind of useless. So, there is a constant tension between making it easy and accessible to everyone and creating something that's scientifically valuable.

E T

What are the main mechanisms for dealing with that?

D B

First off, we maintain a lot of different projects that target different folks, from the really serious, consistent users to casual, occasional contributors, so there's a project for everyone. We're kind of like citizen science advocates: the idea is to get them in the door, get them engaged, and then try to scale up. So, we get people in eBird who, at first, just put in some random observations, which are essentially meaningless for us if they are out of context.

Instead, the goal is to try to ramp people up so that they are collecting more consistent data—by going back to the same location time after time and discovering what is changing. One thing we find is that in the first year of participation, the number of species people observe is always lower. So, as people get more involved, learn more, and gain more skills . . . we try to make it interesting, exciting, and explain why the work is important. But, what many citizen-science projects now do is ignore the first year of data from each user because it is like a training-wheels stage and it is going to be biased.

E T

So, it's teaching by example. Also, because you are featuring certain users, highlighting how successful they've been, and so on, other users emulate this model. It plays into this kind of incentivizing effect of social media feedback loops or digital publics.

D B

Exactly. The other part of it is that when we feature someone and their discoveries, we have them as a participant forever. We do that a lot with photo contests, for example, which from a scientific perspective are not that important. But it is fun, people get excited about it, and it's great for Facebook. It's about getting people to think more about nature and the natural world—that's ultimately our goal, to get people to realize what's out there and to care about it so they make decisions that help protect it.

E T

Has the objective of the Lab, specifically in the context of climate change, changed at all in terms of how the citizen-science element is articulated? For instance, has it moved more toward environmental advocacy?

D B

That's a tough one. Looking at the current state of American politics, I'd say it's been an abject failure on all levels. [Laughter] So, we've decided to walk a pretty tight line. We are in a university, we're all about the science, so what we try to do is partner with outside organizations like the Nature Conservancy, or the American Bird Conservancy, who have more of a policy-based or advocacy agenda. Our goal is to provide sound, science-based information that helps them support what they're doing. We're there with the data, but we tend not to go out on a political limb because we are a science organization. It's tough because we want to educate people and at the same time we don't want to alienate them because then they're completely out of the conversation. It's a really tough balance and something that people are constantly struggling with.

A S

If there are a lot of right-wing people supporting the work of the Lab as birders, I'd also be interested to hear more

about your funding. When I worked with museums in the UK, as well as the American Museum of Natural History in New York, I met many activists putting pressure on these institutions because the oil and gas industry, including companies like BP, Shell, and the Koch brothers, were funding them.[5] Is this financial entanglement something you're also familiar with at the Lab?

D B

Well, our board includes folks who are in the oil and gas industry, or who are investment bankers on Wall Street, and so forth. People who you may not expect to support environmental or conservation work. But we make it very clear: we do good science. And they insist that we focus on science. Our board is full of nice folks; they come in twice a year to hear about what's going on, they love birds, they love nature, a lot of them care about how their way of life is impacting the natural world, and they want to give back. Birds are great because they go beyond political lines; everybody can identify with them and appreciate them. Birds are the hook that we're hoping can bring humanity back to a closer connection with the natural world: we don't want to exclude parts of the community out there by making political statements.

E T

So, there is the mission of connecting to the natural world, and of using birds as a way into that, and then there is the objective of providing solid scientific data. It seems like the Lab has set an example, or standard, whereby citizen science data can be channeled into more traditional expert science using data collected through a crowd-sourcing process. Have you seen a change in opinion regarding the validity of that kind of data?

D B

Definitely. The world of citizen science has changed drastically over the last fifteen years. We used to submit papers and get reviews back saying things like, "These data points were not collected by trained scientists. It's garbage, it's pointless, we're not going to publish it." That never happens anymore and it all changed pretty quickly. In terms of people looking to us as an example, fifteen years ago the Lab was the key player in the world of citizen science, but now everyone's doing it, and there are a lot of people doing it really, really well.

E T

It seems that both the software itself and the various interface designs on top of it can smooth the friction between the user-generated reports and the expert community. If you can train people on how to enter the data in the right fields and look for the right things, then there's a way of legitimizing crowd-sourcing as a scientific method.

D B

Citizen science and crowd-sourcing is finally coming together. With citizen science, you used to have to go outside, into the field, and do something, or measure something, or see something. These days a lot of it is online, including transcription. Zooniverse includes one project called Snapshot Serengeti, which is a camera-trapping project. They have hundreds of thousands of images of animals from motion-sensing cameras that people can view online to help identify the animals. So, people are tagging and creating a dataset that is actually useful for research.[6]

A S

In terms of involvement, these two modes still seem quite different: there's the one who's considered a citizen scientist because they are a person who knows their backyard really well and publicly contributes their own sincere, individual knowledge and their personal relation to a certain space; whereas, if what I do is already framed by an organization that wants me to complete a very specific task (such as identifying zebras or transcribing a handwritten letter by Alfred Russel Wallace or Carl Linnaeus), then as a user I am much more of a mechanical volunteer helping to complete laborious tasks.

D B

And then there are the folks who are brought into the world of citizen science because of a real, tangible environmental issue that they are facing. Perhaps the water in their neighborhood is polluted, so they learn how to do the water testing and seek out resources at a lab. They are actually learning the lab skills to say something scientific about the water quality.

A S

This is important to acknowledge as well, but I am thinking of two cases that led to a lot of frustration because this kind of work was ultimately not recognized by those in power: one example goes back to a colleague who worked on a citizen-science project in Pennsylvania that was measuring potable water contamination caused by fracking; the other example is from Indonesia, where members of an Indigenous community mapped the land as part of their struggle against the illegal expansion of oil-palm concessions. In both cases, the communities were incredibly productive and gathered lots of material (precisely because they were directly affected); however, in both cases, they were dismissed by government agencies because their work was not "science," essentially because they lacked the expert credentials. In these cases, all their data couldn't be mobilized for policy change.

D B

Perhaps that is why it is important to partner with a university, or a respected lab, in order to figure out the protocols that need to be followed to collect defensible data.

E T

And to find experts who can help verify and validate the research methodology. The publication by Pietro Michelucci and Janis L. Dickinson in *Science* about the evolution of the human-computation paradigm suggests that crowd-sourcing methodologies will become increasingly necessary.[7] On this point, I'm curious if there are any publications out that give a history of the Lab for folks who want to learn more about how it all works and what you've achieved so far?

D B

Not yet, but you are the second person this week who has asked about it—so maybe that needs to happen!

1 John W. Fitzpatrick and Peter P. Marra, "The Crisis for Birds is a Crisis for Us All," *New York Times* (19 September 2019); nytimes.com/2019/09/19/science/bird-populations-america-canada.html.

2 Caspar A. Hallmann, Martin Sorg, Eelke Jongejans et. al., "More than 75 Percent Decline Over 27 Years in Total Flying Insect Biomass in Protected Areas," *PLOS ONE* (18 October 2017); journals.plos.org/plosone/article/authors?id=10.1371/journal.pone.0185809.

3 M. Nyffeler, Ç.H. Şekercioğlu, and C.J. Whelan, "Insectivorous Birds Consume an Estimated 400–500 Million Tons of Prey Annually," *Sci Nat* 105.47 (2018); doi.org/10.1007/s00114-018-1571-z; Bridget Huber, "A Grassroots Push to Save Disappearing Birds and Bees Forces Change in Germany," *National Geographic* (3 December 2020); nationalgeographic.com/environment/2020/12/grassroots-push-to-save-disappearing-birds-bees-biodiversity-forces-change-in-germany; Patrick Barkham, "Europe Faces 'Biodiversity Oblivion' After Collapse in French Birds, Experts Warn," *The Guardian* (21 March 2018); theguardian.com/environment/2018/mar/21/europe-faces-biodiversity-oblivion-after-collapse-in-french-bird-populations.

4 The Macaulay Library at the Cornell Lab of Ornithology (macaulaylibrary.org) is the world's largest archive of animal sounds. Besides recordings of seventy-five percent of the world's known bird species, it offers an increasing number of insect, frog, fish, amphibian, and mammal sounds—currently totalling 175,000 audio recordings. The collection also contains photographs and videos. The platform offers technical and educational tutorials and guides for how to upload and share material; it also serves as a resource for loaning records for educational and scientific purposes.

5 Eds. note: Since this conversation, we have also learned about other international initiatives, such as the Feminist Bird Club, which is important to mention here. Founded by Molly Adams in 2016, it is dedicated to "promoting inclusivity in birding while fundraising and providing a safe opportunity for members of the LGBTQIA+ community, BIPOC, and women to connect with the natural world." See: feministbirdclub.org.

6 In the time since this conversation was recorded, Snapshot Serengeti's aim was accomplished and the project has now closed after gathering over a million classifications through the participation of almost 20,000 volunteers; zooniverse.org/projects/zooniverse/snapshot-serengeti.

7 Pietro Michelucci and Janis L. Dickinson, "The Power of Crowds," *Science* 351/6268 (January 2016): 32–33; science.sciencemag.org/content/351/6268/32/tab-figures-data.

Introduction on page 40 by the co-editors.

Anne Geene & Arjan de Nooy: Aristotle's Birds

Written in the fourth century BCE, Aristotle's *Historia Animalium* [History of Animals] is the earliest systematic zoological study handed down from antiquity. It comprises a mixture of philosophical and scientific considerations, assessments, personal observations, as well as texts and stories from his contemporaries. It remained a standard in the field for nearly two millennia.

Given his extensive focus on birds, Aristotle's *Historia* could also be considered the world's first tract on ornithology. The selection of passages that follow are from D'Arcy Wentworth Thompson's translation; Geene and de Nooy's photographs are of specimens in the collection of the Natuurhistorisch Museum Rotterdam; reproduced courtesy of the artists.

ANTHUS

The horse and the anthus are enemies, and the horse will drive the bird out of the field where he is grazing: the bird feeds on grass, and sees too dimly to foresee an attack; it mimics the whinnying of the horse, flies at him, and tries to frighten him away; but the horse drives the bird away, and whenever he catches it he kills it.

— Book IX, 1, 609b

BLACKHEADED TIT

Next to the ostrich, the blackheaded tit is said by some to lay the largest number of eggs; seventeen eggs have been seen; it lays, however, more than twenty; it is said always to lay an odd number.

— Book IX, 15, 616b

CRAKE

The crake is quarrelsome, clever at making a living, but in other ways an unlucky bird.

— Book IX, 17, 616b

CUCKOO

The cuckoo is said by some to be a hawk transformed, because at the time of the cuckoo's coming, the hawk, which it resembles, is never seen; and indeed it is only for a few days that you will see hawks about when the cuckoo's note sounds early in the season.

— Book VI, 7, 563b

The cuckoo, as has been said elsewhere, makes no nest, but deposits its eggs in an alien nest, generally in the nest of the ring-dove, or on the ground in the nest of the hypolais or lark, or on a tree in the nest of the green linnet. It lays only one egg and does not hatch it itself, but the mother-bird in whose nest it has deposited it hatches and rears it; and, as they say, this mother bird, when the young cuckoo has grown big, thrusts her own brood out of the nest and lets them perish; others say that this mother-bird kills her own brood and gives them to the alien to devour, despising her own young owing to the beauty of the cuckoo. Personal observers agree in telling most of these stories, but are not in agreement as to the instruction of the young. Some say that the mother-cuckoo comes and devours the brood of the rearing mother; others say that the young cuckoo from its superior size snaps up the food brought before the smaller brood have a chance, and that in consequence the smaller brood die of hunger; others say that, by its superior strength, it actually kills the other ones whilst it is being reared up with them. The cuckoo shows great sagacity in the disposal of its progeny; the fact is, the mother cuckoo is quite conscious of her own cowardice and of the fact that she could never help her young one in an emergency, and so, for the security of the young one, she makes of him a supposititious child in an alien nest. The truth is, this bird is pre-eminent among birds in the way of cowardice; it allows itself to be pecked at by little birds, and flies away from their attacks.

— Book IX, 29, 618a

NIGHTINGALE

A mother-nightingale has been observed to give lessons in singing to a young bird, from which spectacle we might obviously infer that the song of the bird was not equally congenital with mere voice, but was also something capable of modification and improvement.

— Book IV, 9, 536b

PARROT

The parrot is said to have a man's tongue, and after drinking wine, the parrot becomes more saucy than ever.

— Book VIII, 12, 597b

PARTRIDGE

With partridges, by the way, if the female gets too leeward of the male, she becomes thereby impregnated. And often when they happen to be in heat she is affected in this wise by the voice of the male, or by his breathing down on her as he flies overhead; and, by the way, both the male and the female partridge keep the mouth wide open and protrude the tongue in the process of coition.

— Book V, 5, 541a

The fact is that, when she stands too windward and within scent of the male, she conceives, and becomes useless for decoy purposes: for, by the way, the partridge appears to have a very acute sense of smell.

— Book VI, 2, 560b

The partridge lays not less than ten eggs, and often lays as many as sixteen. As has been observed, the bird has mischievous and deceitful habits. In the spring-time, a noisy scrimmage takes place, out of which the male-birds emerge each with a hen. Owing to the lecherous nature of the bird, and from a dislike to the hen sitting, the males, if they find any eggs, roll them over and over until they break them in pieces; to provide against this the female goes to a distance and lays the eggs, and often, under the stress of parturition, lays them in any chance spot that offers; if the male be near at hand, then to keep the eggs intact she refrains from visiting them.

— Book IX, 8, 613b

And, by the way, it is due to the distress occasioned by the bulkiness of its body that the bird alway screams while flying: for the labour is severe.

— Book VIII, 12, 597b

Ari Bayuaji: Birds of Paradise

In 1858, the naturalist Alfred Russel Wallace was especially proud to proclaim himself the first Englishman to ever see the birds of paradise alive in their rainforest habitat. Paradoxically, it is this experience that also inspired one of his most disturbing, Eurocentric statements, published in *The Malay Archipelago* in 1869:

> I thought of the long ages of the past, during which the successive generations of this little creature had run their course—year by year being born, and living and dying amid these dark and gloomy woods with no intelligent eye to gaze upon their loveliness; to all appearance such a wanton waste of beauty. Such ideas excite a feeling of melancholy. It seems sad that on the one hand such exquisite creatures should live out their lives and exhibit their charms only in these wild, inhospitable regions, doomed for ages yet to come to hopeless barbarism; while on the other hand, should civilized man ever reach these distant lands, and bring moral, intellectual and physical light into the recesses of these virgin forests, we

> may be sure that he will so disturb the nicely balanced relations of organic and inorganic nature as to cause the disappearance, and finally the extinction, of these very beings whose wonderful structure and beauty he alone is fitted to appreciate and enjoy.

There is now no doubt that human activities, including deforestation and environmental pollution, have violently disturbed these "nicely balanced relations of organic and inorganic nature." In Ari Bayuaji's photo series, *Birds of Paradise,* the Indonesian artist was inspired by Wallace's renowned lithographs of majestic male birds exhibiting their extremely unusual plumage as they attempt to attract female mates. Attending to polluted coastal landscapes of Indonesia—the world's third largest producer of plastic waste—Bayuaji's potent photographs depict the afterimage of the *Paradisaea* as a paradise lost to reckless consumption.

Images: Ari Bayuaji, *Birds of Paradise,* 2015
Series of 4 color photographs, dimensions variable; reproduced courtesy of the artist.
Introduction by the co-editors.

Looking at a Blackbird

by Mary Ellen Hannibal

I have been thinking about Wallace Stevens's poem "Thirteen Ways of Looking at a Blackbird" for a long time. Like many, I was introduced to the poem in high school. It is widely taught and, according to one tally, it is among the twenty-five most anthologized poems.[1] Even with its branching complexity, the poem seems accessible, because it keeps re-focusing on an evidently simple blackbird. The poem moves along from one image to another, calling attention to the act of seeing, to thought itself. Look—here's another idea, another blackbird. The poem seems to instruct the reader in the basics of poetry. It feels easy.

Reading it again today, the poem depresses me to no end, or perhaps more accurately, to the end of life itself. There are perhaps hundreds of ways of looking at or talking about a blackbird, but none of them seem to add up to anything. The blackness of the black bird has finally come to stand in for loss of the bird itself. "Real" life has intruded on poetry and can never be retracted from it. In the past forty years, three billion birds have disappeared from the skies.[2] That's a kind of counting that destroys "thirteen ways," since the numbers add up to no

1 Emily Temple, "The Most Anthologized Poems of the Last 25 Years," Lithub.com (24 July 2017); lithub.com/the-most-anthologized-poems-of-the-last-25-years.

2 Kenneth Rosenberg, et al., "Decline of the North American avifauna," *Science*, (19 September 2019); doi.org/10.1126/science.aaw1313.

way of seeing birds at all. Despite the many valiant souls at natural resource agencies and nonprofits, and all the citizen scientists out documenting birds, trends continue to accelerate in the wrong direction. It seems we humans don't know how to see birds in any way that has a real, material impact on their continued existence. Even as we try to find ways to reverse these trends, birds are being exterminated from the biosphere.

Fig. 01. Tiffany Bozic, *Oil Slick,* 2012; acrylic on maple panel; 63.5 × 63.5 cm; reproduced courtesy of the artist.

What will happen to this poem of Wallace Stevens, to all of his poetry, and to much other poetry besides, when there are no longer living manifestations of its subject? Wasn't this poem meant to be universal and eternal? Cycles of life and death, and life again? Many poets in the Western tradition have sought to create something more tangible out of ineffable thoughts and feelings. The project assumes that the physical backdrop to this mental activity is basically stable and continuous. Now we know otherwise. The living tissue of our world is not a permanent referent, and in fact it is threatened with total unravelling. It is no longer possible to consider poetry without also taking into account the living, physical world in which it arises.

Some sorts of human communities will probably survive the anthropogenic apocalypse. We are amazingly protean and adaptable critters. The part of the human enterprise that seems likely to be lost is related to our memory and appreciation of poetry.[3] If the blackbird ceases to play out its life in our world, of course Stevens's poem will still have its time and place, but its meaning will have been squandered. If the bird no longer exists, the poem will lose precisely what the critic Helen Vendler calls its "determining focus of relation."[4] The poem depends on both the real and the symbolic blackbird. But the symbolic vanishes when the experience it springs from

3 Eds. note: on the probability of human survival, see especially David Wallace-Wells, *The Uninhabitable Earth: Life After Warming* (New York: Tim Duggin Books, 2019); on the implications of climate change for human cultures, see Ian Baucom, *History 4° Celsius: Search for a Method in the Age of the Anthropocene* (Durham: Duke University Press, 2020).

4 Helen Hennessy Vendler, *Wallace Stevens' Longer Poems* (Cambridge: Harvard University Press, 1969), 77.

disappears. As we lose blackbirds, perhaps we are losing much poetry along with them. Are we reducing not only biodiversity in sum, but what it means to be human in particular?

The poem could be part of the problem. Certainly, I have been guilty of looking for birds in poetry more frequently than I looked for them outside. Some sort of inner experience of the bird via poetry and literature has constituted "bird" for me, which I now see is ridiculous. This fundamental self-centeredness, the need I've had to find Keat's nightingale or Dickenson's "Hope is the thing with feathers" in my own heart, occluded any responsibility I might have recognized towards actual birds.

Science has raised alarms but hasn't done much better than poetry in confronting the avifauna extermination. Scientists work hard to define and measure biodiversity, to explain its importance and suggest ways to preserve it, but it is hard for many non-scientists to find those definitions personally meaningful or actionable. Conservation biology considers itself a hands-on discipline, but its language is as abstract as Stevens's whirling blackbird. What is a "minimum viable population," really? Squabbles over sustainability metrics don't illuminate the historical, literary, or spiritual value of blackbirds, let alone elucidate how many of them may be necessary to inspire the poetic imagination.

We know why birds are disappearing—habitat destruction, pollution, climate change, etcetera—but we lack a "determining focus of relation" to keep our eyes on the prize, to understand more deeply what is at stake. Vendler didn't mean her phrase to be understood this way but the most important implication of "determining" today is what actions to take

where. Poetry dives deep into the sensibility of the poet at work, while science steps as far away from the personal as it possibly can. Both ends of this continuum of perspective add something to "bird," but we lack essential connective tissue, and, as a result, the bird gets (physically) lost, and is in danger of being lost forever. Could we yoke the two modes of poetry and science together in some way that works to avoid this loss? Can the birds help us connect?

*

In the rest of this essay I am going to use the poem to help nudge the numeracy of science into an experience of the blackbird that Stevens writes about but doesn't really see. I will tack back and forth between the poem and the efforts to know the bird in a way that might help save it. I do love both the languages of art and science and I want them to interbreed. "The imagination loses vitality as it ceases to adhere to what is real," Stevens wrote.[5] He aspired to not just connecting these poles of imagination and reality but to infuse them with one another, until a poem is a "particular of life so intensely felt that the feeling has entered into it."[6] He called the world a "compact of real things," indistinguishable from the things of the imagination.[7] This is the right way to go, literally—and now we need to put the literal methods and data of science into our poetic language to save both nature and poetry. We need to bring the actual bird into the poem.

5 Wallace Stevens, *Collected Poetry and Prose* (New York: Library of America, 1997), 645.
6 Ibid.
7 Ibid., 684.

Backyard Birds

Wallace Stevens lived in suburban Connecticut from 1916 until his death in 1955; he published "Thirteen Ways of Looking at a Blackbird" in his first book, *Harmonium*, in 1923. Stevens is one of those American writers whom fans like to situate in literal place and, like Emily Dickenson, Stevens makes it easy because he was a stolid stay-at-home. He had a day job as an executive at Hartford Accident and Indemnity Company. While other men in gray flannel suits found themselves alienated and adrift in postwar corporate hierarchies, Stevens loved his position. When Harvard asked him to deliver the Norton poetry lectures, he demurred, not wanting to leave his work.[8] He walked to the office and back, four kilometers each way, five days a week. Since he didn't get out much otherwise, it is reasonable to imagine he absorbed his sense of nature by way of this regular commute. In 2009, The Friends and Enemies of Wallace Stevens dedicated The Wallace Stevens Walk, retracing his evident steps.[9] Along the way are placed thirteen granite boulders, each inscribed with a stanza of the blackbird poem.

Presumably, we are meant to take this walk with the ghost of Wallace Stevens and follow along as he makes his poem. Walking is a time-honored mechanism for thinking and creating. Writers as different as Immanuel Kant, Henry David Thoreau, Adam Gopnik, and Rebecca Solnit have all extolled

8 Jeff Gordinier, "For Wallace Stevens, Hartford As Muse," *The New York Times* (23 February 2012); nytimes.com/2012/02/26/travel/for-the-poet-wallace-stevens-hartford-was-an-unlikely-muse.html.

9 This saucy name is explained on their website: stevenspoetry.org.

walking as a way into deeper thought and, by this path, into a deeper life. Walking at one's "own pace," as fast or slow as the mood suits, syncs up the body with the flow of the mind. It establishes a simple and direct line between feeling and physical movement. As one speeds up or slows down, so does the heart rate; the blood flow changes pace accordingly as the rhythm of thought recalibrates. While one is walking, there doesn't seem to be separation between inner and outer selves. As Stevens wrote in "Notes Toward a Supreme Fiction," "Perhaps the truth depends on a walk around a lake."[10] Walking does much more than establish a unity between mind and body; a walk can also encourage a sense of destination that is transpersonal—or at one with nature. I find it a little easier to explain this idea by way of W.B. Yeats, although by the end of Stevens's poem, he completes a similar circuit.

In "The Lake Isle of Innisfree," Yeats declares "I will arise and go now, and go to Innisfree."[11] In ten words, the poet bridges temporal and physical scales—Innisfree is both a place in his mind and an actual place. The sonorous declaration of "I will arise and go now, and go …" invokes a man rising from the dead, a resurrected spirit returning to a place of origin and ending, a timeless now. In this transcendent and yet geolocalizable place, the spirit-poet will participate as day turns into night and back again, part of the Earth turning around the Sun, the changing light. The sounds of bees, crickets and linnets are timed to the same diurnal cycle. As he cultivates bees and peas and moves his body, the spiritual is invited to materialize, as it were, and then Yeats plunks us back down on city streets, where

10 Stevens, *Collected Poetry and Prose*, 333.

11 W.B. Yeats, *The Collected Poems of W.B. Yeats* (New York: Macmillan, 1979), 39.

he continues to hear the sound of waves from the lake. Waves result from tidal pulls related to the Moon and the Sun, the cycle at the heart of the poem. So, no matter where the poet is walking, on the way back to Innisfree or down the road, a fundamental pulse is beating, and through his language we are also stitched into that comprehensive unity. Yeats's poem is more down-to-earth than Stevens's blackbird.[12]

But there are quite a few more conceptual stops along the way of "Thirteen Ways" than there are on the way to and from Innisfree. In the opening stanza, Stevens puts a space between "black" and "bird," thus using black as a modifier and not part of the noun. This opens the poem up to consideration of all birds-that-are-black, like ravens and crows, which make far many more appearances in poetry, literature, and mythology than does the blackbird.[13] Stevens had an avowed passion for art, and crows and ravens make frequent appearances in ancient Japanese, Chinese, and Indian art.[14] The whirling bird in the third stanza seems directly transcribed from brushstrokes, and suggests that we are not necessarily viewing a picture of nature itself, but a depiction of nature. Then Stevens switches, and all subsequent avian references are to the single noun

12 Eds. note: Brooke Jarvis, "The Insect Apocalypse is Here," *The New York Times Magazine* (27 November 2018).

13 Admittedly this is not a precise, scientific evaluation. A search for "raven" in poem titles on poetryfoundation.org turns up 1000 results. A search for "blackbird" turns up just a handful, and some are for "black birds," which is to say, birds-that-are-black, and not necessarily a species of blackbird.

14 In 2013, the Curator of Japanese Art at the Metropolitan Museum of Art was inspired by Stevens's poem to mount *Birds in the Art of Japan*, featuring 150 paintings. John Carpenter said of the poem, "Several of the stanzas can be considered to evoke emotions comparable to a superb set of Kyosai album paintings of crows and other birds, thirteen of which will be included in this exhibition"; metmuseum.org/press/exhibitions/2013/birds-in-the-art-of-japan.

"blackbird"—he evokes the bird of art but then focuses on the backyard bird.

I asked Jack Dumbacher, Curator of Ornithology at the California Academy of Sciences, specifically what kind of blackbird Stevens would have observed on his walk to work more than one-hundred years ago. "Rusty blackbird is a likely species for Connecticut," Dumbacher told me, "particularly during the migratory season." The geography, of course, is New England, and the time is autumn. Red-winged blackbirds were (and still are) one of the most abundant species you can see there on wing. But bright-red epaulets distinguish this bird—and clearly that's not the species featured in the cryptic haiku-like verses of the poem, its whites, grays, and black black black (with one flash of green). Red wings would take the existential death note right out of the poem, as would the bright orange body of the Oriole. Brewer's Blackbirds don't fly over the east coast. Grackles are a possibility—they fly over New England, but they are not as black as Rusty Blackbirds. The feathers of migrating male Rusty Blackbirds in autumn are tinged reddish if you look closely, but to most eyes at the distance you are likely to see them, even with binoculars, the bird looks uniformly black.

This is our bird, and it is a super-common bird, or so it was assumed. It was also a kind of a pest. Dumbacher remembered that "back east in the autumn especially, blackbirds would form large flocks that would mesmerize with their movement over fields and parking lots, and leave behind lots of whitewash on cars or baseball fields where they stopped."[15]

15 Personal communication.

The common quickly becomes uncommon in the poem. The first stop on the walk finds us looking at the moving eye of a blackbird discernable among twenty snowy mountains. The seeing sensibility of the poem turns out to have three minds and now there are three blackbirds, and we are perhaps microdosing. Like thirteen, three is a number freighted with history and multiple meanings. From Christianity we have the tripartite God of Father, Son, and Holy Ghost. Three Beings in One. Various psychological and philosophical traditions have divided up the individual person into groupings of three: the conscious, subconscious, and unconscious; the ego, the superego, and id; the mental, emotional and physical. We can't seem to get outside ourselves, can we?

What if we recognize that those three birds, indeed all the birds in the poem, have their own life, quite beyond their uses here as place-holders for even the most distinguishing of attributes, human consciousness? It seems only fair. For one thing, as it turns out, birds have minds. Western scrub jays hide food from other jays, but only if they have stolen food themselves—they know what other birds are thinking. Remembering where they hid their food suggests episodic memory, or the ability, as Jennifer Ackerman puts it in *The Genius of Birds*, "to travel back into the past in their own minds."[16] Newborn chicks share with humans a left-to-right cognitive methodology, mapping numbers as we do, with less on the left and more on the right. They understand proportion and can add and subtract.[17] With intention, mapping, and counting, birds create what Stevens, in another context, called

16 Jennifer Ackerman, *The Genius of Birds* (New York: Penguin, 2016), 4.
17 Ibid.

"a physical poetry, a geography."[18] Reciprocity has not been one of the many ways to consider the blackbird in the poem, but it is now. The blackbird is looking at us, and could be thinking about us, too.

Mind & Body—At it Again

In the fourth stanza, sex. Here we are treated to a bit of biological instruction, as a man and a woman are "one." Could Stevens be implying a nonbinary gender continuum, perhaps arguing that all sex is equal? Man, woman, it's all one thing. I'm simultaneously reminded of Stevens's sorry sex life and also about the mechanics of reproduction—the means by which *Homo sapiens,* and indeed most species —proliferate.

And then he adds the blackbird: "A man and a woman and a blackbird are one." How could this make sense? Stevens was probably not thinking about the evolutionary tree of life, but if we proceed backwards about 365 million years, back through maybe billions of instances of sexual reproduction, we find the common reptilian ancestor from which both birds and *Homo sapiens* evolved. This is stretching Stevens past what we know or surmise about his thought, but the way this stanza allows for a dive into the deep past and back again to the present sex act parallels other strategies the poet uses for telescoping in and out of various times and spaces. Birds and *Homo sapiens* are united by a common ancestor, the reptile, and Stevens here unifies the

18 Stevens, *Collected Poetry and Prose*, 684.

evolutionary time over which separate species were once one and are now two, and he does this through the act by which life unfolds.[19]

Birds have been around on Earth for more than one-hundred million years. They have already done what humans are now called on to do, namely, survive a mass extinction event. Their big-bodied dinosaur ancestors were made extinct by the impact of a massive meteor that struck the Earth sixty-five million years ago. Dinosaurs had already evolved into different forms, taking on varied body sizes to capitalize on different ecological niches (usually food sources). Over the course of fifty million years, body sizes got smaller and adaptations came forth for climbing trees, gliding, and flying. As Ackerman observes "To say that humans are more successful or advanced really depends on how you define those terms."[20] Today, there are approximately 10,400 species of birds, which is more than double the number of mammal species. We need special equipment to broach the aquatic world for more than a few minutes but some sea birds spend a good portion of their time submerged. To say nothing of the fact that birds fly. And birds are wild. The opposite of wild is domestic—humans. Basically, wild means independent of human management. As individuals, most of us are not capable of being "wild." All of this challenges our assumption that blackbirds are somehow part of us, held within our minds, and not the other way around.

19 Reptiles are different now than they were back then, but of course, they are still here on Earth. It would be fun if a fine-lined skink crossed in front of the stone bearing this stanza—not likely to happen since Connecticut's only native reptile is endangered.

20 Ackerman, 8.

The fifth stanza brings beauty, inflections, innuendoes, and whistling. Stevens was happy once, head over heels in love with Elsie Kachel, whom he married in 1909. She was beautiful—her image appeared on an early iteration of the dime—ten years younger than Stevens, and from the sort of different social class that motivates a father to denounce a son, as happened in Stevens's case. He stuck by her through ever-chillier years, when their domestic arrangements included not just separate bedrooms but discreet territories of the house. Stevens's daughter Holly wrote: "[W]e held off from each other—one might say that my father lived alone."[21] Biographers find Elsie awful and not very smart. Is it fair or useful to find Stevens's personal life here in his poem? The Friends and Enemies of Wallace Stevens have come down strictly on the side of finding him in his poem: in making this walk they have made the poem a physical thing. Let's go with them, and remember that Elsie was there in the house, at the beginning of the morning's journey and at the end of the evening's return.

We've just had a sex act and some bounding pleasure has persisted at least for a moment—but now we are resolutely inside, looking out, in the next stanza, and the mood plummets. Icicles fill the window. The blackbird isn't seen directly from here, as its shadow fitfully streaks back and forth outside the window. What's the problem? The disconnect? In the interpretation of Stevens's biographer Paul Mariani, the shadow of the blackbird "has crossed and will continue to

21 George S. Lensing, "Stevens' Seasonal Cycles," *The Cambridge Companion to Wallace Stevens*, ed. John N. Serio (Cambridge: Cambridge University Press, 2007), 130.

cross that window, its shadow tracing the unnamed, 'indecipherable cause,' death."[22]

I am not so sure the "indecipherable cause" is death—it could be consciousness itself, the origins of which are still mysterious. But let's say the poem is indeed hitting on death here. Poetry often does. Just as poetry frequently invokes living beings like birds without inquiring much into the physical details, it also tends to summon death without looking very far past a subjective sense of loss, futility, and horror associated with what is implicitly understood as the termination of personal awareness. Is it indecipherable? Biologically, we do know the causes of death—they are almost always decipherable. What we don't really understand is the cause of life. Body forms evolve by way of natural selection over time and geography, but what started it all? In the poem, the sight of the blackbird initiates consciousness, and thought continues to depend on it. As thought and thing lose direct contact, meaning dissipates. Stevens writes that imagination adhering "to the unreal" can create an extraordinary effect, but this initial glow will blink right out. The unreal cannot and does not persist.[23] His thinking inched towards physical realization without quite getting there.[24]

Finding death at home, the poet goes back to the office in the next stanza. Things aren't much better there. The Hartford Accident and Indemnity Company was staffed with the "thin men of Haddam," a nearby suburb. So, maybe we also find co-workers at their desks, making the most mundane metaphors

22 Paul Mariani, *The Whole Harmonium* (New York: Simon & Schuster, 2016), 108.
23 Stevens, *Collected Poetry and Prose*, 645.
24 Ibid., 684.

of all, talking about the risks of disaster in the real world as if they were poetic thoughts that might take literal form, and assigning to these a dollar value.[25] The poet asks why they imagine "golden birds"—which could be birds of iconic poetry or money—when they could be ogling a blackbird and the feet of women? (Maybe Elsie wasn't too keen on this feet thing.)

Not Seeing a Blackbird

The thin men of Haddam are not alone in not-seeing blackbirds. In the late 1990s, biologists Russell Greenberg and Sam Droege brought their attention to the Rusty Blackbird, noticing that over two summers of field work in the boreal forest of the Northwest Territories and Ontario, "we found only a single pair [of Rusty Blackbirds] in areas where, historically, they were considered common."[26] The bird must be in trouble—but looking into the matter they found no mention of the Rusty Blackbird on the usual rosters of alarm. The species was not included on the National Audubon's Blue List (1992), nor was it listed as a species of management concern for the U.S. Fish and Wildlife Service (1995). On the Partners in Flight species priority list (1996), it was ranked a declining species at the lowest level of concern. Basically, the bird was

25 Today, the company has a sustainability plan. Like most efforts called "sustainability" it is about reducing a carbon footprint, which is great, but doesn't include helping support biodiversity. The world of nature is still abstract in the world of insurance companies.
26 Russel Greenberg and Sam Droege, "On the Decline of the Rusty Blackbird and the Use of Ornithological Literature to Document Long-term Population Trends," *Conservation Biology* 13/3 (June 1999): 553–59.

assumed to be with us always, not in need of special attention, a constant as common as dirt. Oh, Rusty Blackbird—was no one ever really looking at you?

Droege has long experience and great enthusiasm for population survey data collected by amateurs over long periods of time (aka citizen science). From his post as a U.S. Geological Survey scientist at the Patuxent Wildlife Research Center in Maryland, he has launched scores of community science platforms focused on tallying up birds, amphibians, bees, and others. Droege knows that one pair of eyes, even when attached to an exquisite sensibility, cannot truly see a species—only hundreds of eyes will do. Scratching his head about the Rusty Blackbird, he consulted the North American Breeding Bird Survey (BBS), the Quebec Checklists Program (EPOQ), and Christmas Bird Count (CBC) data. These are three distinct but related "ways of seeing." The BBS collects data from randomly placed point-count surveys half a mile from each other along about 3000 American roadsides. Observers count birds for three minutes and that makes a point. EPOQ collects data from a network of birdwatchers who choose for themselves where to look for birds, and report back data including location, duration, weather, and numbers of individuals of each species. Greenberg and Droege noted the "obvious sources of bias implicit in such a system," but added that thousands of checklists are submitted each year and their numbers corroborate those of the BBS.[27] In general, observational data on birds is much more robust than that of any other species simply because there is so much of it.

27 Ibid., 554.

The methodology of the Christmas Bird Count depends on a circle and would seem to exemplify stanza IX of the poem: "When the blackbird flew out of sight,/ It marked the edge/ of one of many circles." The poem has a recurrent gnomic tone, but these lines are fabulously mysterious. As the blackbird flies out of sight, a basic philosophical question lingers on the emptied tableau: if we don't see the blackbird, does it still exist? Stevens, contemplating the experience of "that occasion, which comes to us all," when we really see a blue sky, "not merely see it but look at it and experience it," asserted "few people realize that they are looking at the world of their own thoughts and their own feelings."[28] What is out of sight is also out of mind. Undoubtedly this is the way many people relate, or don't relate, to the natural world. But not seeing birds doesn't mean, in fact, that they are not there. Conservation biology has come up with some strategies for dealing with this, one of which involves a circle.

Essentially, long-term observational monitoring protocols focused on birds are meant to determine the size of various populations whether we see them on a given day or not. The Christmas Bird Count is an annual event in which amateurs and professionals go out for twenty-four-hour periods along specified routes that are bounded by a circle fifteen miles in diameter. All the birds that are seen are documented, and statisticians put the data through a vetting and verifying process. Nobody pretends the picture of birds that accumulates is precise; rather, every "count" provides an accurate reference point, and a relative measure, against which the data from previous and subsequent counts can be reliably compared.

28 Stevens, *Collected Poetry and Prose*, 684.

Why bound the monitoring territory with a circle? Basically, because birds fly all over the place and naturally, through the air. Our vision of their world is circumscribed by the horizon. How otherwise to bound a portion of the celestial sphere but by the shape through which we perceive it to begin with? Circles are closer to the way birds inhabit a landscape than a rectangular transect (although such methods could be useful for counting birds who spend a lot of their time darting through shrubs or pecking on the ground). All points along the periphery of every circle are equidistant from a center. In the words of Ralph Waldo Emerson, "The eye is the first circle; the horizon which it forms is the second; and throughout nature this primary figure is repeated without end."[29] Emerson's words could be a coda for Stevens's poem.

Greenberg and Droege concluded that Rusty Blackbirds were "very common to abundant" in fifty-six percent of pre-1920 published accounts, nineteen percent of 1921 to 1950, and seven percent of post-1950s accounts. By 1980, the Rusty Blackbird was no longer in the "common" category at all and described instead as "uncommon" in forty-three percent of accounts.[30] Greenberg and Droege succeeded in awakening some keen researchers to the plight of the Rusty Blackbird. An international working group was convened to figure out what has happened to the bird; in 2014, they launched a Rusty Blackbird Spring Migration Blitz, enjoining citizens to help determine where they are and when.

29 Ralph Waldo Emerson, *Essays and Lectures* (New York: Library of America, 1983), 403.

30 Greenberg and Droege, "On the Decline of the Rusty Blackbird…," 553. Their analysis included reports and data sets pre-dating the CBC, the BBS, and the EPOQ.

As for why this bird has flown under the radar, as it were, conventional wisdom points to the inexorable loss of its woodland wetland breeding grounds in the Southeast United States—more than eighty percent of which has been converted for agriculture and other land uses. This has occurred over many human generations, so it is likely that a "shifting baseline syndrome" has kicked in—younger observers don't necessarily have any idea that what they are seeing is only a fraction of what came before. In general, blackbirds are considered hearty and adaptive, and to many this specialized species of blackbird is perhaps not terribly distinguishable from its brethren species that persist. This is also the problem of Stevens's poem—partial ways of seeing and even blindness to what is going on.

The Steady Gaze

Twenty mountains, three minds, one tree, and three blackbirds. And, of course, thirteen ways of looking. Stevens is counting—enumerating—but also aggregating. Because this poem expressly quantifies its subject, it very usefully provides some connective tissue with the way scientists tend to talk about nature, which is also in numbers and amounts. (The same way insurance companies translate fates into fortunes.) Why thirteen? Superstition tells us it's an unlucky number. How a number can be unlucky is a matter of inherited belief—the vanishing point of which is a mysticism around numbers as ultimately ordering the universe. Like the number twelve, thirteen is rare among numbers in that it represents a measured quantity. Thirteen is a dozen plus one. So, Stevens may be

saying, take your measure, and then add one more, maybe the measure of the blackbird. Stevens poses the blackbird as the natural world—both as a single, individual bird and as the whole view; then adds the time it took to make the mountains, the seasonal occurrence of autumn, and the atmospheric forces

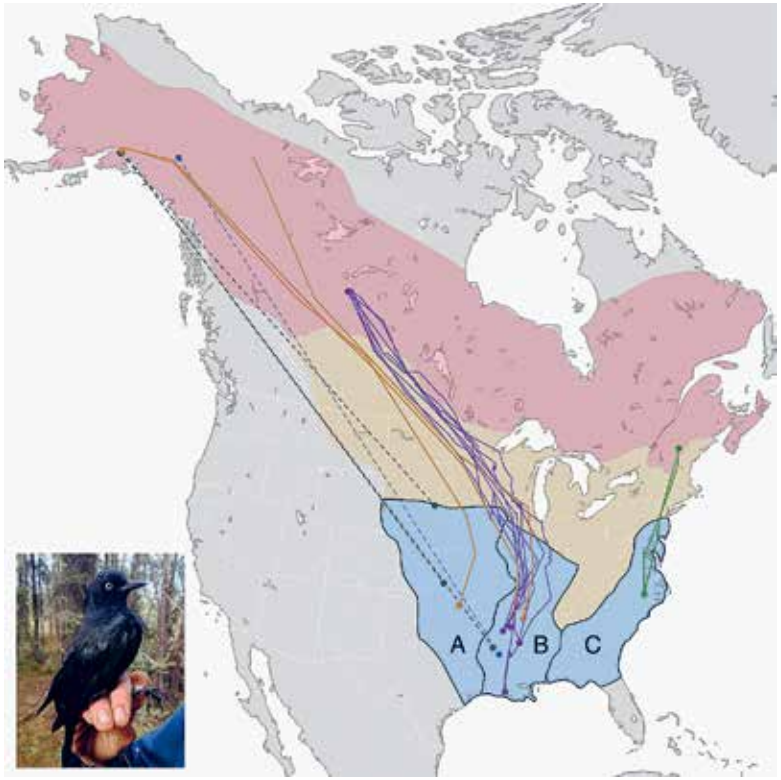


Fig. 02. Bird movements map the ineffable: colored areas represent breeding, migration, and wintering ranges of Rusty Blackbirds; solid and dotted lines mark routes taken by specific birds tracked using GPS devices. From James R. Wright et al., "Migratory connectivity and annual cycle phenology of Rusty Blackbirds," *Avian Conservation and Ecology* 16/1 (2021): 20; ace.eco.org/vol16/iss1/art20/; reprinted courtesy of James R. Wright.

of snow and wind. He connects processes, scales, and life. We could say he takes a landscape-level approach to the scene. At the same time, he's looking at what are called "essential biological variables," or the parts by themselves. Stevens was a fine enough observer and although it is unlikely that he had any ambition to elucidate biology, his strategy makes a web of connection that can be called ecological. Indeed, it orients the reader to perhaps infinite ways of seeing. Ecologies afford infinite ways of relating, many of which are life-sustaining.

In 2013, Amanda Pachomski investigated the literal parts that collectively create the reality of the Rusty Blackbird. She conducted a pilot study of the bird's "site selection," or where it builds its nests and rears its young. She zeroed in on twenty-two beaver-influenced wetlands in the Northeast. Beavers are ecosystem engineers. They slow down the flow of water through creeks by making dams of mud and vegetation, including big pieces of tree trunks and branches. They increase the size and depth of wetlands, and create more habitat for aquatic insects, which are the Rusty Blackbird's preferred food source. So now we have a beaver, a bug, and a bird partaking in an energy flow through water and vegetation. "The river is moving." / "The blackbird must be flying."[31] And, we have a pair of eyes—Pachomski's. She surveyed her wetland sites four times each two-week period between 14 May and 30 June, recording Rusty Blackbird detection during incubation, nestling, fledgling and post-fledgling. Twice a week she surveyed Rusty Blackbirds at each site for sixty minutes, "to document presence/absence and time spent foraging." She also recorded

31 Stevens, *Collected Poetry and Prose*, 76.

pond water depth, water level, air temperature and weather. She collected bug samples. And she did more than look—she listened. She recorded "chucks and 'ker-glees' or songs,"during the first nine minutes of thirty minute surveys.[32] Pachomski helps us "know" the Rusty Blackbird and her information is vital. We are zeroing in on where to support habitat for the Rusty Blackbird. We are understanding how it lives, and how it helps knit up the fabric of life across time and space.

All Meanings Have Become One

Stevens's poem constantly pushes beyond the limits of human awareness to evoke a natural sublime, but even when it concedes power to the blackbird, it seems inescapably tethered to human control. This mindset is playing itself out in nature now, in sorry declines and reductions like that of the Rusty Blackbird. As Stevens walked back and forth to work, day after day, developing beautiful poetry along the way, the Rusty Blackbird was suffering invisible onslaughts traceable to the kind of commerce enshrined by the insurance company Stevens loved working for. He didn't know he was helping to take out the Rusty Blackbird, just like you and I go through our days not knowing exactly how and where we are negatively impacting thousands of species.

32 Amanda L. Pachomski, "Foraging Habitat Characteristics, Prey Availability, and Detectability of Rusty Blackbirds: Implications for Land and Wildlife Management in the Northern Forest," Master's thesis, State University of New York College of Environmental Science and Forestry (2017), 95.

Part what gets in the way of our addressing this situation in any adequate way is the difficulty we have in conceptualizing multiplicities, not just mental ones, although they matter, but physical ones across time and space—like those created by beavers, bugs, birds, and seasons. We need "three minds" to redress the situation. The collective mind of citizen science provides data over longer and longer periods of time and global geographies and thereby shows us what is "real," as in, what is really happening. The minds of individual scientists investigate the ecologies that underlie the data and help determine what specific actions we can to take to support them. The poet's mind helps us reconcile the time frame birds live within and our personal sense of time. When we look at the blackbird, we need to see the Rusty Blackbird, flying through the circle of now into a future in which it can persist.

Lêna Bùi: Where Birds Dance Their Last

In mythology, the Bird Woman shape-shifts between human and avian forms. She descends from the sky in the shape of swans, storks, geese or crows; and, in order to be on earth, she sheds her robe of feathers to take on human form.

In real life, the Bird Woman appeared in a newspaper clipping, looking like a plump ostrich during shedding season. Her photo was beneath the headline, "Duck and chicken feather village Trieu Khuc: Risk of an epidemic alert!" During the avian flu outbreak in 2005, resulting in the culling of nearly 1.2 million poultry in Vietnam, this small village on the outskirts of Hanoi suddenly found itself in the news.

Trieu Khuc, depending on the mood of the time, was sometimes described as a traditional village famous for its flat palm hats (*nón quai thao*), festivals, and dances, other times known as the trash recycling village; or, since that period in 2005, the duck and chicken feather village. Although it is still referred to as a "village," Trieu Khuc had been absorbed into the municipality of Hanoi. It is crowded and densely populated.

After driving through congested roads and narrow alleys lined with skinny townhouses, I arrived at a more open space where the graveyard was. The workers explained that in the past they dried the feathers in the village, but now they dried them here amongst the tombstones. The fresh feathers were collected from the wet markets, abattoirs, and households around Hanoi. Bigger feathers

were turned into shuttlecocks and brooms; down feathers were mostly exported to China where they were processed once more before entering the international market—China is the biggest worldwide provider of down feathers.

Zoonosis—diseases or infections that can be transmitted to humans from animals—account for seventy-five percent of new and emerging diseases in the last decade. Our exposure to these diseases is often a consequence of modern life, as sprawling urban areas become increasingly crowded, and wildlife habitats increasingly small; old ways of life are no longer sustainable. Each time there is an outbreak, it is not just animal and human health that is at risk, but also the livelihood of millions of farmers and people who work directly with animal produce.

In Trieu Khuc, during peak season, the working hours started early in the morning and dragged on into the night. One girl commented that at one point she realized she was spending more time with the dead than the living. The smell was overwhelming. Each time a motorbike drove through the single-lane road small feathers and dust swirled into the air. “We’ve been doing this for three or four generations,” one woman explained. But the numbers of workers have halved since the outbreak. “No one got sick,” said a grandma approaching eighty-years-old and still working. “I’ve been doing this all my life.” In fluid, dance-like movements, she spread feathers onto the ground. There is a jarring discrepancy between the lightness of feathers and the pungent smell in the dust-infused air. I wanted to see her fly.

The Bird Woman’s superior form is her bird form, through which she is connected to the heavens and to other creatures. It is also what gives her her freedom. Usually it is because some mortal man hides her robe, and in doing so holds her prisoner. Life on earth is tedious and harsh. Sometimes she plucks her own feathers to weave clothes for her livelihood, becoming increasingly sick, until her true form is discovered and she returns to the sky.

Perhaps, I came to Trieu Khuc wanting to see women turn into birds—which they did, for intervals of a second or two—in a space where the dead and the living coexist.

Introduction by Lên Bùi; images on pages 100–105: Lên Bùi, *Where Birds Dance Their Last,* 2012; stills from two-channel video, 7:35 min. The composite digital collage on pages 106–107: was especially made for this publication by Lên Bùi in 2020; all images are reproduced courtesy of the artist.

Six Exercises in Minor Ornithology

by Frank D. Steinheimer

How can we examine major scientific research collections as a means to discover other ways of thinking with natural worlds—not in order, finally, to desert the institution but to inhabit it otherwise and repurpose it for social and environmental justice? In their provocative book on Franz Kafka, Gilles Deleuze and Félix Guattari suggest that, "[t]here isn't a subject; there are only collective assemblages of enunciation, and literature expresses these acts insofar as they're not imposed from without and insofar as they exist only as diabolical powers to come or revolutionary forces to be constructed."[1] We believe that, like literature, natural history collections can be repurposed *from within*, by way of engagements that read them against the grain, toward acts of collective enunciation that sustain heterogeneous, multi-species expressions in excess of any taxonomic order, hierarchy, or domination.

As part of a workshop organized through the Haus der Kulturen der Welt's international curators network, SYNAPSE, we staged a performance of minor ornithology with Frank Steinheimer in the collection of the Berlin Natural History Museum. The proposal was quite simple: select, from the ornithological collection, a set of specimens with which we could discuss human-bird interactions and explore new ways

1 Gilles Deleuze and Félix Guattari, *Kafka: Toward a Minor Literature*, trans. Dana Polan (Minneapolis: University of Minnesota Press, 1986), 18.

of storytelling that might be more adequate to the twin ecological crises of climate change and biodiversity loss than the normative, liberal laments of dominant culture (including, most especially, the cultural practices of natural history museums). Frank generously obliged, and what follows is a transcript of his performance with and in the collection; a special thanks to all the SYNAPSE participants, the Berlin Natural History Museum staff, especially the head of its bird collection, Sylke Frahnert, and the HKW for making this event possible.

§1 The Great Auk of Funk Island

Have you ever seen this bird, the great auk, before in your life? It might look to you like a penguin, and that's not wrong. It's not related to the penguin, but it got its name first, *Pinguinus*, so it is the first real penguin. *Pinguinus* probably derives from Latin and means *fat*, but there might also be some Welsh connection to the name auk. It is famously the first European bird hunted to extinction. You can see its tiny little wings and you can probably guess that it can't fly; because of this, these birds needed to be very careful about breeding. In fact, they bred on tiny offshore islands, which had to be so flat that they could walk onto them. The Northern Atlantic, with its rough coastline of rocks and cliffs, is not good for this bird, so it had very limited breeding sites. And—this is why I begin with this story—some birds are on an evolutionary path that might lead them to extinction without human intervention.

In this case, this bird was apparently quite well distributed before humans arrived. Some bones have been found all over

the North Atlantic, including Northern France and even Spain, but always on offshore islands. Mammals, most likely foxes, would eat their nice large eggs. So, these islands would have to be quite far offshore so no one else could swim out to them. The birds themselves would swim in the Atlantic to feed on fish, but they would have to come to shore to breed.

When humans first took an active interest in natural history—let's say from the beginning of the Renaissance—there were only eight known colonies of this bird. The most famous, in fact, was on an offshore island in Canada, where roughly 100,000 breeding pairs were recorded. Then humans arrived, and the birds and their eggs became food, while the soil, rich with bird remains, became fertilizer. Funk Island was very quickly rid of these birds, but there was one remaining colony on an island called Geirfuglasker, or Great Auk Rock, somewhere off the coast of Iceland that was inaccessible to humans. It was flat, but you couldn't reach it easily by boat because there was a strong current around it. In 1830, a volcanic eruption occurred and this island disappeared entirely. It was just gone. When the birds returned to their breeding colony to lay their eggs, they found it wasn't there. In search of firm ground, they then went to another nearby island called Eldey; the people there thought this was a present from the gods because these nice fat birds came to them, started to breed, and were easily hunted. In 1844, fourteen years after the eruption, the last pair was killed, not for food but because museum directors paid such high prices for rare birds. That was what wiped them out, and I actually have the names here—we know exactly who killed the last birds: Jón Brandsson and Sigurdr Islefsson. The dead birds found their way to Copenhagen and I assume they are still in a collection there. There was also an idiot named Ketil Ketilsson who stepped on the last egg—then it was done.

This was the extinction of a bird that had a lot of misfortune in its life because the island where they had a good colony disappeared and then they were exterminated by humans. Seventy-eight specimens are known and a good number of

them are in Germany. Perhaps about forty eggs are known and several skeletons, most of them from Funk Island. Actually, when northern travelers went to the south part of the globe, they met the penguins and gave them the same name, which stuck with the southern birds—but the great auk was the first.

How do you know this was the last bird? Did people discover that when birds no longer showed up?

Actually, these were the last *breeding* birds. There were still some sightings in the Atlantic, swimming in the open water, but they never came on shore. Now we can be pretty sure that they are gone.

§2 Humboldt's Parrot

This is Alexander von Humboldt's parrot. For many, Humboldt is still a hero of scientific exploration, but he was actually an aristocrat, living in Berlin, and there is still a castle near the lake of Tegel where he had this parrot in his possession. The story of this parrot begins in the eighteenth century on the island of Réunion. The species does not occur naturally on Réunion, but Arab and European travelers brought parrots from Madagascar to Réunion in the early eighteenth century and the population thrived there. We believe the bird, a Greater vasa parrot, came from there because it shows up in Munich at the menagerie of Maximilian the First (at that time still the Archduke of Bavaria, later made to the King of Bavaria, as empowered by Napoleon). Anyway, in this menagerie, there

was another bird from Réunion, the Mascarene parrot. That is now an extinct bird, known only from two specimens, one in Vienna's Naturhistorisches Museum and another in the Muséum National d'Histoire Naturelle in Paris. This Munich bird was not prepared after its death, but it was the third known individual of this species ever recorded. And, because it was in the same menagerie, it is quite likely that Humboldt's Vasa parrot and the Mascarene parrot traveled together as living birds to Europe. Actually, they would not travel to Bavaria directly, which had no connection to Réunion whatsoever, so they likely got there by way of French troops or merchants in a colony in Pondicherry, India. On their way back to Europe, these ships always stopped in Réunion for fresh water. So, there they took the birds onboard and brought them somewhere in France, most likely to Strasbourg or Paris, where the Duke of Zweibrücken, a friend of Maximilian, probably purchased and resold these parrots.

The Bavarian Archduke was still a very young man at that time; he later presented this bird to the Archduke of Saxonian-Eisenach-Gotha. He happened to have this bird sitting at home in his living room, and it was apparently very good at speaking to visitors. In 1826, one of these visitors was Alexander von Humboldt, together with Johann Wolfgang von Goethe. Humboldt was the first visitor to identify this species correctly and he was completely taken by the bird. The Archduke was so impressed that he wrote into his will that, when he died, the bird should go to Humboldt, which happened two years later.

They naturally developed a relationship, as one does with pets, speaking to each other, discussing how much sugar goes

into the coffee or tea. They also had a discussion every morning about who would die first. [Laughter] Actually, at the time, both were already a proper age: Humboldt in his eighties and the parrot probably in his late fifties or early sixties, which is quite old for a parrot. Luckily, the parrot died first, because if Humboldt had died first, we probably would not have the specimen. Ever the naturalist, Humboldt sent it as a donation to the museum.

Where is this documented? Did he donate any transcripts along with the body of the parrot?

Good question. [Laughter] These stories are quite well known because many people went and visited Humboldt and then reported them. A friend and colleague of mine, Rüdiger Becker, researched these facts …

§3 Mayr's Duck

The next story is about bird collectors and chance—we could also say it is about the randomness of one's career. I don't know if you've ever heard of Ernst Mayr. [Shows photo] I don't like to show photos of people when they were old, but when they were young and productive. This is the young Ernst Mayr, and he had a lot of luck. He said that in his career he had three situations of luck. His first piece of luck was that he observed this duck. Fairly unknown in Germany at the time, today it is a common bird: the Red Headed Pochard, or the *Kolbenente* in German. Mayr observed this rare bird on

the Moritzburg Lakes in Saxonia, near Dresden, and made a little note that he sent to Erwin Stresemann, who was then the head of the department here in Berlin and the world's most famous ornithologist at the time. Stresemann read the note and said, "Well written, I would love to meet this person." So, young Mayr came to meet the great Stresemann and they were much impressed by each other. Not really, but Stresemann felt he had to promote this young guy. The first thing he did was to tell him to stop his study of medicine and switch to zoology. Today, he would probably use different words, but he promised him—and it was a promise he almost couldn't keep—that if he studied zoology, he'd send him on an expedition. For Mayr, going abroad was the biggest thing, because at that time, in the 1920s, it was still quite expensive to travel privately, even to France. So, he changed to zoology, succeeded in his studies, and then he said, more or less: "I need my expedition now!"

Stresemann made deals with two famous institutes, who shared the expenses for a trip to New Guinea with Baron Walter Rothschild, owner of the largest private bird collection ever assembled. He was a son of the Rothschild banking family but, as someone who wasted money instead of making it, he was distanced from the family; he received only a certain salary and was kept out of the banking business. He was also the one who signed the Balfour Declaration, when Lawrence of Arabia freed Palestine from Ottoman rule. At that time, he was the head of the Jewish world community. He would pay for one third of Mayr's expedition, the Berlin Museum would pay for one third, and the last third was paid for by the American Museum of Natural History.

Mayr was then invited to meet Rothschild and his German curator, Ernst Hartert, who wanted to see if Mayr could shoot. He couldn't hit anything, so Hartert let Rothschild know—the letter still exists—that while he's hopeless at shooting and needs a servant for that, he's an excellent scientist. He was sent to New Guinea at the age of twenty-four with the aim of collecting rare birds of paradise, which were then only known from one or two specimens. He never fulfilled his original aim, as it turned out that these birds were hybrids: very rare events where two different species had mated and had offspring. He did, however, collect over 1,000 birds for Berlin and roughly the same number for the other two sponsors, including some very rare stuff, a huge collection. So again, he had a lot of luck. He found a Forest Rail (a species of bird in the family *Sarothruridae*) of which at the time only two individuals were known to science worldwide, and he collected the rest—exactly forty-three specimens, thirty-five or so in this collection here, and the others transferred to collections around the world.

Other collectors tried to find out where Mayr gathered his specimens, and often came home empty-handed. But Mayr was very clever; hopeless in shooting, he invented a money system when he arrived. He would authorize pieces of paper with his name and a number on them; if someone brought him a very rare bird, he would get a ten note, while a common bird would get no note. With this money, the native hunters could buy equipment, like machetes or guns, from Mayr. When there was a very rare bird that Mayr wanted to have, he would describe what it looked like. His second piece of luck was that the natives knew something about the Forest Rail, which was only recently discovered—these birds sleep in

nests that look like footballs, in tree trunks or small bushes, and were quite easy to access. And, in these balls, there was always more than one bird, there would be four or five, which you could just shoot with arrows. It was very easy for the natives to collect them.

Mayr got a specimen the first day he announced his money system; when he said he'd like to have a few more, the next day he had forty-three. When he came back everyone was very pleased with his rare collections. Actually, when he came back, he experienced his third stroke of luck. In October 1931, Rothschild was blackmailed by a lady with whom he had a child but who was not his wife. British Aristocrats were not allowed to have illegitimate children, so he paid her off. Only two people in the world know who this woman was; but it was obviously a very famous person, otherwise it would be pointless to make a secret out of it. Consequently, Rothschild had to sell his bird collection to pay for this affair. And that is how the largest bird collection ever privately collected was sold to the American Museum of Natural History.

Having just come back, Mayr went to the American Museum to work on his own collection, when the Museum asked him if he wanted to curate this new collection of over 300,000 bird specimens. Mayr happily and immediately agreed, and ended up staying in New York for the next twenty years. He wrote a very famous book on the concept of biological species, and later became a successful professor at Harvard. He is often considered the second most important evolutionary biologist in the world, after Darwin.

Mayr was very active into his old age, writing letters, trying to get somebody to study this and that. I actually visited

him and he told me these stories when he was ninety-nine and a half years old. He remembered, without preparation, that he had collected forty-three of these Forest Rail birds and knew the exact number of these specimens, which we have in this collection. He had a phenomenal memory, and was a little over 100 years old when he died. That was Ernst Mayr. He said, "I know I am a Harvard University professor, but only half of that is my own skill, the rest was just luck."

§4 Cook's Ou

This is a strange story that brings us all the way back to the eighteenth century. This little green Hawai'ian Honeycreeper is a very rare bird called Ou. The bird came to this museum in 1819 and its provenance is quite well recorded. The then-director of the museum had the opportunity to go to an auction in London, so he could buy this bird. William Bullock, the person selling this bird, was a goldsmith who wanted to travel to Mexico and he was selling his bird collection to raise the money. But how did he get this bird? That was a much more complicated story, because Bullock never traveled to the area where this bird comes from. In 1806, there was an auction, and in the auction catalog there were hand-written comments inside, and annotations where you can see which lot was bought by whom. We know Bullock was at this auction, and that there was a lot bought by him, but not a lot that contained this bird. There were four of these birds in the auction: two purchased by Mr. Thompson for the collection of the thirteenth Early of Derby (which are today at the Liverpool museum), and two

for the Vienna Natural History Museum purchased by Leopold von Fichtel. Von Fichtel, however, only handed one birds over to the museum; we now know from the archives that he sold the second to William Bullock.

The bird von Fichtel bought at the 1806 auction from a museum was owned by James Parkinson, a London building broker who had a huge collection. So, where did Parkinson get the specimen? Interestingly, he won it by lottery. There was a person named Sir Ashton Lever, who in 1786 was having financial troubles and wanted to rescue his large museum called the Leverianum by holding a lottery. He kept most of the lottery tickets for himself and sold a few, hoping to pay off his debts. Unluckily for Lever, there was one ticket that would give its holder the entire collection—this winning ticket was sold to Parkinson.

But, Lever was also a close friend of the fourth Earl of Sandwich. This Earl of Sandwich was the First Lord of the Admiralty during the James Cook voyages and, as the Admiralty could not use all the materials collected from the voyages, the Earl sent the birds over to his friend Lever. So, a good bunch of birds officially collected on the Cook voyages were transferred to Lever's museum, especially those of the third voyage, which stopped in Hawai'i, where this bird is from. By the way, Hawai'i was also the place where Cook was killed in February 1779—but that's another story, and it was his own fault.

The Ou bird, the Hawai'ain Honeycreeper, went extinct quite recently, records say around 1989. This bird was collected in the foothills of the Kealakekua Bay of Hawai'i—we know this because there are precise records from the 25th to 30th of January 1779. So, this bird specimen is very old, coming from

the expedition of James Cook; it's very clear that this was one of the very first birds of this species that ever came to Europe, although it had a very long journey after its death, traveling through several different collections, before it arrived here.

§5 Pallas's Rosefinches

This next story happens during World War II. These nice Rosefinches here, why do they look like this? In 1940, the first bombs fell on Berlin. In January 1941, a bank clerk asked Erwin Stresemann, who was still the director here, "Well, I could have a secure place in the bank treasury, do you have some specimens you want to protect?" This was still a time when people might be killed by the Nazis if they started to

rescue stuff because it showed they didn't believe in a great, imminent victory. But, this bank clerk from the Reichsbank went with Stresemann to gather the specimens, and all the skins you see there and in the other room went to the safe. All these specimens of now extinct and endangered species, and a few other bits from other collections (such as the Berlin Quagga, the extinct zebra subspecies, and the Herbarium of Carl Ludwig Willdenow, which is the most famous Berlin herbarium, and the only one to survive the war because the herbarium building was hit by a bomb and everything else was destroyed.) All the other birds of the hall, along with the mounted birds, remained in the museum.

The first bomb hit the Natural History Museum in November 1943; it was not a big bomb, but an explosive shell. It hit the wing where the passerines were kept, exploded, and caused a fire. The specimens were all okay, but because the ceiling was damaged they did suffer some water damage. The next bomb hit the museum in February 1945; it was very heavy and although it did not explode the entire roof collapsed. Another bomb landed outside and its explosion made a big hole in the museum's cellar wall. Three women hiding there were killed. The shock wave was so strong that all the windows shattered. So, there was no glass in the windows or the cases anymore. Then, on 18 March, two shells again exploded in the passerine hall, where there was no roof. The detonation sent about 20,000 of the remaining mounted birds flying into the courtyard. They were all picked up again and brought back to the hall.

These are three of those specimens. This one is a Desert warbler and it is quite interesting. If you have a close look, you can find a piece of glass sticking in the wooden block. These

shards flew around like bullets during the blast. The other two specimens are very important because they are probably type specimens from Simon Peter Pallas in the eighteenth century. It's great that they brought them all back because we still have the biodiversity data on the label; by using modern sampling techniques for DNA we can prove that these are the correct species, or they could even still be identified by the wings that are left. This old bird specimen here was damaged in the war, so it has no foot anymore, but you can still see the original eighteenth-century label from Simon Peter Pallas. Pallas was a famous collector for Catherine the Great, and was among German scientists brought to Russia to explore Siberia. Actually, Pallas did not collect this bird himself, but sent out another collector, named Carl Heinrich Merck, who would label the birds in Russian, which Pallas would then translate into German; this one here for instance reads *toporok* meaning "little axe" because the bird's beak looks like a little axe. In October 1945, they got the other birds back from the safe; the losses were quite small and concentrated, so it is still quite a huge collection, and they were preserved fairly well considering the destruction taking place.

How old are the oldest specimens here in the bird collection?

The collection goes back to the eighteenth century, to the Kings of Prussia and the *Kunstkammer* or Art Chamber; a handful of birds are left from this time, though there are specimens here, for example, those of Pallas, that are scientifically more interesting.

§6 The Beak & The Nectar

My last story is about a hummingbird and its biology. Why does this bird have such a long beak? For the flowers? But why do the flowers make it so difficult? This is perhaps the start of this whole story. It's commonly called coevolution; but coevolution is the wrong term, and this is why I have named it, in my notes here, "The misconception of coevolution." I'll explain why. This bird needs energy from nectar in order to fly. But it cannot live entirely on nectar—nobody lives only on sugar. The hummingbird wants to stay away from the flower because there are a lot of animals there, like snakes and spiders who want to catch the birds when they come close to the flower. So, in general, hummingbirds with a slightly longer bill can stay slightly further away from the flower (when they go for the nectar), meaning they can easily escape and survive, and have more offspring than those with smaller beaks; so, there is a selection for having longer bills.

The plant doesn't care about the bird—it just wants to be pollinated. To be fully pollinated, it needs the bird to hit the pollination stamens, and birds do this with their foreheads. So, for the flower, there is no point if the bird has a longer beak, because it could stay away and not pollinate the plant. For the plant, the solution is to have longer cones so that the bird has to be very close to the flower, which then initiates this interaction between two different interests. The Sword-billed Hummingbird here ended up with a very strange result, having a very long beak indeed. Hummingbirds are also good pollinators because they are more intelligent than bees, and they can fly through bad weather and over long distances. For

flowering trees, hummingbirds are ideal pollinators, because they know the trees, when they are flowering, and will travel long distances, even when it's raining, or to high altitudes. And for the bird, the plant offers very, very rich sugary nectar—so that is the deal. But then, it ends up as the bird with the longest beak in relation to body size, and actually, if I remember correctly, they can only sit like this [shows a bird standing upright with the beak to the ceiling] or else they'll fall over. Yet, a hummingbird needs to do more than drinking with their beak, it needs to arrange and preen their feathers, but you can't do this with such a long beak. So, this is the only bird to arrange the feathers on its back with its foot. Amazing! But then you have another big problem. You cannot live off just sugar. Particularly, their kids need protein. So how do you feed your kids with that beak? And how do you get food? How do you think they collect insects? They still do it with their beak. Actually, there are only a few birds who use their feet for getting food, like the birds of prey. Most do it with their beaks. So, it can't catch moving insects anymore, and it lives entirely off fixed insects in spider webs. It has a very sophisticated tongue and it can move it down to line up the insects. The youngsters have shorter beaks, and they pick from the gape of the female's beak the protein-rich food. It's very complicated, and it's also the end of their evolutionary scale—it's not possible to develop any further. So, probably in the future, they will again have smaller beaks, because evolution is not a one-way system.

Conclusion, or, Why Humans & Birds Understand Each Other

I hope these anecdotes bring you a little bit closer to the interactions between humans and birds, especially in the context of specimens and the work of ornithology. If you were my students, we would open a window and there would be a half a minute of silence, and we would record everything we could hear. Finally, we would record with your mobile phones the noise of the town; the cars and police sirens, and so on. But we wouldn't hear the birds, which are also around us—swifts and blackbirds, which are very common here. This is to train the senses to really listen to the birds. And I can only encourage you to take the time, get out, close your eyes, listen to what you hear. Sometimes in the park in the morning you can hear about thirty different species, in any town you live in, no matter where you are from. It's quite nice.

Birds are also the first introduction of animals to children because they sing and are colorful. Children can always correctly identify birds from three years on—they would know, for example, that the hummingbird is a bird, and the penguin is a bird. It's very strange. They can't do this for mammals, but there is this simple identification that only works with birds. For a lot of people, there is a strong connection to and a deep love for birds—this makes sense because they are easy for us to understand. Birds have the same rituals of approach to the world that humans have. They have similar senses, except that they also have a magnetic sense. They have a very good visual

sense. Colors mean the same thing for them as they do for us; they can see a little bit more of UV light, but they still react to colors as we do. For mammals, everything is brown or black because they rely heavily on scent; but scent does not play a very big role in most birds. So, they have the same visual sense, the same acoustics, they hear the same frequencies as we do. This is why it's so easy for birds and humans to understand each other. Are there any questions?

Can you say more about the magnetic sense of birds?

Birds have a few other senses that we don't have, the first of which is being able to see polarized light. So, if they see the blue sky, but not the sun, they know exactly where the sun is because they can see the rays in the open blue. They also have a magnetic sense; this means they can see the inclination and the angle of a magnetic field, and it's really something they've "seen," because this sense is somewhere connected with the nerves of the visual part of the brain. At the equator the magnetic field is parallel to the surface of the earth, but towards the poles it approaches a ninety-degree angle, and birds can see that. So, they know exactly where they are, which helps them with long-distance migration.

Does that mean that they have a sense of the whole earth, all the time?

Yes, they know where they are on earth, exactly. It's complicated, but they have a good sense of time and space, so they would know exactly what time it is; they can calibrate, for example, the movement of the sun and the movement of the stars to tell exactly how far they have flown.

Is that true for flightless birds as well?

Well, these birds also navigate because they swim quite far distances, like penguins. It might be less important for birds that are really flightless and stay on land, such as Pacific island rails, or the flightless parrot kakapo in Aotearoa, New Zealand. Nature is always eager to get rid of things that don't prove their fitness. There is a very good example of the bullfinch; the males remain very, very red here in Europe, showing the females that they are fit because they are not hunted by birds of prey, even though they are so red, which is usually a handicap. Being red shows their mates that they are great, but on small islands such as the Azores, there are no finch-hunting birds of prey, these bullfinch males lost their color. In the Azores, it is no sign of fitness to the females: this shows you that selection pressure regulates what combination of characters each living being has.

Can you say something about the rare books in the collection? There are some of these locked in these treasure boxes, but we won't show them now because I am not prepared for that. But there are some books where if you took a stack like that [shows a stack about fifty centimeters tall], you would have a million euros on the table because they are so rare. We have here the oldest bird books ever. Pierre Belon, 1555, and Conrad Gessner, 1555. I think this hand-carved copy of Gessner here at Berlin is a later edition, from 1584, but a very nice colored copy. And from Aldrovandi, we have the 1610 edition, though the original was from 1599. These are cuts on metal plates, but Aldrovandi's are uncolored, the Gessner's are colored, and Belon's are uncolored woodcuts. Aldrovandi was the first to use the technique—not of etching but of cutting forty-four plates; etching came much later, in the early eighteenth century. The library of Berlin's natural history museum comes from three sources: the German Ornithological Society, the University and museum's library, respectively, and the library of the Society of Naturalist Friends of Berlin, to which Humboldt once belonged. All of these libraries are more or less included here—and they are all very good libraries. But the most famous ornithology book we have here is a book on pigeons by Coenraad Temminck and Madame Knip, manufactured between 1809 and 1811. There are only twelve copies of this book in the world, and this one is the most complete—it is the reference book for all type descriptions.

Introduction on pages 109, 110 by the co-editors; photos on 108, 115, 126 by Etienne Turpin; photos on pages 111, 116, 122 by Dante Busqets, 2015; reproduced with permission.

“Little Birds” is excerpted from Anaïs Nin, *Little Birds.* London: Penguin Books, 1979, 3–6. Reprinted with permission.

Little Birds

Manuel and his wife were poor, and when they first looked for an apartment in Paris, they found only two dark rooms below the street level, giving on to a small stifling courtyard. Manuel was sad. He was an artist, and there was no light in which he could work. His wife did not care. She would go off each day to do her trapeze act for the circus.

In that dark under-the-earth place, his whole life assumed the character of an imprisonment. The concierges were extremely old, and the tenants who lived in the house seemed to have agreed to make it an old people's home.

So Manuel wandered through the streets until he came to a sign: FOR RENT. He was led to two attic rooms that looked like a hovel, but one of the rooms led to a terrace, and as Manuel stepped out on to this terrace he was greeted with the shouts of schoolgirls on recess. There was a school across the way, and the girls were playing in the yard under the terrace.

Manuel watched them for a few moments, his face glowing and expanding in a smile. He was taken with a slight trembling, like that of a man anticipating great pleasures. He wanted to move into the apartment immediately, but when evening came and he persuaded Thérèse to come and inspect it, she saw nothing but two uninhabitable rooms, dirty and neglected. Manuel repeated, 'But there is light, there is light for painting, and there is a terrace.' Thérèse shrugged her shoulders and said, 'I wouldn't live here.'

Then Manuel became crafty. He bought paint, cement and wood. He rented the two rooms and devoted himself to fixing them. He had never liked work, yet this time he set about

doing the most meticulous carpentry and paint job ever seen, to make the place beautiful for Thérèse. As he painted, patched, cemented and hammered, he could hear the laughter of the little girls playing in the yard. But he contained himself, waiting for the right moment. He spun fantasies of what his life would be in this apartment across from a girls' school.

In two weeks the place was transformed. The walls were white, the doors closed properly, the closets could be used, the floors no longer had holes in them. Then he brought Thérèse to see it. She was quite overwhelmed and immediately agreed to move. In one day their belongings were brought on a cart. In this new place, Manuel said, he could paint because of the light. He was dancing about, gay and changed.

Thérèse was happy to see him in such a mood. The next morning, when things were but half-unpacked and they had slept on beds without sheets, Thérèse went to her trapeze work and Manuel was left alone to arrange things. But instead of unpacking he went downstairs and walked to the bird market. There he spent the grocery money that Thérèse had given him to buy a cage and two tropical birds. He went home and hung the cage outside on the terrace. He looked down for a moment at the little girls playing, watching their legs under the fluttering skirts. How they fell upon each other in their games, how their hair flew behind as they ran! Their tiny new breasts were already beginning to show in their very plumpness. His face was flushed, but he did not linger. He had a plan, and it was too perfect to surrender now. For three days he spent the food money on birds of every kind. The terrace was now alive with birds.

Each morning at ten o'clock Thérèse was off to work, and the apartment was filled with sunlight and the laughter and cries of little girls.

The fourth day Manuel stepped out on the terrace. Ten o'clock was the recreation hour. The schoolyard was animated. To Manuel it was an orgy of legs and very short skirts, which revealed white panties during the games. He

was growing feverish, standing there among his birds, but finally the plan succeeded; the girls looked up.

Manuel called, 'Why don't you come and see? There are birds from all over the world. There is even a bird from Brazil with the head of a monkey.'

The girls laughed, but after school, impelled by curiosity, several of them ran up to his apartment. Manuel was afraid that Thérèse would come in. So he let them watch the birds and be amused by their coloured beaks and antics and odd cries. He let them chatter and look, familiarize themselves with the place.

By the time Thérèse came at one-thirty, he had won from the girls a promise that they would come and see him the next day at noon as soon as school was over.

At the appointed hour they arrived to watch the birds, four little girls of all sizes – one with long blonde hair, another with curls, the third plump and languid and the fourth slender and shy, with big eyes.

As they stood there watching the birds, Manuel became more and more nervous and excited. He said, 'Excuse me, I have to go and pee.'

He left the door of the toilet open so they could see him. Only one of them, the shy one, turned her face and fixed her eyes on him. Manuel had his back to the girls but he looked over his shoulder to see if they were watching him. When he noticed the shy girl, with her enormous eyes, she glanced away. Manuel was obliged to button himself up. He wanted to have his pleasure cautiously. That was enough for today.

Having seen the big eyes upon him set him dreaming for the rest of the day, offering his restless penis to the mirror, shaking it like a candy or a fruit or a gift.

Manuel was well aware that he was highly endowed by nature in the matter of size. If it was true that his penis wilted as soon as he came close to a woman, as soon as he lay at a woman's side, if it was true that it failed him whenever he wanted to give Thérèse what she wanted, it was equally true that if a woman looked at him, it would grow to enormous

proportion and behave in the most vivacious way. It was then that he was at his best.

During the hours when the girls were shut in their classrooms he would frequent the *pissoirs* of Paris, of which there were so many – the little round kiosks, the labyrinths without doors, out of which would always come men boldly buttoning themselves while staring straight into the face of a very elegant woman, a perfumed and chic woman, who would not be immediately aware that the man was coming out of a *pissoir* and who would then drop her eyes. This was one of Manuel's greatest delights.

He would also stand there against the urinal and look up at the houses above his head, where often there would be a woman leaning out of a window or standing on a balcony, and from up there they would see him holding his penis. He derived no pleasure from being stared at by men or else this would have been paradise for him, for all men knew the trick of pissing away quietly while looking at their neighbor performing the same operation. And young boys would come for no other reason but to see and perhaps help each other along in the act.

The day when the shy girl had looked at Manuel he was very happy. He thought that now it would be easier to satisfy himself fully if only he could control himself. What he feared was the impetuous desire that took hold of him to show himself no matter what the cost, and then all would be spoiled.

This was the moment for another visit, and the little girls were coming up the stairs. Manuel had donned a kimono, one that could quite easily slip open, by accident.

The birds were performing quite beautifully, bickering and kissing and quarrelling. Manuel stood behind the girls. Suddenly his kimono opened, and when he found himself touching long blonde hair, he lost his head. Instead of wrapping his kimono, he opened it wider, and as the girls turned they all saw him standing there in a trance, his big penis erect, pointing at them. They all took fright, like little birds, and ran away.

The Sociality of Birds: Reflections on Ontological Edge Effects

Anna Tsing

On the island of Waigeo, off the coast of West Papua, Indonesia, I've been interacting with a community currently fascinated by birds. Birds, people figure, might be the path to the future: they might attract international tourists who could fund village enterprises. And yet relationships between people and birds seem to me filled with ambivalence. Only the pagans of the past, local residents assured me, had special relations with birds and other animals. Today everyone is a Christian, and the terms of Christianity, they told me, require a disavowal of connections with other beings. This seemed to me a puzzle worth attention.[1]

1 This essay—an early missive from a continuing project—reports on material gathered in December 2017. The fieldwork also included Salmon Weyei, at the time a local representative of Flora and Fauna International, and anthropologist Hatib Abdul Kadir of Universitas Brawijaya. Each made this research possible. I am grateful to them, my ornithology colleagues (who taught me all the science here concerning birds), and the local people who facilitated the research (and taught me everything else here concerning birds). Nils Bubandt of Aarhus University got me started in Raja Ampat and shared invaluable insights. The research was supported by the Danish National Research Foundation as part of a Niels Bohr Professorship and the Aarhus University Research on the Anthropocene project it supported (anthropocene.au.dk). An earlier version of this essay was presented in spring 2018 as the closing lecture for the exhibition *Disappearing Legacies: The World as Forest*, curated by Anna-Sophie Springer & Etienne Turpin at the Zoological Museum of the Center for Natural History, University of Hamburg. The text reproduced here is also published in the book *KIN: Thinking with Deborah Bird Rose*, edited by Thom van Dooren & Matthew Chrulew (Durham: Duke University Press, forthcoming in 2022)—a collection edited in honor of the late ethnographer and environmental philosopher.

Given this disavowal, why do so many men notice birds, and with such precision? Why are Waigeo men such good field guides for international bird-watchers? Earlier anthropologies of bird-watching, including in Papua, have stressed the cosmological gulfs dividing Indigenous residents and Euro-American experts.[2] How is it, then, that they can talk to each other at all?

To answer this question requires bringing the sociality of birds into the conversation. In doing so I draw on the pioneering work of Deborah Bird Rose. Rose changed how practitioners get to do anthropology. She urged ethnographers into multispecies *attention*.[3] She showed us how animals participate in the social and ethical lives of human beings and that human responsibilities and modes of empathy stretch beyond humans to include the social responses of other beings. Despite the challenge of even greater communicative gulfs, my questions cannot be limited to interactions between one kind of human and another kind of human. Varied kinds of birds respond to varied kinds of humans, and vice versa.[4] Indeed, including the birds might allow analysts to glimpse overlapping strategies for empathetic attunement, despite cosmological gulfs, not only between one bird and another but also between expert and vernacular and between Euro-American and Papuan. I do not deny the colonial heritage of European bird science, but I do not stop with

2 Paige West, *Conservation is Our Government Now* (Durham: Duke University Press, 2006).
3 Deborah Bird Rose, *Wild Dog Dreaming: Love and Extinction* (Charlottesville: University of Virginia Press, 2011).
4 Thom van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction* (New York: Columbia University Press, 2014).

its reaffirmation.[5] In dialogue with Rose, I follow call-and-response as it refuses to stop at the lip of ontological ravines.[6]

One of the most memorable sections, for me, of Rose's book *Reports from a Wild Country* is her exploration of Australian Aboriginal relations to the cattle brought by white settlers. On the one hand, Rose is clear about the colonizing role of cattle; cattle are "four legged soldiers in the army of conquest"[7]. Furthermore, the celebration of cattle in white Australia is a performance of Man's triumph over Nature. On the other hand, Aboriginal cattle handlers manage to do something surprising with cattle. "Cattle events, rather than performing triumph, actually perform uncertainty, and thus contribute to the ongoing life of the Year Zero as a manifold of possibilities [i.e., Aboriginal ways of understanding time and community, with their contrast to white progress narratives]".[8] In rodeos, cattle respond to both settler and Aboriginal cultural logics. Rather than stopping with ontological differences, Rose brings us into performance events that sponsor multiple forms of relation, human and not human. This practice inspired me to open the study of birds in Waigeo beyond the otherness of international bird-watchers, as established in anthropological literature. How might local residents and international bird-watchers each, respectively but also in dialogue, respond to birds—and birds to them?

5 For example, Henry A. McGhie, *Henry Dresser and Victorian Ornithology: Birds, Books and Business* (Oxford: Oxford University Press, 2017).
6 Deborah Bird Rose, *Reports from a Wild Country: Ethics of Decolonization* (Kensington: University of New South Wales Press, 2004).
7 Ibid., 86.
8 Ibid., 89.

To begin to answer this question, I enlisted the help of ornithologist Kristof Zyskowski of the Yale Peabody Museum and bird photographer Yulia Bereshpolova. They showed me birds I would otherwise never have seen or heard. Kristof's and Yulia's patience and ability to notice, in turn, allowed me a much richer conversation with local residents who also saw and heard these birds, although not always on the same terms. Between these various interlocutors, the birds started to come to life for me as interlocutors on their own. Let me begin again, then, with birds.

Red bird of paradise (*Paradisaea rubra*): At dusk, they gather at the lek, a great tree the birds have designated as the place for performance.[9] This is not the place they eat, nor a place to make nests; this is the place for dancing. The males are superb in their maroon mantles, as saturated with color as velvet, with short golden capes and emerald face masks. This evening no females show, and the males entertain each other, working out their dance steps. First they shiver, shaking their feathers and then opening their wings, which turn crimson and translucent in the slanting light. Then they "moonwalk," shifting forward but pushing back in a shuffle. If the day is

9 About names: No naming gets at the essence of a being; at best, it can gesture in a useful direction. In the ontological ecotones that form the subject of this chapter, naming is particularly fraught, and no choice covers enough territory. To make the chapter readable by ordinary English speakers, I privilege English common names here. I supplement those names with current Latin binomials to honor the ornithology and bird-watching community that forms part of my discussion here. In the summer of 2018, I worked with Waigeo men to put about seventy-five Ambel bird names in dialogue with international bird-watcher identifications; however, an accident of the US Postal Service seems to have deprived me of that material. Those names do not form part of this chapter as originally planned. I will have to redo that research.

overcast, local people tell us, they don't perform. Yes, says our ornithologist, a study has been done showing that the birds recognize those bright days in which their colors glow. Now three males have lined up along a diagonal branch. First they shiver and shimmy; then they moonwalk. They approach the synchrony of a Motown trio. For me, this is the lasting image, those three, moving together through their steps. In the morning, there are females, and the action is less coordination among males and more competition for females' attention. And yet—we pay too much attention to functional goals. The three males dancing in the evening light still haunts me as an image of masculine beauty and coordination.

Across much of Papua and New Guinea, men adorn themselves with feathers to take on the beauty of birds. Post-Enlightenment Europeans, in thrall to the imagined force of masculine rationality, forgot about male beauty; it takes a visit with Renaissance paintings of saints to remember the celebration of male bodies in Europe. But in New Guinea, masculine beauty is paramount. When I saw red birds of paradise, I thought I sensed why: the birds astonish and amaze. In some New Guinea villages, male dancers wear birds of paradise on their heads.[10] In some, dancers evoke birds, at the edge of becoming them.[11] In myths, birds become people, and people become birds.[12] Alas, none of this is true on the island of Waigeo, the home of red birds of paradise and the place I had gone to study people and birds.

10 Malcolm Kirk and Andrew Strathern, Man as Art in New Guinea (*San Francisco*: Chronicle Books, 1993).

11 Edward Schieffelin, *The Sorrow of the Lonely and the Burning of the Dancers* (London: Palgrave MacMillan, 2005).

12 West, *Conservation is Our Government Now*.

In the villages I visited, Christianity had plowed a great furrow separating the people who could change into birds and animals from the people of faith. The former are the "lost people," pagans now transformed into invisible cannibal witches. Christian conversion did not wipe out the pagan past, but it transformed what it means to be human so that animal transformations are signs only of malevolent, satanic powers. The beauty of birds exists across an unreachable divide. And yet: even in this echoing rift, there is an opening. Local men have not forgotten birds, since they encounter them every day in the forest. Most men know dozens of birds' sounds, characteristics, and habits. When ornithologists and bird-watchers showed up in the area to make their bird lists, locals were intrigued—and ready to become facilitators and guides.

This chapter explores the strange spaces of partial contact among birds, Waigeo islanders, and traveling bird-watchers. To understand these spaces, I've borrowed the ecological term *edge effect*, which refers to what happens in the boundary zone between habitats. My habitats here are world-making projects, the distinctive features of which some anthropologists call *ontological*.[13] At the edges of these world-making projects, contact can create unexpected effects. While we may not be able to transform ourselves into radically different others, we can learn about them from immersion in these edge effects. I'm interested in contacts among different kinds of human projects—as when missionaries and villagers together manage to call up cannibal witches. I'm also interested in the contacts

13 Martin Holbraad and Morten Axel Pedersen, *The Ontological Turn: An Anthropological Exposition* (Cambridge: Cambridge University Press, 2017).

between human world making and bird world making. To emphasize that element, I've divided what follows into three parts: birds watching humans, birds and humans watching each other, and humans watching birds. Designs for living together should take all three seriously.

Birds Watching Humans

Watching is a shorthand here by which I really mean "attending to works and lives." Birds pay lots of attention to human projects, although not necessarily in the ways we might first imagine. Perhaps the really important thing, for birds, is human infrastructure, the landscape-modification projects through which we make our living space, with major implications for all life. Many human infrastructures have been harmful for birds, as when pesticide-laced agriculture destroys their ability to hatch eggs.[14] Industrial infrastructures have been especially deadly, in part because investors do not stick around to see the results of their landscape interventions. Such infrastructures destroy not just individual birds but the very possibility of life. I think it's important, however, to distinguish industrial projects from all human existence. Thus, I begin more gently with the possibilities of humans, from birds' perspectives, by situating birds in the small villages and gardens beside Mayalibit Bay, Waigeo.

Radjah shelducks (*Radjah radjah*) are big black-and-white ducks often seen waddling around in pairs or small

14 Rachel Carson, *Silent Spring* (New York: Houghton Mifflin, 1962).

groups; they forage for mollusks, algae, insects, and sedges. I started this project because, on a previous research trip to Waigeo, I was surprised to see Radjah shelducks walking confidently about a village, vocalizing loudly to each other—and then again in another village. Why weren't people eating them, I wondered—or at least scaring them away? On this trip, they were in every village we visited, sometimes foraging together with village chickens and dogs. To answer my original question, however, I had to learn something about the meaning of *village*. It turns out that most of the villages of Mayalibit Bay are very recent enactments of government and missionary dreams. These are not spaces for pursuing livelihoods but rather for being civilized, worshipping God, and receiving government development aid. Not eating the local ducks is part of a new way of being human, which does not depend much on local resources. This is a story worth telling for understanding the relation between local people and birds. But, first, two more things about ducks.

First, village children enjoy feeding Radjah shelducks. Children sometimes offer the ducks the leftover rice from meals. The birds learn to haunt human living places. Second, Radjah shelducks cannot take commercial logging. The watershed around our village was logged by an Ambonese company between 2002 and 2008. A huge swath around the village is still essentially deforested, although an aggressive species of weedy vine covers everything in green. Village people explained that the ducks were gone until the past few years; without trees, they abandoned the village. This is probably because the ducks nest in trees near where they forage. Kill the trees, lose the ducks.

All this matters for thinking about the concept of village. Until the 1950s, one elder explained, this village hardly existed on the bay shore, where it is now. Most people lived inland, in groups attuned to their sago orchards and vegetable gardens. Sago was the staple, and it was eaten along with garden foods such as taro, sweet potatoes, sugarcane, bananas, papayas, and green vegetables, as well as hunted meat, avian and otherwise. Freshwater fish and shrimp were an important part of the diet, but foods from the bay were less convenient. Historically, the bay was a dangerous place, full of slaving and fighting vessels. He mimed how people approached the shore—looking right and left and creeping carefully—on those occasions they dared to search for the bay's resources. He was born in 1968 in the shore village, but his father was born in the interior. As a child, he recalls, he could not ignore a great pile of human bones, left from the wars, near the shore. Only with the coming of Christianity, he says, were the people pulled out of the forest to the bay-shore village sites.

But even this did not last long. In the 1970s, as part of New Order Indonesia's development plan for rural areas, villages were asked to consolidate to form supervillages where the government could control the populace and locate schools. People chafed at the consolidation, which left them far from their sago orchards and vegetable gardens, and in 2001 they mobilized to move back to their previous shore-edge places. The New Order had ended, and the new government was open to decentralization. By then, their old coastal village had become a forest, the elder recalled. Following coastal fashion in this region, they built houses right into the water, on high stilts so the tide ran underneath. But this was not the current

government model of civilization, and by 2004 they had conceded the necessity to move away from the shore and to build flat on the ground with cement platforms and metal roofs. This planned-looking community is the development style to which "villages" are asked to aspire. (Meanwhile, old ironwood posts, set out in the tidal mud in front of the village, have become nesting sites for singing starlings [*Aplonis cantoroides*], who line the cavities made for crossbars with fresh insecticidal leaves to protect their eggs. The nesting starlings are the first sight as a visitor enters into the village from the bay.) In 2008 the logging company built a church as payment for the watershed's forest. In 2015 a cement seawall was built to keep back the tide and transform the village's shoreline from mud into dry ground. Now this is a model village: neat, modern, and well ordered. It was one of two areas chosen by Flora and Fauna International, for example, to receive aid in developing ecotourism. It is hardly a scene of "traditional culture."

Some people, the elder recalled, did not convert and move to the coast. They became the orang Gi, "Gi people," the "lost people." They became invisible (*gaib*); they became witches (swanggi). Gi can turn into birds and animals, but they are also cannibals and sorcerers. That kind of power is not available to modern people on the coast, who are churchgoing men and women of faith. Even though the church front is painted with enormous men with wings (the Javanese finisher copied these angels from a pattern book, people said), there is no tie between humans and birds, even in stories, they told me. The only exception my interlocutor could think of was the possibility of reading the flights of brown-headed crows (*Corvus fuscicapillus*). If a crow flies from the west and gives a special

call, it means someone in the family has died or, alternatively, that someone unexpected and unwanted will come. Of the animal relations once possible, there has been a bifurcation into prophecy—legitimate and respected—and satanic force. The latter is identified with the lost people, who retain the animal relations of the region's pre-Christian heritage. Today's village dancing and drumming (with no feathers involved) were learned from Ambonese Christian missionaries and schoolteachers.

Villagers are subsidized by a variety of government handouts, including rice supplies from the "Rice for the Poor" program. Rice handouts supply most families with a staple food for two to three months, after which cash incomes become necessary to keep the family eating rice, which is imported from western Indonesia. While older people still like sago, the elder explained, the children cry for rice. Thus, everyone scrambles to pick up a little cash here and there, from working on construction projects or selling betel in the regency capital to, in everyone's dreams, opening a homestay for bird-watchers. While the village does not yet have successful facilities, it's on everyone's minds.

Villages, then, are government and missionary infrastructures—with good results for a few birds, such as the starlings who lay their eggs in abandoned posts and the ducks that wander around the village collecting scraps. Those birds who do not thrive in the midst of such infrastructures are missing; they do not participate in this contact zone. They should not be forgotten. Still, it's worth paying homage to those who have found some use for human things. For them, new affordances are gained as infrastructure is put to new uses. In villages at

the edge of mangrove swamps, government-subsidized piers form landing places for migrating sandpipers, stints, and sand plovers, who rest on the wooden surface between food-gathering expeditions in the mud. Without the pier, they might not visit this place. Human things are not useful just for humans.

In gardens, the shared use of human landscape modification is even more evident. As Rose's approach allows us to see, these are storied-places for birds as well as humans, emerging out of histories of interaction and meaning making. They are places of significance and attachment, as they are for humans, even if each of us comes to know and inhabit them differently. As Thom van Dooren and Rose explain, "places are co-constituted in processes of overlapping and entangled 'storying' in which different participants may have very different ideas about where we have come from and where we are going. What would it mean, in a multispecies context, to negotiate 'across and among difference the implacable spatial fact of shared turf'. . . ?[15] What would it mean to really share a place?"[16]

Most gardens here are inland, several hours' hike from the bayside villages, and because of the history I've just described, they tend to be visited too rarely for careful tending. The gardens I knew were overgrown and weedy, blending in and out of the forest. What a haven for birds! The edge of the gardens is a noisy place, full of bird vocalization. In contrast, walking through the surrounding forest was often quiet; birds were less

15 Doreen Massey, "Geographies of Responsibility." *Geografiska Annaler: Series B (Human Geography)* 86.1 (2004): 3.

16 Thom van Dooren and Deborah Bird Rose, "Storied-Places in a Multispecies City," *Humanimalia* 3 (2012): 1–27.

concentrated there. Birds cluster in the trees at the edges of gardens, making use of both forest and garden habitats. Brahminy kites (*Haliastur indus*) find hunting viewpoints on high trees overlooking the bright gap. Glossy-mantled manucodes (*Manucodia ater*) display their dipping flights over the open space. These birds don't care much about the garden as a garden; it's just a gap in the forest. But other birds find the garden a good place to eat, and this might introduce the conflicting perspectives—humans versus birds—that I am calling "looking both ways."

Looking Both Ways

Eclectus parrots (*Eclectus roratus*) are the most sexually dimorphic of all parrots; eclectus males are a brilliant green, while the females are scarlet red with blue and purple. Once, Western birders thought them to be different species. Now, however, everyone seemed to know their sexual morphs, including all my companions from Waigeo, some of whom also knew the English name *eclectus*. They were so common around gardens that my birder companions stopped caring when they flew overhead or perched nearby. Indeed, they are one of the worst garden pests in the area, along with wild boar. Flying foxes, which also haunt gardens, eat only ripe fruits; eclectus parrots eat everything. Sulphur-crested cockatoos (*Cacatua galerita*) perch on high trees around gardens, but they specialize in forest—not garden—fruits. In contrast, eclectus parrots are there to eat the food raised by gardeners, and especially bananas and papayas, green or ripe.

Our host had put a nylon net around a big bunch of ripening bananas, still on the plant, to protect it from the birds, and a bright scarlet female had caught herself in its mesh. She was screaming fiercely when we moved into the shelters by the garden, and eventually our party asked that she be released. Our host did it in our honor, and Yulia gently rinsed her plumage from the feces with which she had soiled herself during her captivity. But our host grumbled. "If it was up to me," he said, "I would sentence that bird to death." As long as the bird was there screaming, other eclectus parrots stayed away, he said, so, held fast by the nylon net, she protected his field. "I would give that bird the punishment [setrap] of standing there until death," he added. Setrap, he explained, is the punishment schoolteachers give their pupils for disobedience, handed down from Dutch colonial discipline: you might be ordered to stand on one foot or stare at the sun for an hour. The violence brings orderly, civilized behavior, and the bird, he thought, deserved it. With other garden birds, however, our host was surprisingly tolerant. Eclectus seemed to him out of bounds.

Eclectus parrots get in the way of people; other birds work hard to stay *out* of the way, and for them, too, the clash of modes of watching is particularly evident.

The Waigeo brush-turkey (*Aepypodius bruijnii*) is Waigeo's most internationally famous bird, at this moment, but it is described by villagers with the banal name of *forest chicken* (*ayam hutan*); as a result, most foreign birders conclude that villagers don't know a thing about the species. (Indonesian birders, more attuned to the excitement of international guests, call the bird *maleo Waigeo*.) The bird is famous because international confirmation is new. A bird specialist from

Belgium, Iwein Mauro, reported its existence based on field observations in 2002.[17] He found the mounds built by males to incubate eggs in the stunted cloud forest that grows at altitudes over 620 meters, that is, on the higher mountains south and east of Mayalibit Bay. This opened a bit of a mystery for him. Historical specimens were found in the lowlands, but now, it seemed, the birds' populations were limited to a few high places. After some consideration, however, he dismissed those lowland birds, which local people knew, as "vagrants." Meanwhile, his reports spread the dogma of local ignorance; based on the local name, he figured that locals mistook the bird for an ordinary village fowl.

The villagers I spoke to had different ideas. Although everyone admitted that the bird was hard to find today except in remote high places, men said that not so long ago, in the lifetimes of their fathers, the bird had been quite common in the lowlands. They thought it had moved to high country to get out of the way of increased human activity—especially after the consolidation of human settlements along the coast in the middle of the twentieth century. Before that, it had been a regular part of hunters' diets, but that was when people were still scattered in gardens inland, or so my informants said.

One of the previous lowland specimens Mauro reports involved the head and the bones left from a hunters' meal.[18]

17 Iwein Mauro, "Field Discovery, Mound Characteristics, Bare Parts, Vocalisations and Behaviour of Bruijn's Brush-Turkey (*Aepypodius bruijnii*)," *Emu* 105.4 (2004): 273–81; Iwein Mauro, "Bruijn's Brush-turkey *Aepypodius bruijni*: Field Discovery, Monitoring, and Conservation of an Enigma," in S. Davies, ed., *Katanning National Malleefowl Forum* (2007), 107–19; malleefowlvictoria.org.au/2007Forum/Forum Proceedings.pdf.

18 Mauro, "Bruijn's Brush-turkey *Aepypodius bruijni*," 108.

That part of the local story finds agreement on both sides. As to the historical ecology of the species, it seems important to note that Mauro invokes a strange timeline, which appears sensible only because of the political cosmology that produced it. Mauro imagines a past in which "nature" was untouched by human effects; meanwhile, he yokes this past to a future in which villagers are likely to destroy everything immediately. Thus, the birds' distribution in the past has nothing to do with human histories. In contrast, the future is human: Mauro's first conservation suggestion is to stop local villagers from destroying the birds. (While he admits that industrial mining and logging are key problems, he never suggests that corporations be contained.) He wants to outlaw hunting (even pig hunting—and pigs are the birds' worst egg predators); only trained scientists should have access to the areas where one might find birds.[19] Nature comes to scientists pure, and yet it arrives immediately vulnerable to native depredation. This is an exotic mythology in which scientists inherit the colonial burden of saving the land from its people.

To balance out the strangeness of this cosmology, it seems sensible to attend to the stories of local hunters, whether mythical or otherwise. For this, it doesn't matter where the core nesting areas of brush-turkeys lay historically. Let's say lowland birds are vagrants. It seems likely that they have sometimes, perhaps sporadically, been frequent visitors. It also seems likely that they have paid attention to humans in a different way than the smaller, less inviting (as food) dusky megapodes (*Megapodius freycinet*), which merely melt into the

19 Ibid., 114.

bushes when humans make an appearance, returning later. The bigger, more delicious brush-turkeys, it seems, got out of the way more firmly, finding refuge in high places. Brush-turkeys no longer visit the lowlands because there are too many people there. Ontological edge effects: brush-turkeys, too, may be capable of skilled practice on the borders between world-making projects.

Mauro's recommendations for restricting villagers' access to their highland forests resonate with common parlance among international bird-watchers, who are worried about the ways local people treat birds.[20] This reaction allows me to take some distance from bird-watchers. Surely capitalists have developed more powerful ways to kill birds, mostly involving toxicity and habitat destruction. The strangeness of bird-watchers' focus on local ignorance and destruction, then, is a reminder that bird-watching as a world-making project is as parochial and exotic as that of Waigeo islanders using colonial punishments on parrots. When every cosmology is strange, we might notice edge effects—a way into others' lifeways that does not erase the effect of observation itself.

In this section of the chapter, I've tried to show the distinctiveness of world-making projects—of birds, bird-watchers, and Waigeo island residents. This is necessary but not sufficient to understand the ontological edge effects I've promised. Let me turn to the most taken-for-granted part of bird-human relations (to Western readers): bird-watching. I

20 To his credit, Mauro states that human predation is not currently a major threat. Many bird-watchers, in contrast, jump to the assumption that local hunting is the first concern for any bird, even where major infrastructural disturbances seem likely to be more deadly. See Mauro, "Bruijn's Brush-turkey *Aepypodius bruijni*," 113.

hope I've already made it richer by suggesting bird-watching's interplay with many projects, human and not human. Now I'll identify some dynamics at play in the intersections across those projects.

Humans Watching Birds

What is bird-watching all about? One element is finding empathetic attunement with another being. This is a matter of working through edge effects, that is, tentative sites of touching. In this section I'll focus on three kinds of edge effects: copying, negotiating differences, and finding overlapping curiosities. Each takes me a little further into thinking through how varied kinds of humans and birds do and do not create common worlds together. Let me clarify: I'm not longing for the unification of all worlds. But I also refuse to assume that all these worlds are autonomous and nonoverlapping. We need to see where and how touching occurs, that is, what happens in edges.

Copying: birds and humans each copy the other. This is really clear among the pet sulphur-crested cockatoos (*Cacatua galerita*) that people keep in Waigeo's regency capital. Cockatoos were chained to perches in front of people's houses. One woman I met had nursed hers from the bedraggled state she bought it in to a healthy shine by feeding it a human baby food of milk and rice porridge; the bird, she said, would not eat her domestic fruit. But it could call motorcycle taxis (ojek) by crying, "Ojek," and wake the children for school by calling, "Sekolah" (school). She copied its high nasal voice, and, in

turn, its voice copied her copy. Copying each other's copies: here is one edge effect.

Mimicry is not limited to the relationship of pets and owners. All the Waigeo men with whom we traveled used bird sounds to call birds. Kristof used his recorder in the same way: he would record a birdsong (or, if necessary, call it up from his library) and play it back to see if the bird would come to investigate. And the birds, too, copied. The first reaction to hearing a version of their song was often to sing it out again. One of the most impressive was the hooded butcherbird (*Cracticus cassicus*), which has a complex song and mimics the sounds of other birds around it. As we walked through a forest grove thick with butcherbirds, the songs kept morphing, drawing new elements into the melody. Like mockingbirds, butcherbirds are alert to sounds around them, copying and reweaving. Copying is one kind of attunement. Just as biologist Scott Gilbert says, "We are all lichens," to highlight our symbiotic natures, when it comes to copying and reweaving, we are all butcherbirds.[21]

Negotiating differences: it's easy to accept new information as long as it fits easily into the framework we already know. But it's really hard to even notice something from outside one's own world-making project.

After some years of attention to contact zones and hybridities, anthropologists have become obsessed with just how difficult it is to get outside one's own world and with how people just reinterpret what they experience—however

21 Scott Gilbert, "A Symbiotic View of Life: We Have Never Been Individuals," *The Quarterly Review of Biology* 87.4 (2012): 325–41.

divergent—into their own frames.[22] This is especially true, my colleagues say, for scientists and conservationists.[23] I'm investigating edges because I think anthropologists have gone too far now in ignoring them, and yet the new scholarship is a helpful reminder: both disconnections and connections matter. Deborah Bird Rose motivates just this remembrance by attending to multiple ways of knowing and being while insisting on overlaps, dialogues, and cross-pollinations.[24] Paying attention to what happens at the edges of discrepant world-making projects requires noticing refusals to hear each other as well as unexpected forays into each other's worlds.

I thought about this problem a lot in my interactions with villagers, bird-watchers, and a tiny, bright bird, the yellow-capped pygmy parrot (*Micropsitta keiensis*). It was one of my most breathtaking glimpses of bird life. The tiny birds were clutching an arboreal termites' nest, near the lip of a hole near the bottom. At first I saw one, then two, then three. They glowed green, and the male had a red chest. They moved to a branch. He sat between two females exchanging overtures and glances back and forth, seemingly courting both. It felt intimate to see this, so near through my binoculars. Kristof checked his book, which said they are communal breeders who excavate in the termites' arboreal nest to lay their group's eggs.

22 Eduardo Viveiros de Castro, "Perspectival Anthropology and the Method of Controlled Equivocation," *Tipití: Journal of the Society for the Anthropology of Lowland South America* 2.1 (2004): 3–22.

23 For example, Mario Blaser, "The Threat of the Yrmo: The Political Ontology of a Sustainable Hunting Program," *American Anthropologist* 111.1 (2009): 10–20.

24 Deborah Bird Rose, "Val Plumwood's Philosophical Animism: Attentive Interactions in the Sentient World," *Environmental Humanities* 3.1 (2013): 103.

Kristof asked Pak Noh, the village man who was with us, to climb the tree to see if there were any eggs in the hole. There were not, and besides, Pak Noh claimed, the hole was not a nest. The birds were eating there, he said. But Kristof said that parrots only eat fruit; the hole was a nest. We were at an impasse. Later, looking at another source, I read that pygmy parrots are eaters of lichen and fungi, not fruit. (Some sources said the sexes look the same, which was not true for ours; not everything one reads is true.) But might termites' nests be a good source for fungi? I don't know and can't make a judgment. But, as an anthropologist, I was interested in the conflict. Pak Noh said that parrots and kingfishers do make nests in termite constructions, but not this parrot. Kristof said Pak Noh lacked the experience to know.

Where does certainty come from? Birders come to the field expecting to identify a known series of birds. Birders do not expect to see any birds that are not cataloged in their books, and they trust the book's knowledge. Having more experience with fungi, I expect many organisms to be unclassifiable by eye at the species level as well as sometimes to lack names or classifications at all. Birds are different. Kristof and Yulia thought the lizards and butterflies they photographed might be "new to science." But not birds. Because of the international birding community, this is well-trodden territory. At least for birders, the classification of birds and the general outline of their habits are considered well known and stable. Birders add information from local people but only where it fits known gaps in their already established knowledge base.

When Kristof and Yulia, who have been around the world watching birds, explained to me that everywhere they went,

local guides showed them birds, I found this a great mystery. Why would local people necessarily be interested in birds at all—and when they were, why would it be on close-enough terms to those of Western bird-watchers to allow communication? I don't know the answer for the world, but from working with villagers and bird-watchers in Mayalibit Bay, I have a few ideas about that place.

Consider the ambitious young villager I'll call Yosep. Yosep aspires to open a homestay for international bird-watchers, and he has already built a toilet and a gazebo in an auspicious place, close to the water so tourists won't need to hike. To augment his skills, Yosep—who knows no English at all—sat down with a booklet on Waigeo birds produced by a nongovernmental organization (NGO) and memorized eighty-two English bird names in one week. For me, who before this project knew almost no bird names, this seemed astounding. But without more training in English, Yosep was unable to say the names in a way that an English speaker might understand without a whole lot of work. Kristof and Yulia were annoyed by his attempts to say bird names in English. They were particularly disdainful of his attempt to pronounce *yellow-capped pygmy parrot*, which came out as a slurred single sound arranged around a two-syllable *cap-ped*. And yet—Yosep knew the sounds and habits of every single bird we heard calling while we walked together. His detailed knowledge of bird life in the forest will make him an ideal guide.

Two cultural legacies come together here. First, there is the strangeness of scientific ornithology, which is much influenced by the lay practice of bird-watching: as a result, and in contrast

to the science of fungi, for example, cryptic species and traits not picked up by human eyes and ears are not particularly important in discussion of birds across the lay-scholarly line. This makes it easier to find resonance between villagers and international birders. Both international birders and Waigeo villagers know birds through sounds and appearances.

Second, there is the strangeness of Mayalibit Bay village life, which is torn between the earnest adoption of an evangelical Christianity and the still-necessary practices of a forest and bay-edge livelihood. Village men see and hear birds every day, and they continue to attend to the details of bird lives. But they are cut off from bird worlds by Christian dogma, which demonizes human-animal boundary crossing. The vehemence with which villagers denied speaking to animals was impressive; it is this refusal that makes one civilized and, indeed, now, properly human. And yet the men *know* birds. In the midst of this tension, along come international bird-watchers and a potential source of new income. The eagerness with which village men embraced this possibility is not just about the money. They have skills and experiences that keep birds important—but difficult to fit into current cosmological practice. Yosep's eagerness to learn English names is exemplary here. In the gap between Christian faith and forest practice, local language is inadequate. English names and international bird-watching practices jump in as a promising alternative. Here, both refusing and grasping the framework of others gain traction—creating unexpected edge effects.

This is a difficult and risky road to navigate. Let me end this section with something gentler: finding overlapping curiosities. And one more bird story, for the Raja Ampat

pitohui (*Pitohui cerviniventris*). Kristof had wanted to see this endemic bird, which is special because, at least if it is like its relatives on the mainland, its feathers and skin are poisonous, discouraging predators. Because we had not encountered these birds in the villages of Mayalibit Bay, he asked Yakub, a local and self-trained bird guide who worked out of an ecotourist-oriented coastal village. Kristof told us the story of how the poison became known to Western science, itself a story of overlapping curiosities. A researcher studying Papuan birds of paradise netted a pitohui by mistake. As he tried to free the bird, it clipped him. Instinctively, he put his finger to his mouth—and his lips and tongue instantly lost feeling. He realized the bird had poisoned him. He asked the local people, who told him of course it was poisonous. Following a curiosity nourished in common space, he switched his dissertation research to study pitohui, documenting several kinds. Very few birds carry poisons. These birds eat a poisonous beetle, he found, and are able to transfer the beetle's poisons to their skins. Incubating eggs in the nest transfers enough of the poison to protect the eggs.

Yakub knew a lot about pitohui, and before long, he caught the bird's song. We stopped on the trail (a former logging road wide enough to offer good visibility), and because Yakub did not have it on his phone, Kristof played a library recording of the male's call. He put the speaker by the side of the road, and we stepped back, hoping the birds would come to the speaker. They did. Not just one male but several males gathered to find out about this interloper. We admired their burnished breasts, took photographs, and let them go about their business. Kristof offered Yakub a copy of his song recording.

Conventional wisdom has it that male pitohui come to a call to drive invaders from their territory. We attracted at least five, and if they were all on their own territories, those territories would have had to have a rather strange shape. It does not seem so far out of bounds to offer a simpler explanation: they were curious. Just as humans remake our skills for the socialities of different kinds of humans as well as birds, birds remake their skills for the socialities of humans. If we each—birds and humans—satisfied our curiosities a little that morning, it was because our respective skills were extended into the opportunities at the edges of others' worlds.

Some Final Thoughts

Research is always a series of edge effects across human and nonhuman world-making projects. As researchers, what we learn is what our research subjects allow us to notice through the edges we mutually create with each other. This is why it is important to keep observers in the stories we tell; otherwise, we build our prejudices into our research without realizing what we are doing. Watching pitohui together with a local self-trained professional geared toward foreign tourists and their pocketbooks on the side of a former logging road built to fund a regional government geared toward ecotourist "protection" of the very biodiversity that the logging kills is so full of contradictions I can hardly begin to unpack them. Clearly, however, the pitohuis' willingness to hang out in logged-over forest and come to bird-watchers' calls shapes the possibilities of interaction.

Yet pitohui responses to bird-watchers and logging roads are still an odd-looking element of analysis coming from the humanities and social sciences. Even social and cultural analysis that highlights the importance of other living beings continues to privilege human relations with other humans. We learn that there are varied ways people make sense of and live with other organisms. We learn that human-nonhuman relations form part of human systems of power and knowledge. We learn that other cosmologies challenge the tools of Western science. Too often, the active responses of other beings are not part of the analysis—even when the whole point is to move beyond the Enlightenment-sponsored nature-culture dichotomy. Indeed, social and cultural analysts have been wary of attention to the active practices of other organisms for fear of subsumption into hegemonic scientific logics. In contrast, I argue that allowing bird responses to human projects, as well as the other way around, into social and cultural analysis opens more avenues to consider how science and its alternatives variously shape bird-watching practices.

Making a sharp contrast between local, Indigenous, and vernacular, on the one hand, and expert, scientific, and colonial, on the other, has been an important move in questioning the hegemony of colonial science. Mary Pratt's *Imperial Eyes* (1992) pioneered scholarly attention to the ways that European natural history ignored Indigenous land rights and advanced colonial knowledge and power; a host of scholarly exposés of natural history followed.[25] Bird-watching has been closely tied to imperial expansion; this continues in contemporary

25 Mary Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London and New York: Routledge, 1992).

imperial conquest, as when ngos send their bird-watchers to the Iraq marshes to support the American occupation.[26] It is important to keep a critical eye on the dangerous alliances and imperial institutions that ornithologists and bird-watchers build.[27] At the same time, merely reiterating the contrasts between local and scientific, or vernacular and expert, is not enough. Instead, I have argued that we need attention to edge effects, where touching and overlap occur even across varied projects of world making, whether those of Waigeo residents, foreign bird-watchers, or birds themselves.

To bring nonhuman responses into social and cultural analysis also opens possibilities for collaboration between anthropologists and natural scientists in moving beyond human exceptionalism—even as we continue the work of decolonizing public knowledge. I do not believe this means giving up attention to violent histories of dispossession and exclusion, but I have devoted this essay, instead, to the spirit of possibility. In the events described here, some Waigeo villagers, Western bird-watchers, a local ngo representative, and two anthropologists, one Indonesian and one not, got a little closer to appreciating more-than-human sociality, which we will need to build better alliances together.

26 For example, Bridget Guarasci, "Birding Under Fire: The Violence of Environment in Iraq," n.d. Unpublished manuscript.

27 Michael Lewis, *Inventing Global Ecology: Tracking the Biodiversity Ideal in India, 1947–1997* (Athens: Ohio University Press, 2004).

Nina Katchadourian: The Birds of New Zealand

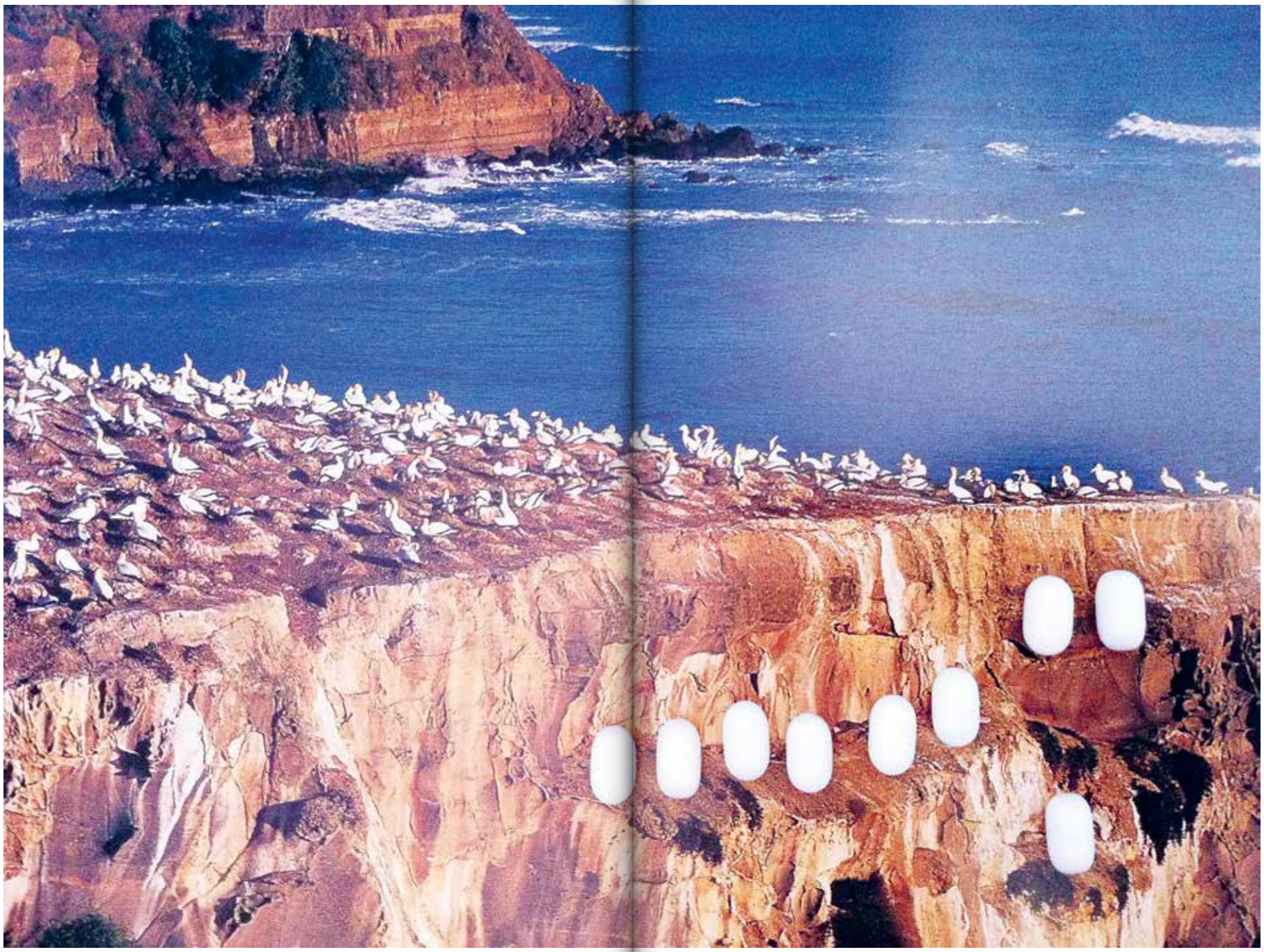
In and on their notorious tenth plateau, "Becoming-Intense, Becoming-Animal, Becoming Imperceptible …" Gilles Deleuze and Félix Guattari ask the interminable question: "How can we conceive of a peopling, a propagation, a becoming that is without filiation or hereditary production?" They insist: "It is quite simple; everybody knows it, but it is only discussed in secret." The secret follows: "Propagation by epidemic, by contagion, has nothing to do with filiation by heredity. […] The difference is that contagion, epidemic, involves terms that are entirely heterogeneous: for example, a human being, an animal, and a bacterium, a virus, a molecule, a microorganism. […] These combinations are neither genetic or structural; they are interkingdoms, unnatural participations. That is the only way Nature operates—against itself."[1]

For Nina Katchadourian, working against the constraint of flight itself—and the attendant paradox of being constrained to one's own seat in flight mode—is an intrinsic part of her artistic process in her series *Seat Assignment,* wherein the typically inhospitable cramped quarters of an airline seat serve as a studio. Using found objects and materials commonplace to air travel, Katchadourian transforms airline magazines, packets of sugar, or barf bags—inter alia—to create images, music videos, or video

1 Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia,* trans. Brian Massumi (Minnesota: University of Minnesota Press, 1987), 241.

animations. Her work invites the viewer to examine the mundane with renewed curiosity as she works within specific constraints—only in flight, only with her camera phone, and only using objects found on the plane—to produce thousands of images. In a curious role-reversal, Katchadourian's *Birds of New Zealand* are thus created in flight, decorating and re-imagining captured and still portraits of birds from travel guides, and thereby adding a vitality and playfulness to these static, touristic images. Cashews, sunflower seeds, tic tacs, and earplugs embellish found ornithological portraits, creating makeshift plumage out of innocuous objects and mimicking the markings and feathers of actual species. Unnatural participations? Perhaps, but so much the better to have left the terminal of representation behind and embark on another line altogether.

Introduction by the co-editors; images on pages 166–80 are from Nina Katchadourian's series *Birds of New Zealand,* 2011; reproduced courtesy of the artist, Catharine Clark Gallery, and Pace Gallery.



The Voice of a Bird, Or, The Problem of Strangeness

by Yoko Tawada
translated from German by Anna-Sophie Springer

When one speaks in a foreign country the voice hovers strangely isolated and naked in the air. It is as if one wasn't spitting out words but birds.

Sometimes, a bird's chirping occurs that deeply penetrates one's sense of hearing and yet remains unfathomable. Then, one looks for the songbird as if wanting proof that there really has been a voice. But one doesn't see anything except for the thickly grown leaves. If one is lucky, one sees a shadow of the creature flying off.

A strange feeling while speaking for foreign ears: the sentences draw clear contours—something which, when speaking in the mother tongue, often isn't the case—the content appears concretely and figuratively, except the voice doesn't find its place in the air.

It is known that the various bird species chirp very differently, even though the articulation organs of almost all of them are similar. The differences in their song have no biological or climatic reasons. It is similar for humans. Humans do not only speak different languages but they also have diverse voices. In Sweden, for example, voices are quieter than in

Germany; and in East Asia, voices are often higher than in Europe. In California, I heard how the voice came from the crest, while in Styria, speaking originated between the belly and the collarbone. There are many more differences and interesting details. What do you do when you are surrounded by foreign voices? Some people try, consciously or unconsciously, to adapt their voice to the new surroundings, correcting pitch and volume, imitating the new language's rhythm, and paying attention to inhalation and exhalation. Every consonant, every vowel, and perhaps even every comma enters through the body's cells and transforms the speaking person. That may be one of the reasons why emigrés of the second or third generation have different faces than those who have remained in the places of their ancestors.

Instead of attempting to assimilate, one can also enjoy the strange nudity of one's own voice. The voice's function is oftentimes to bind a person to society. With this aim the voice has to become invisible, functioning like a chemical adhesive. In contrast, a foreign voice remains intransparent and disturbs the melody of the collective conversation, opening a gap that can be embarrassing or refreshing.

When speaking here of the "foreign voice" I am not assuming that someone who only speaks their mother tongue conserves their original voice. For, we do not keep the voice with which we were born. The tension between the integration and strangeness of the voice is an inevitable part of socialization. Julia Kristeva makes an observation with regards to the Chinese language that is particularly interesting in this context:

> Sound variations and intonations are the first means for differentiating between sounds that children grasp and imitate; while children who do not grow up in a linguistic milieu that operates with tonalities, tend to forget them very quickly, children who do need to pay attention to the tonalities of the spoken words and remember them very precisely; based on this, small children in China who are being introduced into the social codex of language manage to differentiate very quickly between sounds as fundamental features of language. And, since at this age the dependency on the body of the mother tends to be very strong, the emotional-physical imprinting of the mother models the tonality of the sonic expression, which she passes on unchanged. It becomes the latent but active base of communication as soon as the secondary grammatical system has been grasped, which now exerts a stronger socializing function since it guarantees the transmission of a message (that now is more than sonic impulses) to another (who is no longer the mother).[1]

In a language in which the pitch is of relevance grammatically, spoken language generates a relationship between the phases before and after entering into communicative language. The rhythm of language, which survives in the foreign language by distorting it—one also calls this the "accent"—contains a memory of the body of the mother tongue. In reverse, a language sometimes gains a kind of physicality when it is spoken

1 Julia Kristeva, *Die Chinesin* (Frankfurt: Suhrkamp Verlag, 1982), 27; this quote, as well as all the others that follow, is translated by the translator unless otherwise noted.

by a foreign tongue. Before I came to Hamburg, my voice had no meaning for me. I never experienced it as vibration, waves, trembling nudity, or flapping birds in the air. I was speaking as inconspicuously as one usually speaks in one's mother tongue, and my language was absorbed by my interlocutors as solid statements. I never had the feeling that my words came out of my body. My handwriting, on the other hand, meant a lot to me. In letters, diaries, or school essays, I traveled to unknown landscapes, and my handwriting was my travel guide. Nothing destroyed my children's cursive, which I carefully entered into the paper with a soft pencil, and my voice was swallowed by the harmony of my community.

*

I once watched a video recording of an artist standing on his head and repeating a word so many times until he could no longer speak. If I remember correctly, the word which he diligently pronounced was "lisping." Over the course of time, the tongue became heavier and heavier as if it had to move against gravity. The physical effort of speaking gave the voice a different quality. The voice turned into an animal, the lips became ever more uncertain, and the teeth were nothing but a bother. In order to speak, one has to maintain control over all the organs. That man lost control and the individual body parts began to assert their own will.

In this sense, I understand speaking a foreign language while observing the physical effort it takes as an artistic experiment. Of course, it's usually not intended as an experiment when someone lives in/with a foreign language. For those who live abroad, it is much rather a necessity.

Nevertheless, I do ask myself whether an experiment or a game that isn't born from boredom but from necessity isn't the much more interesting one. One should push the redundant nonsense exactly to that point where something existential is at stake.

Whoever engages in an experiment out of uncertainty stands on a paper bridge. If one can only speak more slowly, stutteringly, or whilst making unnecessary breaks between words, someone with a uniformed brain will instantly spit out improving propositions, psychological advice, pedagogic offers, or humanist sympathy. Since there are always people around who want to exert control, domesticate, attack, or silence our language, one actually must not show any weakness when speaking. Aired voices make their speakers vulnerable. One could defend oneself, for instance, by saying nothing. But keeping silent is prohibited in Germany. What then? This imperative can lead to experimental speech. For instance, one can consciously utilize the ruptures of embarrassment that clumsily cut apart a sentence as a rhythmic element; one can utilize a monotonous linguistic melody or the obsessive repetition of a word or a phrase as a means to give the text a ritual character.

Stimmen, ins Grün	*Voices*, scratched into
der Wasserfläche geritzt.	the water surface's green.
Wenn der Eisvogel taucht,	When the kingfisher dives,
sirrt die Sekunde:	the second saws:[2]

2 Paul Celan, "Sprachgitter" [1959], translated by Pierre Joris as "Speechgrille" in Paul Celan, *Memory Rose Into Threshold Speech: The Collected Earlier Poetry, Bilingual Edition*, trans. Pierre Joris (New York: Farras, Straus, Giroux, 2020), 164–65.

These first lines from Paul Celan's collection of poems, *Sprachgitter*, have been sitting in my head for a long time. The voices that are scratched like writing into a water's surface appear to be nearly inaudible. Only the dives of the kingfisher produce a kind of noise, a sawing, upon which one notices the colon. In *Sprachgitter*, most of the stanzas begin with the word "Stimmen" [voices]. Often a colon follows, as if to announce: now comes the content of the statement the voice has uttered; now comes the translation of the incomprehensible voices into human language. The colon evokes the expectation of the content's mediation through an explanation or a translation. However, the area in front of the colon, that of the voices, remains free of content. I imagine a poem that consists only of voices, not needing any content.

*

There is an interesting phrase in German: "Bei dem piept es." [Literally, "He's got a chirping," but meaning something like "He must be crazy."] In this case, a voice—probably that of a bird—takes over and influences the thoughts of the person with the "chirp." The bird's voice also plays a role in German Romance literature. In E.T.A. Hoffmann's tale "The Strange Child," for instance, forest birds compete with mechanical musical dolls. This competition starts in the nursery. While the children are playing with their new mechanical dolls they hear the voices of the siskin, finch, and nightingale singing in the nearby forest. They wish to venture out into the forest. But since they don't want to leave their dolls behind they take them along into the forest. In the tale's fairy kingdom, the birds are considered special creatures because their song

gives life to everything that exists in the palace, the garden, and the forest.

Bird language is simultaneously bird *song*, bringing together language and music. It's the language of flight. Humans actually only know flight from their capacity for dreaming. In that sense, one can also call the language of the birds the language of the dreamers. The children in Hoffmann's tale comprehend the language of the avian voices for the first time when they are themselves flying. The mimetic movement of flight enables them to learn the language of those who fly. But there is also a demonic character that wants to destroy the language of the birds and the forest. This character takes on various shapes throughout the tale and first appears as the private tutor Master Ink. He claims to be an important representative of the sciences and calls everything that isn't valued by science "Zeug" [stuff]. For him, the forest is cluttered with the worst kind of stuff. He especially can't stand that there is no "ordentlicher Steg und Weg" [orderly steps and paths] and that the birds can't speak a single "sensible word." He prefers a "reasonable garden." For instance, he likes potted flowers because their scents save the expense for incense. The tiny flowers in the forest on the other hand are useless in his eyes and should be eradicated instantly. His aggression intensifies when Christlieb points out the "eyes" of the flowers; as the eyes of the flowers are looking at the humans, Master Ink gets so angry that he pulls out the flowers together with their roots. Christlieb considers flowers neither as useful objects nor as study material. Much rather, they are themselves observers looking at the humans with their own eyes. But the scientist does not want to be observed by nature. An object

that returns the gaze stirs anger and hatred in him. He has to eradicate and destroy the eyes of the flowers in order to reassure himself of his position as nature's ruler. It's a similar case regarding the bird. When a siskin flutters past the Master's nose to land on a twig and starts singing, the song rings in his ears like mockery. This angers him so much that he throws a rock at the bird and kills it. The scientist does not want to hear any commentary from nature. While the children are able to perceive all of nature's sounds as language, Master Ink calls them stuff. "What crazy, ridiculous stuff are you uttering? Who put this nonsense in your mind? That's just what we needed—that forests and creeks are bold enough to interfere into reasonable conversations—and the song of the birds is worthless, too."[3]

*

The tale of the "Nightingale" by Hans Christian Andersen also features a singing bird that competes with a mechanical bird.[4] While in Hoffmann's tale the language of the mechanical dolls is as important as that of the birds, Andersen's story carries an ecological, moral concept: the emperor who replaces the wonderful real bird with an efficient mechanical bird falls ill and regrets his mistake. The tale is based on the old belief in the healing powers of the nightingale's voice. Because of its catchy morality and sentimental love of nature this story became much more known than the one by Hoffmann.

3 E.T.A. Hoffmann, *Die Serapionsbrüder I* (Berlin/Weimar: Aufbau Verlag, 1994), 606. For an earlier translation: Ernst Theodor Wilhelm Hoffmann, *The Serapion Brethren* (in two volumes), trans. Alexander Ewing (London: G. Bell & Sons, 1886–92).

4 The author thanks Andrea Ehlert for this reference.

In Ludwig Tieck's tale "Der blonde Eckbert" bird language is also very important. The female protagonist leaves her abusive foster parents as a young girl. After a long hike through ominous forests and wild rocky landscapes, she encounters an old woman, who lives alone in an uninhabited region. She owns a bird that sings:

Waldeinsamkeit,	Forest solitude
Die mich erfreut,	That delights me
So morgen wie heut	Tomorrow as much as today
In ew'ger Zeit,	In eternity,
Oh wie mich freut	Oh delightful
Waldeinsamkeit	Forest solitude.[5]

The girl begins to live with the old woman and works for her. One day, the old woman discloses to the girl the secret of the bird. Everyday it lays an egg containing either a pearl or a gemstone. Every day, the girl ought to take the egg from the cage and put it into a vessel. The beauty of the jewels, which remain unnoticed and unchanged, will later be compared to the girl's beauty because she grows up without being seen by any other humans. The girl knows no other interlocutors than the old woman and the bird. The tale goes: "[…] the bird answered to me in his songs all of my questions." Some readers wish to see the girl as a reflection of innocence. But the girl soon develops a yearning for a different world and begins to think more frequently of the wealth she could gain from the sale of the bird eggs. By reading innumerable books, she also

5 Ludwig Tieck, *Der blonde Eckbert. Der Runenberg. Die Elfen* (Stuttgart: Reclam, 1952), 9.

develops in her mind the image of an ideal knight. One day, when the old woman has gone on a longer journey, the girl can no longer control her inner urge to leave the house. She takes the bird cage and runs off. She wanders from place to place and in the course of time her fear to be pursued by the old woman fades. It appears as if she had surpassed pain and anguish. But one night, the bird, which hasn't sung in a long time, begins to sing the old song with new lyrics:

Waldeinsamkeit,	Forest solitude
Wie liegst du weit!	You are so far!
Oh, dich gereut	Oh, you regretted
Einst mit der Zeit. –	Once upon a time.—
Ach, einz'ge Freud'	Ah, only delight
Waldeinsamkeit	Forest solitude. [6]

For the girl, this song evokes feelings of guilt and regret. She can no longer sleep and suffocates the bird when it won't stop singing. The protagonist marries the blond Eckbert, a knight, and they go on living a quiet life. One day, she tells a friend of her husband's, Philipp Walther, about her strange childhood. Coincidentally, it turns out that Walther already knew the story of her childhood very well. Eckbert's wife falls ill and can't overcome the feeling that Walther is no one else but the old woman from back in the days. Eckbert murders Walther, whose existence torments him and his wife. The uncanny compositum "Waldeinsamkeit" [forest solitude] that is repeated in the bird's song begins with the same phonetic

6 Ibid., 17.

sequence as the name "Walther," a figure that returns like a repressed memory. After his wife has died of an illness Eckbert withdraws into solitude. A long time passes before he makes a new friend: Hugo. But in Tieck's stories every new element means the return of a memory. Thus, the new friend Hugo soon turns out to be Walther. As soon as Eckbert takes note of this, the old song resounds once more. And again, with different lyrics:

Waldeinsamkeit	Forest solitude
Mich wieder freut,	Delights me again
Mir geschieht kein Leid,	I suffer no harm
Hier wohnt kein Neid,	No envy dwells here
Von neuem mich freut	Once more I am delighted by
Waldeinsamkeit.	Forest solitude. [7]

The murdered Walther reappears as Hugo, much like the betrayed old woman had appeared as Walther. Everything that was abandoned or killed reappears when the song of the bird activates old memories. But nevertheless, the content of the song remains encrypted. Particularly because the lyrics of the song don't describe a concrete event, the repetition of the notion of "forest solitude" becomes magically effective and the song touches the old memories that had seemed to be buried deeply.

*

One of the best examples of the meaning of bird language can be found in Richard Wagner's *The Ring of the Nibelungs*.

7 Ibid., 23.

Since striking the dragon dead, Siegfried can understand bird language.

Von des Wurmes Blut	The dragon's blood
mir brannten die Finger;	made my fingers burn
sie fi hrt' ich kühlend zum Mund:	I put them in my mouth to cool
kaum netzt ein wenig	barely touched a little
die Zunge das Naß, [sic]	the tongue wet
was da die Vöglein sangen	what the birds were singing
Das konnt' ich flugs verstehn.	I could swiftly understand. [8]

The voice of the "Waldvogel" [forest bird], an actual character in the *Ring*, gives advice to Siegfried helping him to protect his life from the enemy.

Bird language however is not solely a structural element in Germanic myths and German Romance. In *Shamanism: Archaic Techniques of Ecstasy*, Mircea Eliade states that the idea that certain people can learn the "language of animals" can be found everywhere in the world:

> Magic and song—especially birdsong—are often referred to by the same word. The Germanic word for the magic spell is *galdr*; it is used together with the verb *galan*, "to sing," which specifically refers to the calls of the birds. To learn the language of the animals, foremost the birds, everywhere in the world means to know the secrets of nature and thus also to be able to make auguries. One generally learns the language of the birds by eating snake or another animal deemed sacred. These animals can reveal the secrets of the future because they are inhabited by the souls of the dead and are epiphanies of the gods. [9]

This description shows that Wagner's Siegfried repeats a shamanic tradition without knowing. The dragon Siegfried strikes dead corresponds to the snake Eliade talks about. By drinking the blood of the dragon Siegfried learns the birds' language. But, since he does not learn animal language consciously in the course of a ritual—as do, for instance, the shamans in Siberia—he lacks respect for the dragon through whom he's achieved this knowledge.

The special meaning of bird language was also known in ancient China: Confucius allowed a man that he liked to marry his daughter, although this man had been found guilty and officially charged with murder. The reason why he was a suspected murderer is interesting: he was able to understand birds' language and happened to hear them speak about a murder. Thus, he knew precisely where the corpse was hidden. But most people refused to believe his story and alleged that he was the actual perpetrator.

Instead of staging a tragic hero to kill a giant snake, Mozart created a parody of the shaman: his bird catcher Papageno in the *Magic Flute*. He is, like a shaman, dressed in feathers. Papageno lets the prince think he was the hero killing the snake even though, in reality, three women conquered the snake—and not by means of the sword and blood but

8 Richard Wagner, *Götterdämmerung* (Stuttgart: Reclam, 1951), 68.

9 Mircea Eliade, *Schamanismus und archaische Ekstasetechnik* (Frankfurt: Suhrkamp, 1994), 105.

solely through language. They merely needed five words: "Die, monster, through our power!" The next line already goes: "Triumph! Triumph!" Papageno is no dragon slayer but simply a bird catcher. He does not speak the birds' language and is thus no prophet either. He merely delivers captive birds to the women in turn for food and drink. [10]

Eliade writes that when becoming a shaman one has to learn the secret language as part of the initiation. This secret language often developed from the imitation of animal calls.[11] It is presumed to be a mimetic language that imitates the sound of nature. Since it is assumed to be in more direct connection with nature and the dead than human language, it is also understood as the medium of prophecy. But in the enlightened context of modernity, this type of secret language no longer has a culturally recognized place. The phrase "einen Vogel haben" [Literally, "to have a bird," but meaning, "to be crazy"] shows that birds' language is a different language than the language of reason. According to this phrase, birds' language is seen as a diversion from normality. A human who has a "different" language in their head is said to be crazy.

*

The oldest known song representing bird voices was composed around 450 years ago. A composer in Paris wrote the piece entitled "The Song of the Birds." I happened to come across it in a musical program about this topic on Deutschlandfunk that I listened to while exactly working on this moment in the lecture. When hearing some compositions by Beethoven,

10 Wolfgang Amadeus Mozart, *Die Zauberflöte* (Stuttgart: Reclam, 1962), 11.
11 Eliade, *Schamanismus und archaische Ekstasetechnik*, 103.

Leopold Mozart, Händel, Schumann, *Saint-Saëns* and so on, which were played on the radio, I noticed that most composers deal with the cuckoo or the nightingale. They tend to refer to the mythological images of these birds rather than to any bird calls they had encountered in reality. Olivier Messiæn's composition, "Catalogue d'oiseaux" reveals entirely different musical mimesis and gestural expressions. The chirping of the Alpine chough, oriole, Blue rock thrush, Western black-eared wheatear, Tawny owl, Woodlark, and so on, is transported into piano music. Neither the cuckoo nor the nightingale can be found in this catalog. The music triggers a strong memory in me, but this memory is not directed to a specific bird call. A naturalistic imitation of birds' voices on the piano is impossible simply because birds' songs have much smaller intervals than the piano keys can resound. They neither sing in an evenly tempered sound system nor do they pay any attention to human rhythm. Playing bird song on the piano thus inevitably produces mimicry. It is exactly what reveals the attitude of the imitation. Messiæn's transformation seems precise, diligent, and focused. There are some photos of him listening to the birds' songs in a natural landscape. He is holding a pen in his hand and is recording the songs of the birds. It is nothing else than the activity of imitation itself that he imitated. For one of the most important characteristics of birds is to imitate the chirping of other birds.

A bird that mimics human language understands neither its content nor its so-called grammar. Likewise, humans will never be able to understand the birds' language. But a focused imitation can—like dreams—reproduce clear images of a foreign language.

When I speak German I sometimes feel like a composer standing in a forest trying to listen to, record, and imitate the music of the birds.

Whoever speaks with a foreign tongue is an ornithologist and a bird in the same person.

"If You Were a Bluebird" is excerpted from Juliana Spahr, *The Winter the Wolf Came.* Oakland: Commune Editions, 2015, 29–35. Reprinted with kind permission of the author and Commune Editions.

If You Were a Bluebird

Began with a list.
A bird. Reed cormorant.
Added a fish and a monkey. Hingemouth. White throated monkey.
Added because.
Because the six dorsal and anal fins of the hingemouth and its two teeth too and also its swim bladder like a lung, covered in alveoli.
Because the silvery wings, longish tail, and short head crest of the reed cormorant.
Because the white throated monkey, with its red belly and its white legs.
Added the phrase the principle of relation.
Because it was with the principle of relation that the Niger Delta came to teem.
So the hingemouth with its six dorsal and anal fins and its two teeth too and also its swim bladder like a lung, covered in alveoli, swims.
So the silvery wings, longish tail, and short head crest of the reed cormorant dives down to considerable depths in the Delta and also dives to feed, as it tends to do, in more shallow water, bringing slow-moving mormyrids and cichlids to the surface.
So the white throated monkey, with its red belly and its white legs, bangs objects against the ground, throws sticks.

Then added another bird.
Eurasian spoonbill.
Added a crab and a fish.
Cleistostoma kuwaitense. Mudskipper.
Again added because.
Because the Eurasian spoonbill with its dark legs, occasionally grunting and trumpeting.
Because the cleistostoma kuwaitense building a semi-permanent mud hood over the entrance to its burrow.
Because the mudskipper digging a deep burrow then hiding in it during high tide, a polygonal territory surrounded by dams, and defended against rivals, yet also shared with digging crabs.
Added the phrase the principle of relation.
Because it was with the principle of relation that the Kuwait Bay came to teem.
So the Eurasian spoonbill with its dark legs, grunts and trumpets, sweeps the end of its partly opened bill from side to side as it wades through shallow water.
So the mudskipper builds its burrow beneath the mudflats, defends its territory, keeps a pool of water so as to also engage in surface activity.
So the cleistostoma kuwaitense, using the same mud of these mud flats, builds a semipermanent mud hood.

Then another bird.
Pelican.
Added a mammal and a fish. Bottlenose dolphin. Red snapper.
Returned to because.
Because the gregarious pelican, traveling in flocks.
Because the bottle nose dolphin, remembering and comprehending.
Because the nibbling and the picking of the red snapper with its short, sharp needle-like teeth.
Returned to principle of relation.
Because it was with the principle of relation that the Gulf of Mexico came to teem.
So the gregarious pelican hunts, hunts cooperatively, plunge dives from high up so as to stun the fish, scoops them up, and then also breeds, breeds colonially, in trees, bushes, in the ground, around the gulf.
So the dolphin talks, talks, over thirty distinguishable sounds.
So the red snapper spreads itself out in the artificial reefs of oil platforms, the smaller fish in the upper part of the water column, the larger in deeper areas.

I am waiting.
Said this out loud.
Said to no one in particular.
Said we are waiting.
Some of us are waiting.
Waiting for the assembly of fish.
Waiting to be complete.
Waiting to storm the waters.
Also waiting for the assembly of trees.
Waiting to be complete.
Waiting to be infiltrating the land.
And waiting for the assembly of animals.
Waiting to be complete.
Waiting. Waiting.
Waiting for the assembly of birds.
Waiting to be complete.
Waiting to fly the sky dark.
Waiting for the impossible.
Said waiting.
Meant wanting.
Wanting to fly the sky dark.
Wanting to be complete.

Wanting the principle of relation.
Wanting for the six dorsal and anal fins of the hingemouth and its two teeth too and also its swim bladder like a lung covered in alveoli to be with the red snapper as it nibbles and picks with its short sharp needle-like teeth to be with the bottlenosed dolphin hunting as it makes squeaks and whistles and leaps from the water, slaps tail on the water's surface to be with the reed cormorant as it dives down into the water with a characteristic half-jump to give itself a more streamlined entry and then once there under the water propels itself with its feet and sometimes with its wings to be with the pelican as it dives down so as to submerge below the surface, snaps up prey, surfaces, water spilling from the throat pouch before it swallows to be with the Eurasian spoonbill as its head moves back and forth as it holds its bill in the shallow waters of marshes rivers lakes flooded areas and mangrove swamps deltas estuaries tidal creeks and coastal lagoons to be with the mudskipper in and out of the water as it is walks on land too to be with cleistostoma kuwaitense as it builds a semi-permanent mud hood over the entrance to its burrow to be with the white throated monkey, cheek pouches full of food.
Wanting to be together.
Hingemouth and red snapper and bottlenosed dolphin and reed cormorant and pelican and Eurasian spoonbill and mudskipper and cleistostoma kuwaitense and white throated monkey and me too. I mean us. Together.
Together. Water in one hand. The right hand.
Together. Sky in the other. The left hand.
The earth. Together.
Together. Wanting become forests.
Together. Wanting become grasslands.
With the unfeathered legged ostrich and the equal lengthed toed osprey and the pygmy hippopotamus.
The small things also.
The sulphate reducing bacterias.
The foraminiferal species.
Sandbanks. Swamps. Edges of the open forest.

Wanting to be coming to be possibility gathering.
As it happened with blood cockle gathering when the women went to gather blood cockles and the cockles were covered in oil.
And then began another sort of gathering.
Gathering so as to be seizing.
Seizing a boat.
Dividing into groups.
Occupying airstrips, helicopter pads, oil storage areas, docks.
Singing all day and night.
Dancing ridicule too.
Chanting of threatening songs.
Attacking of stores and prisons.
Knocking down of telephone poles and severing of wires.
Wearing palm leaves.
Slowly at first.
One at a time.
One location at a time.
And then more.
From four hundred one day to four thousand the next.
Wanting to be coming to be possibility gathering.
As it happened.
The women and the women-identified of 1789 and 1871 and 1917 and 1918 and 1929 and 1969.
Sometimes they had just a drum and churchbells, then kitchen blades, and then suddenly ten thousands.
Sometimes they began with stones and snowballs and then they turned to attack police stations.
More.
Always more.
For more.
Like how the white throated monkey does it, five or six at the beginnings, then more gathering up to thirty.
But not stopping then.
Gathering like the silt too.
Traveling through the circuits that already exist.
Traveling with the ease of oil tankers.

From Banias in Syria, Tripoli, Ceyhan in Turkey.
Through the Neutral Zone to the terminals at Mena Saud and Ras Al Khafji.
Through Umm Said.
Through Das Island and Jebel dhanna.
Arjuna, Balongan, and Cinta, and Widuri.

Fig. 01. Konrad Lorenz photographed by Bernhard Hellmann (1932); Konrad Lorenz Archive, Altenberg. Reproduced with the kind permission of Paul Hellmann.

Bird Culture

by Sophia Gräfe

> Mammals are the production animals, birds the pleasure animals of man. […] Their lives, their voices, their flight, their evident contentment with being elates and edifies us. […] They are our pets and darlings.[1]
>
> — Alfred Brehm

Understanding the history of behavior is near impossible without birds. By behavior, I mean a concept used to observe humans and animals, that is, a procedural knowledge about collecting, assessing, and predicting terrestrial activities. Philosophy's interpretative sovereignty over such activities was, at some point during the nineteenth century, arguably revoked; accredited instead was the fledgling discipline of biology. At least since the publication of Konrad Lorenz's (1903–1989) popular writings, behavioral science has been indelibly connected to a knowledge of birds: a kind of anthropological foray into the animal's soul, which, in ethological practice, conducts behavioral research from a bird's-eye view, thereby substituting an anthroposcopic regime for the birds' own perspective.

Lorenz's numerous, well-known publications—both popular and scholarly—impressively portray the biologist as a bird enthusiast and expert, and even as a member of his own bird community [Fig. 01]. Lorenz writes, "In order to reach even an

1 Alfred Brehm, "Ein Blick auf das Leben der Gesamtheit," in *Brehms Thierleben: Allgemeine Kunde des Thierreichs*, Vierter Band, Zweite Abteilung: Vögel, Erster Band: Papageien, Leichtschnäbler, Schwirrvögel, Spechte und Raubvögel (Leipzig: Verlag des Bibliographischen Instituts, 1882), 33.

approximation to satisfactory [behavioral] catalogues, the investigator must live with the animals day after day, year by year."[2] Other widely-read texts include the scientist's autobiographical reports on the formative encounter with his first pet and lab animal—a domestic duck that he had received as a gift at the age of six.[3] Countless other birds would accompany him through the course of his scientific career. U.S. science historian Tania Munz, for instance, has drawn attention to Lorenz's portrayal of two Greylag geese (*Anser anser*), Martin and Martina. In accordance with the changing political and behavioral-theoretical zeitgeist, Lorenz used varying rhetorical strategies to make the geese, as well as all the birds that animated his research, into authentic protagonists through his writing.[4]

However, in what follows I do not focus on these biographical and textual stagings of the close relationship between bird and man; rather, a methodological and epistemological set of questions are at issue: What is it exactly that makes birds an acceptable research subject for ethologists? Why did Lorenz—like his peers and idols Charles Otis Whitman, Wallace Craig, Oskar Heinroth, Erwin Stresemann, Erich von Holst, Nikolaas Tinbergen, and Robert Hinde—choose birds as model organisms for their science? Surely there must be more to the culture and science of bird research than Brehmian joy.

2 Konrad Lorenz, "Comparative Studies of the Motor Patterns of Anatinae," *Studies in Animal and Human Behaviour*, vol. 2, trans. R. Martin (London: Meuthen, 1971), 17.
3 Konrad Lorenz, "My Family and Other Animals," in *Leaders in the Study of Animal Behavior: Autobiographical Perspectives*, ed. D.A. Dewsbury (Lewisburg: Bucknell University Press, 1985), 259.
4 Tania Munz, "'My Goose Child Martina': The Multiple Uses of Geese in the Writings of Konrad Lorenz," *Historical Studies in the Natural Sciences* 41/1 (2011): 405–66.

*

In his "Anthropology from a Pragmatic Point of View" [1789], Immanuel Kant systematically categorized the states that can be characterized by their "essential and incurable disorder,"[5] phenomena of a "deranged" rationality, and products of the imagination that cannot be reconciled with the way in which they are experienced. He discusses irrationality (*amentia*), insanity (*dementia*), and madness (*insania*), before addressing a kind of "positive unreason," which, for Kant, is "not merely disorder and deviation from the rule of the use of reason."[6] In the state of absurdity (*vesania*), he claims, the soul is transferred to "a totally different standpoint […] from which it sees all objects differently."[7] Kant explicates this condition using examples of induced and, therefore, invariably dangerous mental derangement, like the story of Jan Baptist van Helmont, who is said to "have perceived a sensation as if he were *thinking in his stomach*" after he ingested a specific dose of poisonous wolfsbane.[8] He also describes the natural correspondence of the emotion, during which, for example, a mentally ill man "flies over the entire guidance of experience"[9] and imagines "that he conceives the inconceivable"[10]; or, as given through the image of the soul, which, transposed to a faraway place, "sees all objects differently […]

5 Immanuel Kant, "On Mental Illnesses," in *Anthropology from a Pragmatic Point of View*, eds. Robert B. Louden and Manfred Kuehn (Cambridge: Cambridge University Press, 2006), 108.
6 Ibid., 110.
7 Ibid.
8 Ibid., 111.
9 Ibid., 110.
10 Immanuel Kant, "On Mental Illnesses," 110.

just as a mountainous landscape sketched from a bird's-eye view prompts a completely different judgment about the region than when it is viewed from level ground."[11] The French philosopher Jean-Francois Lyotard returns to this motif of the bird's-eye perspective in his 1988 text on landscape. Calling such an experience "mouth to mouth contact with distance,"[12] he attributes it to a sensorium of the "inhuman." Here, contra Kant, landscape is experienced as a constant "displacement of the vanishing point,"[13] during which the self "is left behind, sloughed off."[14]

In his animal research, Lorenz is also concerned with the implications of this change of perspective. In order to study the avian sense of community, he seeks to survey the "instinctive framework"[15] [Bauplan der Instinkte]. In his dissertation, titled "Companions as Factors in the Bird's Environment" [Der Kumpan in der Umwelt des Vogels, 1935] and dedicated to the umwelt biologist Jakob von Uexküll, Lorenz describes the necessity of simulation. In an "experiment, which was self-denial in the truest sense of the word,"[16] he intends to play the role of his birds' companion. Here, the scientist approaches the animals virtually undetected and paradoxically trains them to be "fully tamed" in "total freedom."[17]

11 Ibid.
12 Jean-François Lyotard, "Scapeland," in *The Inhuman*, trans. Geoffrey Bennington and Rachel Bowlby (Cambridge: Polity Press, 1991), 182.
13 Ibid., 187.
14 Ibid.
15 Lorenz, "Companions as Factors in the Bird's Environment: The Conspecific as the Eliciting Factor for Social Behavior Patterns," *Studies in Animal and Human Behavior*, vol. 1, trans. Robert Martin (Cambridge: Harvard University Press, 1970), 109.
16 Ibid., 138.
17 Konrad Lorenz, *Ethologie der Graugans*, Begleitveröffentlichung zum wissenschaftlichen Film C 560 / 1950 (Göttingen: Institut für den Wissenschaftlichen Film, 1976), 3.

Following Uexküll's biosemiotics, Lorenz interprets all environmental conditions that could trigger an innate or nurtured reaction as signs. Signs that Lorenz can read, translate—and even send. Accordingly, the reader can join Lorenz in his texts as he implants his own body into the animals' semiotic system in an attempt to map their behavior. The fact that his research subjects have few innate markers works in his favor, even though instincts control most of their behavior. Ducks and greylag geese are not only easy to breed, cross, and take care of: these species have "so few characteristic signals of the companion […] innately incorporated that they can be artificially provided as appropriate stimuli in an experiment."[18] This allegorical substitution begins early by imprinting the image of the scientist on the young animals and imitating the sounds of the mother bird. It expands to the discovery of the signs necessary to induce a jackdaw's instinct to fly:

> After calming (and perhaps even feeding) the bird for a while, one must suddenly leap up and run away from the bird at top speed. The abrupt rising movement is very important for elicitation of the following instinct [Nachfliegetrieb], and the jackdaw must therefore be perched at a height below the experimenter's head. If this has all been done correctly and the jackdaw is in good, healthy condition, the bird is sure to fly after the human companion. […] One cannot elicit the following instinct by standing near to the tree and suddenly running away. Apparently, elicitation of take-off is

18 Lorenz, "Companions as Factors in the Bird's Environment," 137.

> dependent upon the guiding companion being at the same level as the bird and probably rising somewhat higher on take-off.[19]

Lorenz thus approaches the fundamentals of behavior by testing what it means to be a bird in a bird's environment. In order to conceive the inconceivable, Lorenz himself has to become a participant in the scene that extends across species. But is this accomplished without a vanishing point?

Contrary to Kant, who attributes mental derangement to those who surrender to a fantasy that should remain inaccessible to experience, the Lorenzian principle of bird imitation proceeds on this fundamental assumption. His methodology is based on ecological theory of perception first initiated by Karl Bühler and Egon Brunswick, his colleagues at the Vienna Institute of Psychology.[20] In his epistemological essays—especially "Kant's Doctrine of the *A Priori* in the Light of Contemporary Biology" [1941][21] and "Gestalt Perception as Fundamental to Scientific Knowledge" [1959][22]—Lorenz argues against Kantian idealism and its *a priori* concept of understanding, referring instead to the direct relationship between environmental conditions and organisms: "[…] in the manner in which our foot fits the floor or the fin of the fish

19 Ibid., 158.

20 See Veronika Hofer, "Konrad Lorenz als Schüler von Karl Bühler: Diskussionen der neu entdeckten Quellen zu den persönlichen und inhaltlichen Positionen zwischen Karl Bühler, Konrad Lorenz und Egon Brunswick," *Zeitgeschichte* 3/28 (2001): 135–59.

21 Konrad Lorenz, "Kant's Doctrine of the *A Priori* in the Light of Contemporary Biology," in *Konrad Lorenz: The Man and His Ideas*, ed. R.I. Evans (New York and London: Harcourt Brace Jovanovich, 1971), 181–217.

22 Konrad Lorenz, "Gestalt Perception as a Source of Scientific Knowledge," in *Studies in Animal and Human Behavior*, vol. 2, 281–322.

suits the water."[23] Based on evolutionary biology's concept of adaptation, in this interpretation perception is always a consequence of the empirical contact from which it emanates:

> But just as the hoof of the horse is adapted to the ground of the steppe which it copes with, so our central nervous apparatus for organizing the image of the world is adapted to the real world with which man has to cope. Just like any organ, this apparatus has attained its expedient species-preserving form through this coping of real with the real during its genealogical evolution, lasting many eons.[24]

Therefore, human and bird cannot be mistaken, although induced imaginations and simulated behaviors are, in this respect, also true. The ethologist—at least one capable of adaptation—is committed to implanting new phenomena into the animals' perception while remaining unnoticed. The way he or she skims over the behavioral map can thus be considered the positive irrationality of leaving a mark without making a difference.

Equally covert are the ethograms of traditional behavioral studies that intervene in and disassemble an organism's expressions of life. Ethologists speculated about kinship among species based not only on observations in the field, photography, and film specimens, but also by means of diagrammatic sketches. Once the behavioral characteristics of a species are standardized and encoded in short linguistic cues,

23 Lorenz, "Kant's Doctrine of the *A Priori*," 186.

24 Ibid, 187.

mathematical processes enable researchers to create notes, calculations, and illustrations.

Lorenz advanced this methodology for his 1941 study on *Anatidae* (the zoological family comprising the swan, geese, and ducks).[25] In order to reconstruct kinship among eighteen species and two other genera of ducks, he cataloged their behavioral patterns as short descriptive texts before visually translating them into a grid-like relational structure using shorthand notations [Fig. 02]. In a horizontal layout, he marked the presence or absence of particularly striking behavioral features as well as data gaps for each of the species. The complete image, which displays different and overlapping behaviors, integrates numeric values that served as an indication for phylogenetic kinship.[26] In order to justify his arithmetic techniques, Lorenz took advantage of arguments from the field of probability calculation:

> A philologist finding the same word expressing the same concept in two different human populations can virtually disregard the almost infinitesimally small probability that this is a pure product of chance and can justifiably assume that the word has a unitary historical root. In the same way, the comparative psychologist can in many cases assume that phylogenetic homology is doubtless present when the releasing ceremonies of two related species (usually incorporating a large number of characters) correspond.[27]

25 Lorenz, "Comparative Studies of the Motor Patterns of Anatinae," 14–114.
26 Ibid., 114.
27 Ibid., 19.

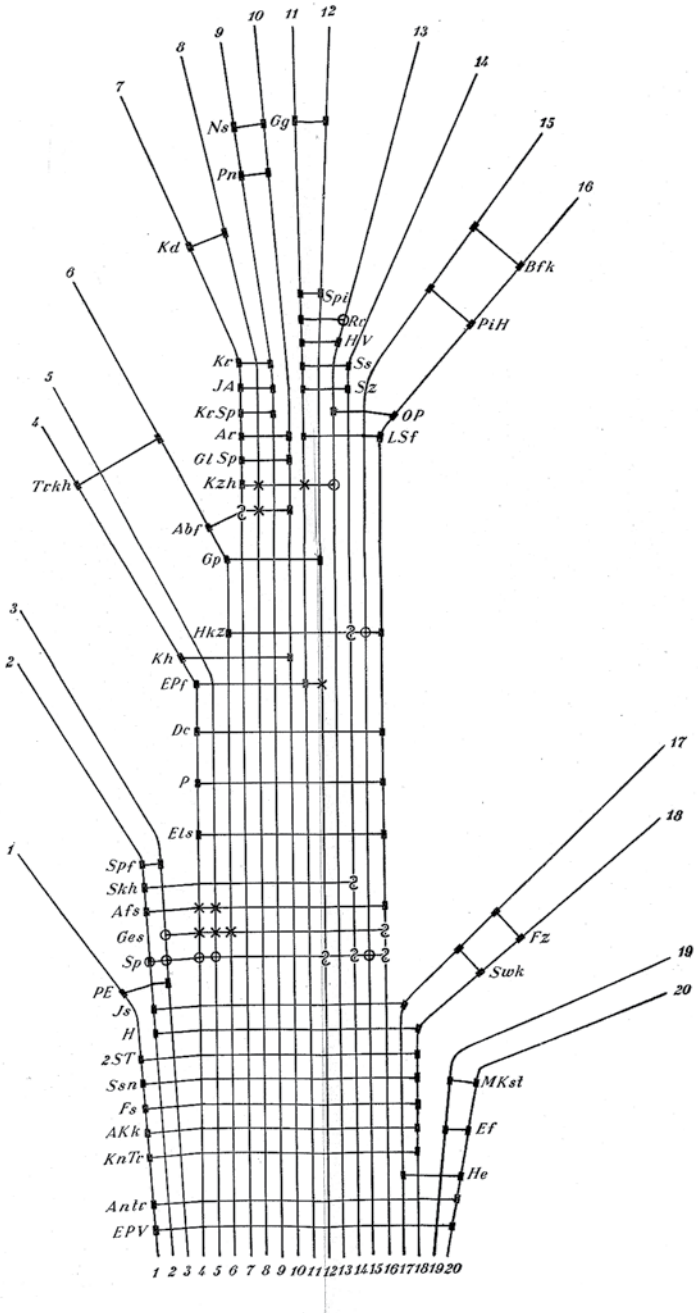


Fig. 02. Table of "Comparative Studies of the motor patterns of Anatinae" [1941] from Konrad Lorenz, *Studies in Animal and Human Behaviour*, vol. 2, trans. R. Martin (London: Meuthen, 1971), 114.

This metric for the processing of life by way of measurable images in ethology initiates a data-driven ecology, paving the way for the emerging belief of the environment as a numerical problem, which becomes evident, to take one especially well-known example, in recent theories of the Anthropocene.[28]

*

> Where the comparative anatomist takes a bone out of a drawer or an organ from a glass of formol, the comparative behaviorist takes the film reel on which types of movement have been preserved.[29]
>
> — Wolfgang Wickler

The excesses of an allegedly complete behavioral calculation matrix becomes especially apparent in the way ethologists treated film, which, in 1952, would lead to a major, path-breaking project. Until that point, scientific disciplines were not infrequently based on an analysis of fragmented microscopic specimens in natural history collections and therefore illustrated observed conditions statically. The research film, however, enabled a view of processes in motion.[30] The procedure of ethologically measuring the behaviors of humans and animals was transformed into the moving image as a durable specimen of

28 This hypothesis refers to debates connected to "The Anthropocene Project" at the Haus der Kulturen der Welt in Berlin, and the related exhibition publication, *The Whole Earth: California and the Disappearance of the Outside*, eds. Diedrich Diederichsen and Anselm Franke (Berlin: Sternberg Press, 2013), which links the ecological paradigm of the modern human-environment coupling with questions emerging from cybernetics and the science of computer simulation.

29 Wolfgang Wickler, "Phylogenetisch-vergleichende Verhaltensforschung mit Hilfe von Enzyklopädie-Einheiten," *Research Film – Le Film de Recherche – Forschungsfilm* 5/2 (1964): 109–10.

30 Gotthard Wolf, *Die wissenschaftliche Film-Enzyklopädie* (Göttingen: IWF, 1952), 2–3.

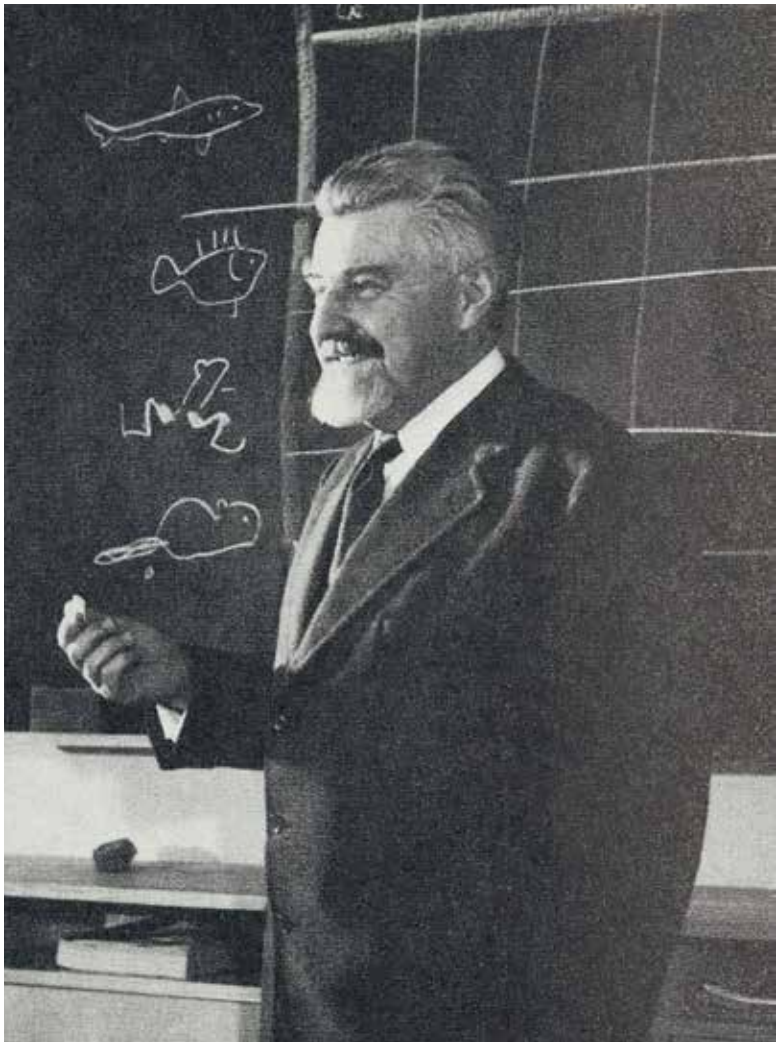


Fig. 03. Konrad Lorenz explains the scheme of the motion matrix of the *Encyclopaedia Cinematographica*, from Gotthard Wolf, *Der wissenschaftliche Film in der Bundesrepublik Deutschland* (Bonn-Bad Godesberg: Inter Nationes, 1975), 122.

movement [Bewegungsdauerpräparat][31] with the introduction of the encyclopedic film by the Institute for Scientific Film [Institut für den Wissenschaftlichen Film, henceforth IWF] in Göttingen.

Lorenz took great interest in the establishment of a scientific cinematic encyclopedia and became a key advocate and a leading figure of the *Encyclopaedia Cinematographica*, founded in 1952 by Gotthard Wolf.[32] The goal of the IWF's most important long-term project was to draw a cinematic map of all available knowledge about the living (moving) world, following the example of the classical (textual) encyclopedia. Built on a meticulous cataloging system, the *Encyclopaedia Cinematographica* started out with short movie sequences of locomotive forms in zoology. Recordings from botany, ethnology, technical sciences, and contemporary history were later added to the collection.

The *Encyclopaedia Cinematographica*'s "base capital"[33] were cinematic units—compiled strictly on the principles of the encyclopedia—that showed the dissection of a species' inventory of movement following the concept of the traditional ethogram. In as few cuts as possible, the encyclopedic movie is supposed to record a species' movement units "exhaustively and briefly."[34] Following a processing pattern of comparative study, the aim was a vast matrix of

31 Gotthard Wolf, "Die Aufgaben des wissenschaftlichen Filmes," *Die Umschau* 56/19 (1956): 577.
32 Wolf, *Die wissenschaftliche Film-Enzyklopädie*, 2.
33 Otto Koenig, "Vom zoologischen Film zur *Encyclopaedia Cinematographica*," *Research Film – Le Film de Recherche – Forschungsfilm* 5/5 (1966): 438.
34 Gotthard Wolf, *Neuere Ergebnisse wissenschaftlicher Filmarbeit* (Göttingen: Vandenhoeck & Ruprecht, 1968), 4.

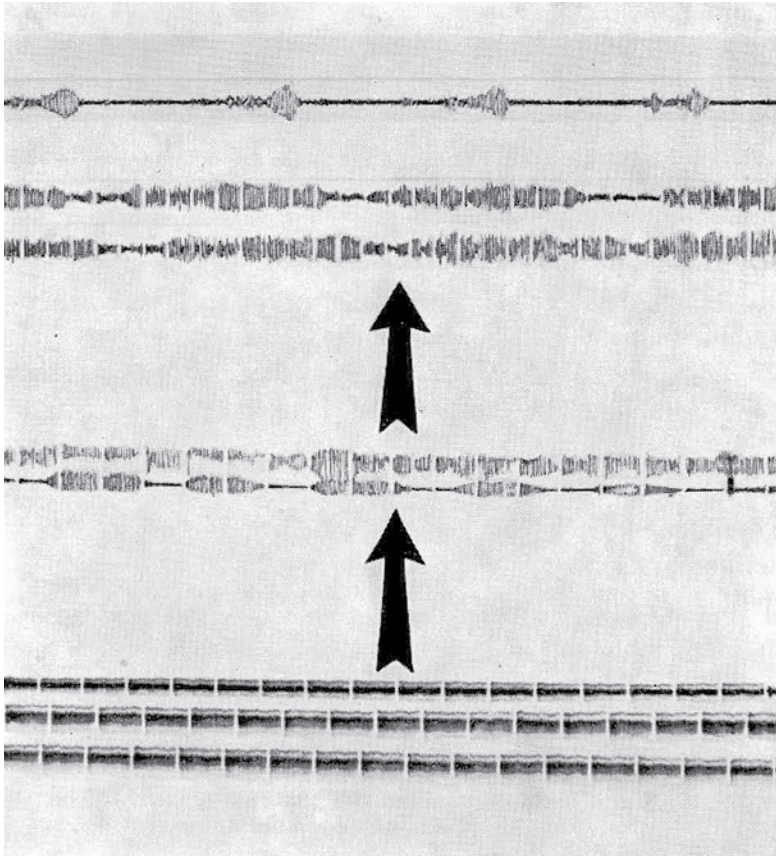


Fig. 04. Illustration of the development of rhythmic sound forms in the red fox (*Vulpes vulpes*) from Günter Tembrock, "Lautentwicklung beim Fuchs – sichtbar gemacht," *Umschau in Wissenschaft und Technik* 18 (1958): 567.

visual comparisons, which would in turn make it possible to analyze and measure movement independently from the actual subject's time and space [Fig. 03].

The Animal Sound Archive [Tierstimmenarchiv], founded in East Berlin by Günter Tembrock in 1951, which today has its home inside the Museum of Natural History in Berlin, is another example of the excitement that accompanied the establishment of ethological databases.[35] Their purpose was to make new, synthetic insights possible—visually in one place, audibly in another. [Fig. 04] The biological individuals that were segmented under the 1960s system-theoretical paradigm came to witness different entanglements by way of new media representations. In the context of the archive (as in comparative ethological studies), images and sounds were no longer considered isolated units; rather, they were instead defined by their reference, proximity, or relationship to other images and sounds. As is the case for all forms of life—animals and humans alike—the encyclopedic entries were seen as part of an underlying web of relations, which could be further explored through comparative studies.[36]

35 For an overview on the history of the Animal Sound Archive in relation to the development of behavioral science, see Günter Tembrock, "Change of Concepts of Behavior Over the Last 60 Years at Humboldt University Berlin," in *Quo vadis, Behavioral Biology? Past, Present, and Future of an Evolving Science*, eds. Jörg Hacker and Nova Acta Leopoldina, Abhandlungen der Deutschen Akademie der Naturforscher Leopoldina 3/380 (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 2011): 29–60; tierstimmenarchiv.de.

36 See, for example, the graphic abstraction of movement patterns from an encyclopedic film study of the phylogenetic explanation of cleaner-imitator mimicry in fish; Wickler, "Phylogenetisch-vergleichende Verhaltensforschung mit Hilfe von Enzyklopädie-Einheiten."

In this regard, both the visual and sound specimens occupy a special position within the material history of scientific collections because of their unique mediated materiality. They are themselves the material that the specimens consist of; we can copy, measure, cut, enlarge, slow down, or accelerate them. The ethological specimen thus causes a shift in archival procedure and the scientific production of knowledge, moving from the modeling of natural objects to the processes of their recording. They are "open objects" in the sense that they interlace the traits of both object and sign.[37]

Thus, the ethologists' attempt to create a comprehensive record of the dynamic aspects of all living beings—thus making them both classifiable and comparable—also establishes by necessity an aesthetic hierarchy with respect to the ability of life to be modeled. The building blocks of their databases not only define the correctness of the behavioral statements in question, but also what questions are reasonable to ask. As models for the analysis of phenomena, they do not so much convey facticity but rather index an ability to process the modeled object.

*

37 On the concept of the "open object," see *Offene Objekte*, eds. Bernhard Siegert and Lorenz Engell, *Zeitschrift für Medien- und Kulturforschung* 2/1 (2011).

> Every bird has a vocation. […] Open your eyes to the evidence. Throw aside your prejudices, your traditional and derived opinions. […] Dismiss your pride, and acknowledge a kindred in which there is nothing to make a devout mind ashamed. What are these? They are your brothers.[38]
>
> — Jules Michelet

What does this genealogy mean for ethology's ongoing fascination with avifauna? Can we speculate further about birds as models for human behavior? Birds, like signs, can assume almost any position. They inhabit nearly every place, are easy enough to catch, and even easier to tame. Is their *birdness* as medium rooted in some relative indeterminacy or in the mediality of their notorious sociability?

If one follows Lorenz, their social instincts can easily be imprinted on humans. During his "non-disruptive experiments," he tried variously to be a mother, friend, and partner. Birds can be human-like, as they have no sense of birdness. The flexibility of their ultimately limited world of perception [Merkwelt] affords them a place in the history of behavioral science as ideal experimental subjects.

Lorenz himself further developed this speculative line of thought in his remarks on "birds as experimental animals."[39] As he points out, "the reflex chains of birds incorporate a sufficiently low number of variable component links for the latter to be distinctly recognizable, while the links themselves have an influence on the overall behaviour great enough to approximate

38 Jules Michelet, *The Bird* [*L'Oiseau*, 1856], Eighth edition, illustrated by Hector Giacomelli (London: T. Nelson and Sons, 1868), 271.

39 Konrad Lorenz, "A Consideration of Methods of Identification of Species-specific Instinctive Behaviour Patterns in Birds," *Studies in Animal and Human Behaviour*, vol. 1, 72–75.

to that seen in mammals."[40] In any case, he assumes a "great correspondence between the sensory capacities of the observer and those of the observed animal." Thus, "birds, like men, are largely optically-orienting animals [Augentiere]."[41]

Perhaps it is more compelling to imagine such a scene in reverse; that is, that birds bring out the bird-like qualities of humans. When Lorenz talks about the joys of keeping animals as a requirement for his science, he brings the art (if not the science) of being-an-animal into full view:

> It is precisely this interaction of extremely precise, analytical observation of the animal with creative imagination in the structuring of the artificial environment in which it is kept that constitute the art, the pleasure, and the cognitive value of scientific animal keeping.[42]

After all, one can hardly explain the fascination with bird culture by referring merely to physiological similarities between humans and birds. Rather, engaging with birds allows us to inquire into birdness otherwise and thereby trace a possible outline for another anthropology.

40 Ibid.

41 Ibid., 73. Lorenz adds: "In both, the major function of hearing is the perception of the vocalizations of conspecifics rather than scanning for signs for approaching danger."

42 Konrad Lorenz, "Animal Keeping as Research Method," in *The Natural Science of the Human Species: An Introduction to Comparative Behavioral Research—"The Russian Manuscript (1944–1948),"* ed. Agnes von Cranach, trans. Robert D. Martin (Cambridge: MIT Press, 1996), 224.

"The Experiment" is excerpted from Bertolt Brecht, *Tales from the Calendar* [Kalendergeschichten], prose translated by Yvonne Knapp and verse translated by Michael Hamburger. London: Methuen & Co. Ltd., 1961, 33–43. Reprinted with permission.

The Experiment

The public career of the great Francis Bacon ended like a crude illustration of the specious maxim 'Crime doesn't pay'. As the highest judicial functionary of the realm he was found guilty of corruption and thrown into gaol. With all the executions, the granting of obnoxious monopolies, the decreeing of arbitrary arrests and the passing of prescribed verdicts, the years of his Lord Chancellorship rank among the darkest and most shameful in English history. After his exposure and confession it was his world renown as a humanist and philosopher that made his offences known far beyond the frontiers of the realm.

He was an old man when he was allowed to leave prison and return to his estate. His body was weakened by the efforts he had spent to bring about other people's ruin and by the sufferings other people had inflicted when they ruined him. But no sooner did he reach home than he plunged into the most intensive study of the natural sciences. He had failed in mastering men. Now he dedicated his remaining strength to investigating how best mankind could win mastery over the forces of nature.

His researches, devoted to practical matters, led him constantly out of the study into the fields, the gardens and to the stables on the estate. For hours on end he discussed with the gardeners the possibilities of grafting fruit trees, and told the dairymaids how to measure the milk yield of each cow. In this way a stableboy came to his notice. A valuable horse had fallen ill and the lad reported on its condition twice a day to the philosopher. His zeal and his powers of observation delighted the old man.

But one evening as he came into the stables he saw an old woman with the boy and heard her say:

'He's a bad man; look out! He may be a great lord, he may have made his pile, but he's bad for all that. He's your master, so do your work conscientiously, but always bear in mind he's bad.'

The philosopher did not hear the boy's answer for he turned about at once and went back into the house, but he found the lad's attitude towards him the next morning unchanged.

When the horse was well again he let the boy accompany him on many of his rounds and entrusted him with minor tasks. Little by little he fell into the habit of talking to him about various experiments. In doing this he did not bother to choose words that grown-ups commonly believe suited to the understanding of children, but spoke to him as to an educated man. In the course of his life he had associated with the greatest minds and had seldom been understood: not because he did not make himself clear, but because he made himself too clear. So he was not put out by the boy's difficulties; nevertheless, he patiently corrected him when the boy himself tried out the unfamiliar words.

The lad's main duty consisted in having to describe the objects he saw and the processes he experienced. The philosopher taught him how many words there were and how many were needed to describe the behaviour of a certain thing in such a way that it was more or less recognizable from the description and, above all, that it could be dealt with in accordance with the description. There were also some words that it was better not to use since, strictly speaking, they meant nothing: words like 'good', 'bad', 'beautiful', and so on.

The boy soon realized that there was no sense in calling a beetle 'ugly'. Even 'quick' was not good enough; you had to state how quickly it moved compared with other creatures of its size and what this enabled it to do. You had to put it on an inclined surface and on a flat one and make noises so that it ran away; or set out little scraps of prey towards which it could advance. You had only to busy yourself with it long enough and it 'quickly' lost its ugliness.

Once he had to describe the piece of bread that he was holding in his hand when the philosopher came upon him.

'Now here you may safely use the word "good",' said the old man, 'for bread is made for people to eat and can be good or bad for them. It is only in the case of larger substances created by nature and not, on the face of it, created for specific purposes and, above all, not purely for the use of man, that it is foolish to be satisfied with such words.'

The boy thought of his grandmother's remarks about his lordship.

He made rapid progress in grasping things, inasmuch as it was always something quite tangible that had to be grasped: that the horse recovered as a result of the treatment applied, or a tree withered as a result of the treatment applied. He grasped, too, that there must always remain a reasonable doubt as to whether the observed changes could really be owed to these measures. The boy scarcely took in the scientific significance of the great Bacon's mode of thought, but the manifest utility of all these undertakings fired him with enthusiasm.

This was how he understood the philosopher: a new era had dawned for the world. Mankind was enlarging its knowledge almost daily. And all knowledge was for the advancement of well-being and of human happiness. Science was the leading force. Science investigated the universe, everything that existed on earth – plants, animals, soil, water, air – so that greater use could be extracted from it. The important thing was not what you believed, but what you knew. People believed far too much and knew far too little. So one had to test everything, oneself, with one's hands, and speak only of things seen with one's own eyes and that could be of some use.

That was the new teaching and ever more people turned towards it, ready and eager to undertake the new tasks.

Books played a big part in this, even though there might be many bad ones. It was quite clear to the boy that he must find his

way to books if he wanted to be among those who were undertaking the new tasks.

Naturally he never came within reach of the library in the house. He had to wait for his lordship at the stables. The most he could do, if the old man had not appeared for several days, was to come across him in the park. Nevertheless, his curiosity about the study, where every night a lamp burnt late, waxed ever greater. From a hedge facing the room he could catch a glimpse of bookshelves.

He decided to learn to read.

That was by no means easy. The parish priest, to whom he went with his request, eyed him as though he were a spider on the breakfast table.

'Do you want to read the gospel of the Lord to the cows?' he asked irately. And the lad was lucky to get away without a thrashing.

So he had to adopt a different way.

There was a missal in the vestry of the village church. If you volunteered to pull the bell-ropes, you could get in. Now, if you could determine which passages the priest was singing at mass, it ought to be possible to find a connection between the words and the letters.

At all events, at mass the boy began to learn by heart the Latin words which the priest intoned, or at least some of them. It must be admitted that the way the priest articulated the words was uncommonly indistinct, and all too often he did not read the mass.

All the same, after a while the boy could repeat some introits sung by the priest. The head groom surprised him at this exercise behind the barn and thrashed him, for he thought the boy was trying to parody the priest. So he got his thrashing after all.

He had not yet succeeded in finding the place in the missal with the words which the priest sang when a great catastrophe occurred, putting an end for the time being to his efforts to learn to read. His lordship fell mortally ill.

He had been ailing all the autumn and had not recovered by the winter when he drove in an open sledge to an estate a few miles off. The boy was allowed to accompany him. He stood on the runners at the back next to the coachman's box.

The visit was paid, the old man was plodding back to the sledge, escorted by his host, when he saw a frozen sparrow lying on the path. Halting, he turned it over with his stick.

'How long has it been lying here do you think?' the boy, trotting behind him with a hot-water bottle, heard him ask his host.

The answer was: 'Anything from an hour to a week or more.'

The little old man walked on deep in thought and took a very abstracted farewell of his host.

'The flesh is still quite fresh, Dick,' he said, turning round to the boy as the sledge drove off.

They made their way at a good pace, for dusk was falling over the snow-covered fields and it was rapidly growing colder. Thus it came about that, as they turned into the gates of the courtyard, a chicken, having apparently escaped from the coop, was run over. The old man followed the coachman's attempts to avoid the starkly flapping chicken and made a sign to stop when the manœuvre failed.

Working his way out of his rugs and furs, he left the sledge and, his arm supported by the boy, he went back to the spot where the chicken lay, despite the coachman's warnings of the cold.

It was dead.

The old man told the lad to pick it up.

'Take out the entrails,' he ordered.

'Can't it be done in the kitchen?' asked the coachman seeing his master standing frailly in the cold wind.

'No, it's better here,' he said. 'I am sure Dick has a knife on him and we need the snow.'

The boy did as he was told and the old man, who had evidently forgotten his illness and the cold, himself stooped down and,

with an effort, picked up a handful of snow. Carefully he stuffed the snow inside the chicken.

The boy understood. He, too, gathered up snow and handed it to his teacher till the chicken was entirely filled with snow.

'It should keep fresh like this for weeks,' said the old man with animation. 'Put it on cold flagstones in the cellar.'

He walked the short distance to the door, a trifle exhausted and leaning heavily on the boy who carried the snow-stuffed chicken under his arm.

As he stepped into the hall he shivered with the cold.

The next morning he lay in a high fever.

The boy trailed about dejectedly and tried wherever he could to pick up news of his teacher's condition. He learnt little. The life of the great estate went on unchanged. Things took a turn only on the third day: he was called to the study.

The old man lay on a narrow wooden bed under many rugs, but the windows stood open, so it was cold. Nevertheless, the sick man seemed aglow. In a tremulous voice he enquired after the state of the snow-filled chicken.

The lad told him it looked as fresh as ever.

'That's good,' said the old man with satisfaction. 'Give me further news in two days' time.'

As he went away the boy regretted that he had not brought the chicken with him. The old man seemed to be less ill than they made out in the servants' hall.

Twice a day he changed the snow, putting in fresh, and the chicken was still unblemished when he made his way again to the sickroom.

He met with quite extraordinary obstacles.

Doctors had come from the capital. The corridor buzzed with whispering, commanding and obsequious voices and there were unfamiliar faces everywhere. A servant, who was carrying a dish covered with a large cloth, rudely turned him away.

Several times throughout the morning and afternoon he made

vain attempts to reach the sickroom. The strange doctors appeared to be trying to settle down in the great mansion. They seemed to him like huge black birds settling on a sick man who was now defenceless. Towards evening he hid in a closet in the corridor where it was very cold. He shivered all the time, but considered this a good thing, since the chicken must be kept cold at all costs in the interests of the experiment.

During the dinner hour the black tide receded a little and the boy was able to slip into the sickroom.

The invalid lay alone; everyone was at dinner. A reading lamp with a green shade stood by the small bed. The old man had a peculiarly shrivelled face of a waxy pallor. The eyes were closed, but the hands moved restlessly on the stiff covers. The room was very hot; they had shut the windows.

The boy took a few steps towards the bed, clutching the chicken as he held it out, and said in a low voice several times: 'My lord!' He got no answer. The invalid did not, however, seem to be asleep, for his lips moved every now and again, as though he were speaking.

The boy decided to rouse his attention, convinced of the importance of further instructions for the experiment. But even before he could tweak the covers – he had had to lay the chicken in its box on a chair – he felt himself seized from behind and pulled away. A fat man with a grey face glared at him as if he were a murderer. He tore himself free with great presence of mind and, in one bound, caught up the box and made off through the door.

In the corridor he fancied a manservant coming up the stairs had seen him. That was bad. How was he to prove that he had come at his lordship's bidding, in the conduct of an important experiment? The old man was completely in the doctors' power; the closed windows in the room showed it.

And now he saw a servant crossing the courtyard on his way to the stables. So he went without his supper and, after he had put the chicken into the cellar, crept into the forage loft.

The enquiry hanging over him made his sleep uneasy. It was with fear that he emerged from his hiding-place the next morning.

No one paid any attention to him. There was a terrible coming and going in the courtyard. His lordship had died towards morning.

All day the boy went about as though stunned by a blow on the head. He felt he would never get over the loss of his teacher. As he went into the cellar with a bowl of snow in the late afternoon, his grief at the loss turned into grief for the unfinished experiment and he shed tears over the box. What would become of the great discovery?

Returning to the courtyard – his feet seemed to him so heavy that he looked back to see whether his footprints were not deeper than usual – he found that the London doctors had not yet left. Their carriages were still there.

Despite his aversion, he made up his mind to confide the discovery to them. They were learned men and would be bound to recognize the significance of the experiment. He fetched the little box with the frozen chicken and stood behind the well, concealing himself until one of the gentlemen came by, a dumpy fellow, not too awe-inspiring. He stepped forward, holding out the box. At first his voice stuck in his throat, but he did at last manage to bring out his request in disjointed sentences.

'His lordship found it dead six days ago, your excellency. We stuffed it with snow. His lordship believed it might keep fresh. See for yourself; it has kept fresh.'

The dumpy fellow gazed into the box with perplexity.

'And what of it?' he asked.

'It hasn't gone bad,' said the boy.

'Oh,' said the dumpy fellow.

'See for yourself,' urged the lad.

'I see,' said the dumpy fellow and shook his head. Still shaking his head, he walked on.

The boy stared after him flabbergasted. He could not understand the dumpy fellow. Had not the old man brought on his death by getting out in the cold and making the experiment? He had gathered up snow from the ground with his own hands. That was a fact.

The boy went slowly back to the cellar door, but stopped short outside it, then turned about smartly and ran to the kitchen.

He found the cook very busy, as funeral guests from the neighbourhood were expected for dinner.

'What are you doing with that bird?' growled the cook testily. 'It's completely frozen.'

'That doesn't matter,' said the lad. 'His lordship said it doesn't matter.'

The cook gazed at him in an absentminded way for a moment, then went importantly to the door with a big pan in his hand, presumably to throw something out.

The boy followed him eagerly with the box.

'Couldn't you try it?' he entreated.

The cook lost patience. He grabbed at the chicken with his enormous hands and sent it spinning into the yard.

'Haven't you anything better to think about?' he yelled, beside himself. 'And his lordship lying dead!'

Angrily the boy picked up the chicken from the ground and slunk off with it.

The next two days were filled with the funeral ceremonies. He had a lot to do, harnessing and unharnessing horses, and was almost asleep with his eyes open when, at night, he still went to put fresh snow into the box. Everything seemed to him hopeless and the new era at an end.

But on the third day, the day of the burial, well washed and in his best clothes, he felt a change of mood. It was fine bright winter weather and the bells pealed out from the village.

Filled with new hope, he went into the cellar and gazed long and attentively at the dead fowl. He could discern no speck of

decay on it. He carefully packed the creature in its box, filled it with clean white snow, put it under his arm and set off for the village.

Whistling merrily he stepped into his grandmother's lowly kitchen. His parents had died young, so she had brought him up and enjoyed his confidence. Without at first showing her what was in the box, he gave the old woman, who was just dressing for the funeral, an account of his lordship's experiment.

She heard him out patiently.

'But everybody knows that,' she said at the end. 'They go stiff in the cold and keep for a bit. What's so remarkable about it?'

'I believe you could still eat it,' answered the lad, trying to appear as casual as possible.

'Eat a chicken that's been dead for a week? Why it's poisonous!'

'If it hasn't changed at all since it died, why should it be? And it was killed by his lordship's carriage, so it was quite healthy.

'But inside, inside, it's gone bad,' said the old woman, growing slightly impatient.

'I don't believe it,' said the lad stoutly, his bright eyes on the chicken. 'It's had snow inside the whole time. I think I'll cook it.'

The old woman got cross.

'You're coming along to the funeral,' she said with finality. 'I should have thought you'd had enough kindness from his lordship for you to walk decently behind his coffin.'

The boy did not reply. While she tied her black woollen kerchief round her head he took the chicken out of the snow, blew off the last flakes and laid it on two logs in front of the stove. It had to thaw out.

The old woman took no further notice of him. As soon as she was ready, she took him by the hand and went resolutely out of the door with him.

He went along obediently for quite a stretch. There were other people, men and women, also on their way to the funeral.

Suddenly he gave a cry of pain. One of his feet was stuck in a snowdrift. He pulled it out with a grimace, hobbled to a milestone and sat down, rubbing his foot.

'I've sprained it,' he said.

The old woman looked at him suspiciously.

'You can walk all right,' she said.

'I can't,' he said sullenly. 'But if you don't believe me, you can sit down with me till it's better.'

The old woman sat down next to him without a word.

A quarter of an hour went by. Villagers still kept passing, though fewer all the time. The two of them squatted stubbornly by the roadside.

Then the old woman said gravely: 'Didn't he teach you not to lie?'

The boy made no answer. The old woman got to her feet, groaning. It was getting too cold for her.

'If you don't follow in ten minutes,' she said, 'I'll tell your brother and he'll tan your backside.'

And she waddled on, in great haste not to miss the funeral oration.

The boy waited until she had gone far enough and got up slowly. He turned back, but looked round several times and also went on limping for a while. Only when a hedge hid him from the old woman's view did he walk normally again.

In the cottage he sat down by the chicken at which he looked expectantly. He would boil it in a pot of water and eat a wing. Then he would know whether it was poisonous or not.

He was still sitting there when three canon shots were audible from a distance. They were fired in honour of Francis Bacon, Baron Verulam, Viscount St Alban, former Lord High Chancellor of England, who filled not a few of his contemporaries with loathing, but also many of them with enthusiasm for the practical sciences.

Figs. 01, 02. "Common Loon, Wind Propulsion," photos by Eddie Bartley, 2020; reproduced courtesy of the photographer.

Loons, Space, Time, and Aquatic Adaptibility

by Megan Prelinger

A Species Account: *Gavia immer,* Common Loon
Order = Gaviiformes
Family = Gavidae
Genus = Gavia

Wildlife on California beaches in winter is noisy yet subtle. Gull calls fill the sky while the quiet flight lines of Brown Pelicans limn the horizon. Offshore, floating figures in gray and white appear in silhouette on the water's surface only to vanish with a flash beneath the waves. These are wintering loons that have migrated south from their summer homes in the lakes of northern North America. A beach walker heading onward might spot the same loon again in a few minutes when it slices the water silently from below to resume its surface glide. Or, submerged for a few minutes and swimming powerfully, it may outdistance a beach walker and seem to disappear altogether.

Modern *Homo sapiens,* among other species in the genus *Homo,* have been walking the earth and its beaches for less than 200,000 years. Throughout that time, humans encountered seabirds along the earth's coasts, although relative to loons (and many other animals), we are still newcomers. One early member of the order *Gaviiformes* and family *Gavidae,* a

distant relative of modern Loons, was swimming the seas at the end of the Cretaceous period:

> A new and gracile species of fossil Loon *Polarornis* from Upper Cretaceous strata on Vega Island of Antarctica […] is about the size of a Red-throated Loon. […] The new species of Polarornis has striking similarity to the fossil and extant Loons, displaying remarkable evolutionary stasis of *Gavidae* over 65 million years […].[1]

This piece of ornithological history reminds us that contemporary loons and their near ancestors have been inhabiting the Earth for a significantly longer duration than human beings; from this perspective, the human time scale of our own species' history may not prepare us to understand the lives of loons.

The five species of modern Loons span the Northern Hemisphere and are clustered in the family *Gavidae* and are grouped together in one genus, *Gavia*.[2] They are piscivorous, foot-propelled diving birds that are superbly adapted to cold, deep water; almost all of their long lives are spent in open water of northern latitudes. Their bodies are built for efficient diving, with powerful legs and large, silky webbed feet that

1 Sankar Chatterjee, D. Martinioni, F. Mussel, Fernando Novas, and R. Templin, "A new fossil loon from the late cretaceous of Antarctica and early radiation of foot-propelled diving birds," *Journal of Vertebrate Paleontology* 26/3, Supplement (2006): 49A.

2 In addition to *Gavia immer* (Common Loon), the other four species are *Gavia adamsii* (Yellow-billed Loon), *Gavia pacifica* (Pacific Loon), *Gavia arctica* (Arctic Loon), and the smallest, *Gavia stellata* (Red-throated Loon). All are circumpolar; *Gavia adamsii* and *Gavia immer* are weakly differentiated and together they form a "superspecies." Similarly, *Gavia pacifica* and *Gavia arctica* are closely related.

push water behind them. Their legs are positioned at the very back of their bodies, making them perfectly long and streamlined at the apex of each kick. Their center of gravity is directly over the center of their bow-shaped keel bone rather than over their legs. This body plan maximizes diving strength, but their powerful legs do not hold their weight on land. The largest and most populous of the five species is *Gavia immer* (Common Loon, also known as Great Northern Diver), which can weigh up to eight kilograms. On an ordinary day, they are perfectly insulated and waterproof. They leave the water only during nesting season; their floating, saucer-shaped platform nests of reeds and sticks support their large bodies while nesting.

San Francisco, 2005: a Common Loon is briefly in captivity—in my home. An hour earlier, just before sunset on a March evening, I picked up a call from Beach Patrol and drove out to Ocean Beach in San Francisco with a large fishing net, a sheet, and a portable kennel packed with towels. The large first-year Common Loon stranded on the beach picked up a drop of oil that breached its waterproofing. A few minutes later, she is cushioned inside the large dog kennel and protected from visual stress by a draped sheet; soon after, she is nestled in the quietest corner of our apartment. By 9 A.M. the next morning, she will be swimming in the therapy pool.

Loons nest in spring and summer in the circumpolar northern temperate latitudes, typically on lakes in remote areas. In bright breeding plumage, they wear deep shades of black accented with patches of iridescent blue-green undertones and lacy dappling wrapped around them. In their summer freshwater lake habitat, Common Loons are known to people near them by their iconic undulating flutelike wail. They

form annual pair bonds and rear one or two young in the summer. In their breeding range, they are highly visible and iconic, serving as regional symbols of the natural beauty of the lakes.

In winter, loons migrate to coastal and estuarine saltwater environments in ice-free parts of the world. In common with other seabirds, the natural history of loons roughly conforms to a set of features that the seabird biologist Anthony Gaston terms the "Seabird Syndrome."[3] In this system, body sizes are generally large (most terrestrial species of birds weigh less than 300 grams, while most marine species of birds weigh *more* than 300 grams). Along with large body size, they exhibit multidecadal lifespans, low reproductive rates, colonial nesting behavior, and sexual monomorphism. Like other seabirds, loons are able to live in salt water by desalinating the water they drink inside their bodies.

Once beached, the loon enters a compression of space and time that threatens its life: in the wrong-space of solid ground, its legs are of limited use. Its large body weight means its sharp keel bone is capable of cutting through the flesh that covers its flight muscles, especially if it has lost body mass from hunger, which is a common result of hypothermia. The clock begins to tick: loons cannot survive more than a few days out of water.

Meanwhile, their presence in their winter range is more subtle than their high summer profile. People in northern Asia, Europe, and North America can find members of the five species within *Gavia* silently browsing and sluicing near shore waters from late autumn to late spring. Some species, including *G. immer,* range as far south as the Gulf of Mexico

3 Anthony Gaston, *Seabirds: A Natural History* (New Haven: Yale University Press, 2004), 22–23.

and southern California. But they make few sounds in winter, and their more reserved winter plumage is composed of medium grays, pale grays and whites, meaning they all but disappear in the landscape.

Loons in Space

While today the five species of loons are restricted to the Northern Hemisphere, recent fossil evidence indicates that the order *Gaviiformes* likely evolved in the fertile landscape of Upper Cretaceous Antarctica:

> The occurrence of *Gaviiformes* in the Southern Hemisphere during the Upper Cretaceous–lower Eocene times is consistent with recent phylogenetic proposals relating this group to *Sphenisciformes* and *Procellariformes*, birds already recorded in Antarctica. The fossil record also supports the idea that the hemispheric displacement observed in *Gaviiformes* could be a response to increasing competition for resources with *Sphenisciformes*. The phylogenetic proximity of penguins and loons plus their similar trophic behavior, suggest that competitive exclusion could have triggered the *Gaviiform* migration to the Northern Hemisphere and explain their extinction from Southern continents.[4]

4 Carolina Acosta Hospitaliche and Javier N. Gelfo, "New Antarctic Findings of Upper Cretaceous and Lower Eocene Loons (Aves: *Gaviiformes*)," *Annales de Paléontologie* 101 (2015): 315–24; doi.org/10.1016/j.annpal.2015.10.002.

In summary: *Sphenisciformes* = penguins; *Procellariformes* = tubenoses (albatrosses and allies); *phylogenetic proximity* = genetic relationship between orders and families of birds; and, *trophic behavior* = feeding locations and behaviors.

The phrase *hemispheric displacement* expresses the physical reach through global space that the order *Gaviiformes* have traversed since the dawn of the Eocene. The range of contemporary loons has been restricted to the Northern Hemisphere since at least the Miocene (23 million years). The vast majority of fossil evidence of loons is found in Northern and Central Europe and in North America, including evidence of a dozen or more extinct species of loons that populated these parts of the world in the recent tens of millions of years. Yet the fossil record finds their earliest traces in the Southern Hemisphere.

Loons in Time

At the level of their order history, *Gaviiformes* inhabit the Earth across geologic time, which has enabled their massive shift in location. On a geologic time scale, they accomplished long-distance terminal migration from the Southern Hemisphere to the Northern over tens of millions of years, from the time when they emerged as a family of animal life forms around the end of the Cretaecous period. This means that *Gaviiformes* have survived several worldwide waves of extinction, including the Eocine–Oligocene extinction event (23 million years), and the Pliocene–Pleistocene boundary extinction (2.6 million years). This, in turn, suggests that loons are capable of inhabiting the Earth with expanded spatial and

temporal strategies that our own species can hardly even imagine, let alone aspire to.

One teaspoon of contaminated sea water can wick between the microscopic barbules of a loon's feathers. In normal conditions, the feathers are zipped together like Velcro, tighter than the size of a water molecule, forming a waterproof shield that surrounds the bird and keeps its insulating down warm and dry, maintaining a very warm-blooded body temperature of 39.4 ºCelsius. Underneath this shield, loons are as vulnerable to hypothermia in ocean water as a human being, or any other warm-blooded animal. One teaspoon of oil is enough to create a hole in their shield that can allow cold water to wick through it and seep in around the bird's body; once it begins to feel very cold, the loon will beach itself in an effort to escape the icy clutches of ocean water.

The Late Pleistocene Extinctions & Aquatic Survivorship

The most recent major extinction event took place fairly recently, late in the Pleistocene, just 11,000 to 13,000 years ago. Humans have a sense of historical time that grasps thousands of years, making the late Pleistocene extinctions easier to visualize than earlier and larger cycles. The extinction event was global, but the Americas were incubating so many large animals during the Pleistocene—sloths the size of elephants, sabertooth cats, mammoths, mastodons, and birds the size of small aircraft—that the Americas were disproportionately

impacted by the mysterious suite of environmental changes that brought about the extinction of most of these species. As the paleontologist Donald K. Grayson so clearly explains in *Giant Sloths and Sabertooth Cats: Extinct Mammals and the Archaeology of the Ice Age Great Basin,* the Americas lost seventy-seven genera of land mammals and fourteen genera of terrestrial birds in that fairly recent period.[5]

Grayson's close analysis of the chronology and geography of the extinctions disproves the popular hypothesis that human hunting caused the extinctions: his book shows that the fossil evidence of human habitation, compared with the fossil evidence of animal extinctions, do not align. The general and gradual overlap in time between the arrival of humans in the Americas and the Pleistocene extinctions thus coincide without any causation. In fact, the last woolly mammoths survived on Wrangel Island in the Arctic Ocean until within 4,000 years ago.[6]

Aquatic life was largely spared from this extinction event. While some aquatic bird species did become extinct, the majority survived, and the fish, cetaceans, and cephalopods that ply the seas swam through the extinction event largely unchanged as a major terrestrial drama played out.

A few terrestrial animals also survived the late Pleistocene, notably the last living member of the genus of giant birds *Gymnogyps,* which once were populous across the Americas.

5 Donald K. Grayson, *Giant Sloths and Sabertooth Cats: Extinct Mammals and the Archaeology of the Ice Age Great Basin* (Salt Lake City: University of Utah Press, 2016), 155.

6 Sergey Vartanyan, Khikmat A. Arslanov, Juha A. Karhu, Göran Possnert, and Leopold D. Sulerzhitsky, "Collection of Radiocarbon Dates on the Mammoths (*Mammuthus primigenius)* and Other Genera of Wrangel Island, Northeast Siberia, Russia," *Quaternary Research* 70 (2008): 51–59.

The California Condor (*Gymnogyps californianus)*, while not currently a self-sustaining wild population, *is* alive in the wild and breeding, and its conservation status is hopeful. The Condor's adaptability to the Pacific Ocean appears to have enabled its survival into the Holocene. This is explained by the biologist Kena Fox-Dobbs and her colleagues:

> The use of marine megafauna by California Condors on the Pacific coast likely allowed these populations to survive the extinction of terrestrial megafauna.… [the results of our research] highlight the importance of understanding how top consumers use productive coastal zones as extinction refugia during periods of environmental or ecological change.[7]

In other words, coastal condors may have survived the recent mass extinction because they were co-adapted to foraging the beached carcasses of marine animals in addition to other terrestrial food sources.

Mammalian Analogies & Survivorship on Earth

This adaptation might hold for people too. Genetic research into human lineages has found evidence for a compressed

7 Kena Fox-Dobbs, T.A. Stidham, G.J. Bowen, S.D. Emslie, and P.L. Koch, "Dietary Controls on Extinction Versus Survival Among Avian Megafauna in the Late Pleistocene," *Geology* 34/8 (2006): 685–88; doi.org/10.1130/G22571.1.

bottleneck in the human population in the era of early Pleistocene glaciation cycles. The evolutionary paleontologist Curtis Marean and his research collaborators have established that the coastal southern tip of Africa served as an extinction refuge for *Homo sapiens* between 19,000 and 12,300 years ago, when Africa was heavily glaciated.[8] The savannas that had supported the rise of our species were largely unavailable for foraging during that time, and surviving humans rode out the ice age by adapting to a coastal lifestyle of fishing and foraging for shellfish. Their proximity to the powerful Benguela Current upwelling ecosystem ensured a rich aquatic forage—an abundance comparable to that of the California Current upwelling ecosystem, which more recently supported the survivorship of the Pacific coastal branches of the California Condor.

In many parts of the Northern Hemisphere where a loon might beach itself, it has a real chance of being picked up and carefully crated by an experienced loon handler. At International Bird Rescue in California, the course of therapy pools and the resources to clean off the oil offer the loon its best chance for a swift return to the water. The set of evidence provided by the cases of aquatic life, and of the unique cases of both the condor and human survivorship through co-adaption, suggests that aquatic environments are more constant in their ability to support life over epochal spans of time than are terrestrial environments.

Oil is an easy reference point for introducing the story of the beached loon. The word "oil" jumps out at the reader, loaded with oversized chains of association that connect to our

8 Curtis Marean, "When the Sea Saved Humanity," *Scientific American* 25/4 (2016): 36–43.

carbon-intensive, extraction-based industrial lifestyles. But, it is necessary to add to the problem of oil the phenomenon of superblooms of toxic aquatic algae that are supported and accelerated by climate change. The algal blooms spread in slicks across warming ocean surfaces: these algae, too, can breach the waterproofing of a loon (and that of any other seabird that possesses a waterproofing system similar to loons). From a veterinarian-authored report following a 2009 algae bloom event off the California coast:

> The fouling agent was a proteinaceous foam derived from the cellular breakdown of the dinoflagellate *Akashiwo sanguinea.* This foam coated seabird plumage in a manner similar to fouling by petroleum oil, causing waterlogging, hyperthermia, morbidity, and mortality […].[9]

In both cases—oil and algae—the charismatic loon is a symbol that stands for itself as well as for the aquatic food web on top of which it literally sits: *A. sanguinea* causes acute toxicity not just in seabirds, but in populations of finfish, shellfish, and among the zooplankton that support entire food webs.[10]

The extraordinary durability of loons suggests that they could serve as an alternative model for addressing questions

9 Elizabeth M. Phillips, Jeanette E. Zamon, Hannahrose M. Nevins, Corinne M. Gibble, Rebecca S. Duerr, and Lauren H. Kerr, "Summary of Birds Killed by a Harmful Algal Bloom Along the South Washington and North Oregon Coasts During October 2009," *Northwestern Naturalist* 92/2 (2011): 120–26.

10 N. Xu, M. Wang, Ying Tang, Q. Zhang, S. Duan, and Christopher J. Gobler, "Acute Toxicity of the Cosmopolitan Bloom-forming Dinoflagellate *Akashiwo sanguinea* to Finfish, Shellfish, and Zooplankton," *Aquatic Microbial Ecology* 80 (2017): 209–22; doi.org/10.3354/ame01846.

about human survivability. In addition to endangering loons, the fossil fuel economy is the leading cause of global climate change. The impact of *A. sanguinea*, however, forces us to ask a more complicated question: will aquatic food webs continue to support life of all kinds on an epochal scale? What must we do, now, to ensure that the ocean and its generative aquatic ecosystems continue to provide a refugium from extinction for terrestrial life forms, including humans, for another million years?

Homo sapiens lack the deep history that would allow us to apprehend or intuit these epochal time frames. We would do well to try, and to emulate the loon: that is, to imagine our species enduring millions of years on Earth. If we were able, collectively, to envision and strive toward such a survival horizon, we'd be better able to convene the interventions that are called for to protect both aquatic and terrestrial food webs from anthropogenic extinction.

The worldwide network of wildlife crisis responders are one group among many that are striving to exist outside the dominant culture of extraction. Their research and public outreach contributes to a human understanding of animals and their ecosystems, while their daily work returns animals, one by one, to their environments. My loon was cleaned of its contaminants, re-waterproofed, and nourished before its release. Six days after we picked her up, we took her to a bay shore beach and released her. We placed the creature onto soft sand as close as we could step to the waterline. Her delicate feet and powerful legs pushed the sand behind her as she eased into the water. A brief fluting chirp and a big drink of water, then she dove in and disappeared.

Of Wild Sanctuaries

Bernie Krause & Kat Krause
in conversation with Etienne Turpin

When we first read the news in 2017 that Wild Sanctuary—the home, archive, and business of Bernie and Kat Krause—had been completely destroyed by the Nuns Fire in California, we were devastated. As readers and admirers of their work and of Bernie's books, we had also been deeply moved by his Fondation Cartier exhibition, *The Great Animal Orchestra,* in 2016. We couldn't imagine how, after fifty years of committed work recording biophonies around the world, such a loss could even be grieved. Fortunately, although the original analog recordings were lost, the "natural sound archive—the core of a lifetime of devoted work—miraculously survived in digital form. The heart of the collection, an eloquent narrative of living organisms expressed through the numerous biophonies present in the recordings, is still there to be explored by students of environmental sciences and rendered into fine art creations in the fields of music, dance, theatre, museum exhibitry, and contemporary art installations."[1] And yet, even knowing the backups were saved, the thought that one of the most important collections of natural sound—and one of the very few focused on ambient biophonic recordings, as opposed to individual creatures—had been incinerated by a climate change-induced wildfire was terrifying. Even more terrifying was the realization, which came as we were completing the edits for this book, that the megafire which destroyed Wild Sanctuary, as well as over 400 square kilometers of land and thousands of homes, was less than a tenth of the size of the gigafire currently ravaging California.

Quarantinewhile, in May 2020, as the COVID-19 pandemic shuttered businesses and airports, the U.S. National Oceanic and Atmospheric Organization reported that the concentration of carbon dioxide in the atmosphere had passed 418 parts per million, "the highest ever recorded in human history and likely higher than at any point in the last three million years."[2] While climate activists hoped that global stay-at-home orders might demonstrate just how drastic a change to business-as-usual is required to prevent a runaway climate change scenario, scientists warned that we should not expect the pandemic itself to make any significant contribution to lowering CO_2 levels. This is because, as NOAA's Global Monitoring Lab explains, "There is no photochemical destruction of atmospheric CO_2 like there is for many other gases. [. . .] Atmospheric CO_2 can dissolve in water and it can be turned through photosynthesis in plants into wood and other organic matter. However, these transfers are not permanent because the carbon can, and in fact does, come back again as CO_2."[3] This condition is worth remembering as governments around the world begin making pledges for greenhouse gas reductions in anticipation of COP26; whether the commitment to reducing emissions in order to limit global temperature increase to 1.5 degrees is renewed will be determined at the meeting in November 2021. It is also important to remember that in 2009, when the Danish circulated a draft document among the

G20 countries attending the Copenhagen Climate Conference that proposed a 2-degree global target, the Sudanese diplomat Lumumba Di-Aping rebuked it as "climate genocide."[4] As Bill McKibbon explains, "A rise of one degree doesn't sound like an extraordinary change, but it is: each second, the carbon and methane we've emitted trap heat equivalent to the explosion of three Hiroshima-sized bombs."[5] As more heat is trapped in the atmosphere, climate change accelerates, causing, among other things, larger and more dangerous forest fires. For example, Californians are now witnessing the fulfillment of climate change predictions.[6] In September 2020, the August Complex Fire became the largest recorded in modern history after burning over 4,000 square kilometers of land—roughly equivalent in size to the state of Rhode Island. Aside from their awesome destructive power, these wildfires remind us that climate change and biodiversity loss are indelibly entwined—so clearly demonstrated by the Australian bushfires of 2020, which killed over one billion animals—and require massive transformations to avoid even more horrifying scenarios.[7]

In "The Sound of Disappearance," Bernie Krause writes:

> In early October 2017, my wife, Kat, and I lost everything in the wildfires that destroyed large areas of Northern California. Our home. Our dear cats. All my detailed field journals going back half a century. Slides and photos of work in the field. Reference books. Nearly seventy years of correspondence. The wonderful sounding guitar I played at Carnegie Hall as a member of The Weavers. Fine art. Clothes. Furniture. The intensity of the inferno was so great that even the refrigerator and the engine block of Kat's car melted into unrecognizable puddles of stainless steel and aluminum. Except for us, not one single item that we had amassed over the arc of our lives survived.[8]

He continues, addressing the sonic homeliness that was also lost in the inferno:

> With all the "stuff" gone, now, the gentle tranquil soundscape remains the feature we miss the most. I suppose it's a detail that we will be dealing with for the rest of our lives. After all, it was from the voice of our special animal orchestra that we knew the time of day or marked the progressive phases of the seasons. From messages inherent in those distinctive narratives we became intimately familiar with many aspects of the small bit of earth that we occupied and affectionately managed. Until the fire, the quality of the soundscape was always welcoming, healing, and reassuring—a subsequent effect of the collective sound produced within our modest but mostly healthy biome.[9]

In Spring 2019, thanks to an invitation from the curator Paola Antonelli to join her for a conversation as part of her program for the exhibition *Broken Nature,* (which included *The Great Animal Orchestra*), Etienne was finally able to meet Bernie and Kat in person. The following conversation is an edited transcript of our conversation; a very special thanks to Erica Petrillo for making this meeting possible and to the Triennale di Milano for generously hosting us in their space.

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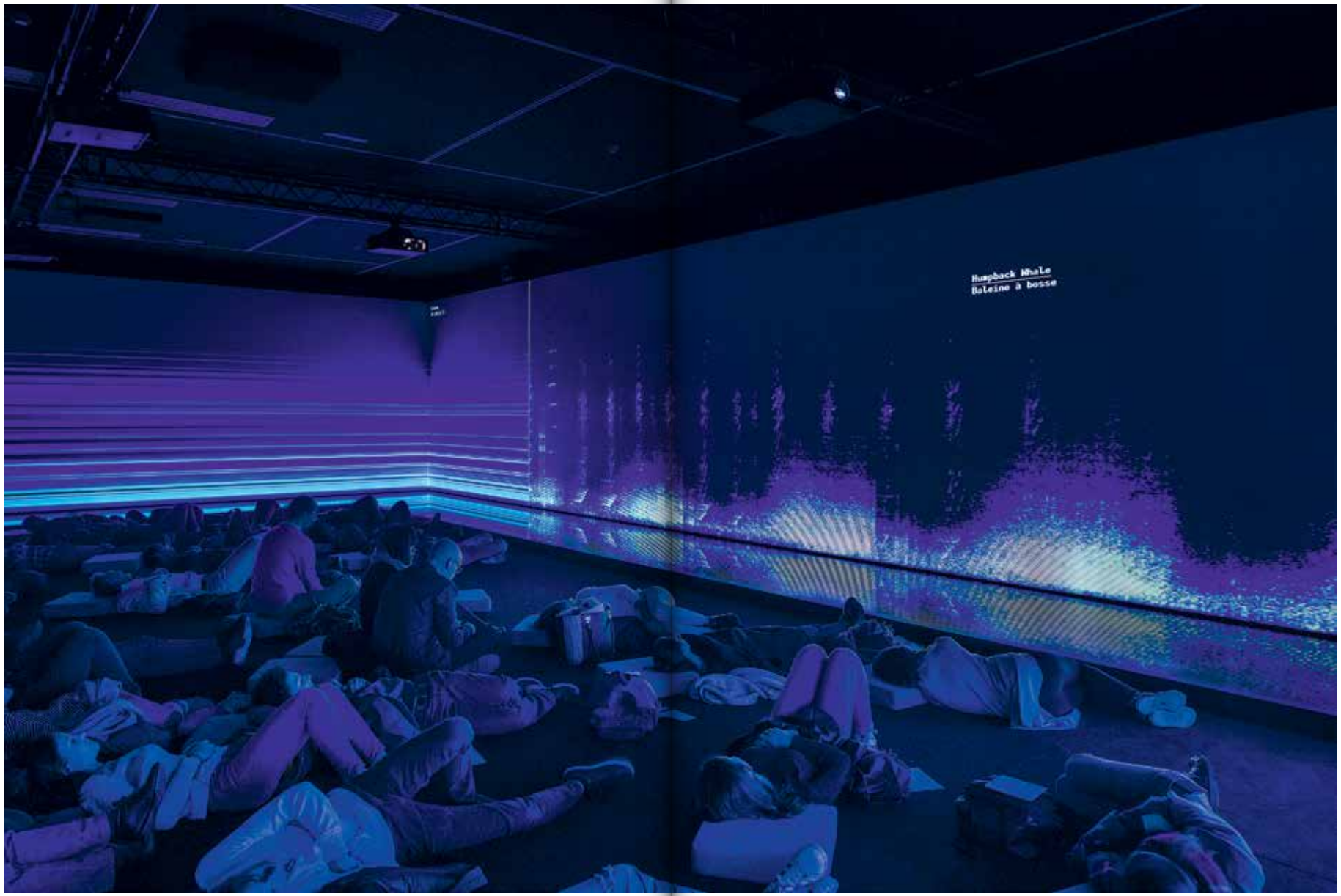


Fig. 01. Bernie Krause, *UVA, The Great Animal Orchestra,* 2016; view of the exhibition *The Great Animal Orchestra,* Fondation Cartier pour l'art contemporain, Paris, 2016. Photographer credit: © Luc Boegly. Artist credit: © Bernie Krause / © UVA.

Etienne Turpin

In the context of *Broken Nature,* I'd like to talk with you both about extinction because I don't really think that it is nature which is broken—rather, I would argue that nature is what is being broken by a fairly specific group of human beings.

Bernie Krause

Did you know that fifty percent of my archive comes from habitats that no longer exist?

E T

Really? I didn't realize that—that is terrible. What I did notice is that the recent IPBES Biodiversity Report, which is also terrible, was covered by the media but they didn't connect the report to any current environmental struggles like Extinction Rebellion or Climate Strike (Fridays for Future).[10] How can we begin to connect science, politics, activism, and art in order to develop a more coherent and comprehensive position with respect to this escalating ecological collapse?

B K

That is my mission and that has been our mission. We've been experimenting with different things, like this exhibition [*The Great Animal Orchestra*], to see what works and what doesn't.

E T

But you said earlier that you had never had a response in the United States to your work that was as big as with your show at the Fondation Cartier in Paris. Can you say more about this? When Anna-Sophie and I saw it, we were both completely amazed; I think it really set a new standard in terms of immersive, thoughtful, precise exhibition making.

B K

We don't know if that is how you do it though, because there hasn't been any real proactive results from seeing this work!

E T

You mean it didn't change policy?

Kat Krause

Not yet.

B K

Not yet, but, whether or not impact lasts, how to make it last, and how to make it into policy, these are things I have no idea how to do. What I do know how to do is to convert this medium of bioacoustics, the scientific aspect of it, because of the ways and protocols we use to record it, we have ways of converting it now into works of art that do engage people.

But let me go back: I've been doing a lot of work in the U.S., at least fifty installations at different institutions, museums, zoos and aquaria. The museums, these specialized public spaces, all claim that part of their mission is protecting animals, or the environment, or any number of different ways they make a similar set of claims, the problem is: that is not quite true. Their mission is primarily, as an institution, to survive as an institution, and they have to survive within the structure of the capitalist system—the way that capitalism is structured right now—and so they have a lot of people on their boards of directors like David and Charles Koch, and others like that, because they have so much money. But these kind of people also have a lot of influence on what is being shown in terms of content in these spaces. Consequently, what tends to happen is that the soundscapes are relegated to the same position as sound effects in film production, namely, the last thing that is considered. The film is done, they have run out of money, spent millions on visual and other special effects …

E T

… and, we have ten bucks left to deal with the sound!

B K

Oh yes. [Sarcastically] "We have ten dollars left Bernie and we'd like you to fill in the sound. We'd be really grateful, and next time, the next film we get, you'll get the whole film at full rate!"

K K

[Laughter]

B K

So the ways in which natural sound recordings have been put into most museums is terrible. We had a patent on some really fantastic delivery systems, which performed non-repetitively, like sound occurs in the natural world, and we made a mixing system which presented not only the soundscape but also different creatures that would be featured, and we also had a component which identified in real time what people were hearing. One museum out of fifty bought that system; one museum had a successful installation where they didn't have a lot of competing sound. So, our success rate was not high. That is my judgement, not theirs.

K K

They liked it, but Bernie is very discerning.

B K

The upshot is that this stuff was not getting any traction and I was getting very depressed because here is all this money being spent, yet no one can even pay attention to it. There are so many competing sounds in these huge spaces, including HVAC systems, people and guides talking, background noises, kids running, shouting and screaming, and, in general, museums are just not designed very well.

When I wrote *The Great Animal Orchestra* in 2012, I was still in that conceptual model. But when the book came out, it was translated into French, and there was an anthropologist in South America by the name of Bruce Albert, who was a good friend of Hervé Chandès, the director of Fondation Cartier pour l'art contemporain in Paris. Albert gave him a copy of the book, then Hervé called me, and after a few years of process, we decided we would do an installation and see if it worked.

E T

The same Bruce Albert that wrote *The Falling Sky* with Davi Kopenawa?[11]

K K

Exactly him. He read Bernie's book, gave it to Hervé, and as soon as he had read it he called us.

B K

So, Hervé came to California and we began to work through it; eventually, he picked seven pieces out of fifteen or so things that I had prepared. They were all habitats that are under threat; most of the habitats that are in the show [in the Triennale di Milano] are already gone. There is a lot more that is disappearing that we need to pay attention to. When Hervé set this up and the Fondation Cartier decided to go ahead with it, I was still working in a small format concept since that had been the model I had been limited to for so long.

K K

We also didn't have the technology. We did exhibitions but people were not ready.

B K

Maybe we weren't ready either. We didn't have the intellectual resources, or the technical or financial resources either. Fondation Cartier has seemingly unlimited resources, which changes the equation. The projected spectrograms I had been using as examples were too small. The Cartier folks imagined something much larger in scope. At some point, they took me downstairs in their Paris museum and showed me this huge room. Because of my design limitations, I immediately thought it wouldn't work; the volume of the room was way too large, the walls were parallel surfaces, and the consequential reverb would sound like shit. They asked me to trust them and assured me that building out the whole space would work.

So I had to put my ego away. They hired United Visual Artists and Matt Clark. I showed them what I had in mind and they said, okay, we'll see you in a few months. When I returned to Paris, they showed me what they had developed. Damn, it was pretty good! [Laughter]

They wanted flat walls. No curves; no domes. They wanted people sitting in the middle with surround sound. Normally, that kind of architectural space would be an acoustic disaster. But the Cartier folks and UVA had planned to mitigate the room with sound absorbing material on all of the surfaces transforming the space into more of a well-tuned concert hall setting.

Since all of my field recordings are formatted in MS [Mid/Side] all of the material converts easily to 5.1, 7.1, or ambisonic. Along with help from engineering folks at the Centre Pompidou, we decided to install 7.1. It was a collaboration with people who really knew what they were doing. Hervé had a vision for the work; he thought it could really reach people because the sounds themselves are so powerful. And, it is all natural sound, the kind that crosses all kinds of divisions: language, age, culture. Even young kids could sit fully engaged for hours. It was amazing. I was in Seoul and a five-year-old asked me, during a Q&A, "What kind of a sound does a whale make? How do you record a whale?" I was astonished. There hasn't been a single adult or kid in all of the United States in fifty years of outreach who has asked me that question.

K K

People are hungry for some connection to our natural home and they want to be nurtured by those sounds. People want to hear this.

E T

One thing that the biophonic recordings make very clear is that the natural history museum model typically presents aspects of the natural world as *speciated,* as if the objective of evolution is to speciate and then hold that form, as it does with its taxidermy specimens.

K K

That is, of course, ridiculous.

E T

Exactly, it is absurd because the process of speciation has no finish line, nor does it have any teleology. There are moments of arrival and departure. Forms change, speciation continues. The presentation of life as a speciated freeze frame is a complete conceptual failure that contributes, I would argue, to our current crises. It sets the imagination up for failure from the beginning.

B K

There is another element to this that we should talk about. The recording of natural sound that began in the late 1880s with Ludwig Koch—no relation to the Koch brothers—recorded a single, individual animal, in his case the common shama (*Copsychus malabaricus*), with his wax cylinder recorder. That was 1889, but he set a protocol that still exists for recording natural sound. So, when you are talking about the speciated form presented in the natural history museum, it is the same thing in bioacoustics. In fact, all of the great library collections are primarily comprised of single, individual animals (Cornell University, the British Library of Wildlife Sound, etc.).

From the onset of my work in the field, because I came at this as a musician, I was hearing it more as a collection of sound—as a proto-orchestra. I hated taking a single species out of that context because the meaning got lost. It is like taking a violin player out of the orchestra playing Beethoven's 5th and listening to just that one part. Dee-dee-dee-dee—the opening notes make the point. And this is what we have done when studying aspects of the natural world. We've taken it apart, deconstructed it. And in that distorted way, we attempt to understand it.

E T

As isolated?

B K

As individual parts, because we have the intellectual power to isolate them. But, when I started in 1968, I wanted to get a better perspective on this, and I felt then, as I still feel now, that there is much more to learn by listening to the whole biophony, which is the collective sound produced by all organisms in a given habitat at one moment. So, that's the way I began my whole collection, and the reason this collection is so important is that the biophony is a narrative of place. That narration contains a lot of information, it informs practically every discipline you can think of, including medicine, religion, biology, natural history, resource management, mathematics, and philosophy. If you learn to listen to it, you will have enough scientific study to do for another twenty or thirty lifetimes. There is a lot there that we have not been paying much attention to.

I'll give another way to look at it. My voice is quite bad today because I'm not feeling so great. A soundscape, a biophony, conveys the health of a habitat in much the same way. When it's not feeling great, it tells you through its collective voice. The density and diversity will change. The articulation will change. The timbre will change.

E T

Are you saying that there is a biophonic health measure or that you can read the health of an ecosystem through the biophony?

K K

It is more of a biophonic barometer that indicates the health of the environment.

B K

Yes.

E T

I have been wondering for some time about your biophonic recordings as a possible corrective to the current practice of biodiversity estimates. As I understand it, typically these estimates use an extrapolation metric based on tree canopy coverage in satellite

imagery; so, if the canopy diminishes by twenty percent, the equation for providing the estimate would give a result that was also reduced by twenty percent. But, anyone who regularly walks in the forest can tell that would be unreliable. The biophonic recording would provide a far more accurate picture of the health of the forest!

B K

Biophonies are but one indicator of habitat health.

K K

We are on a planet, a big round ball, in the middle of a vast . . . *what*. But our planet is teeming with life. It has worked out this vitality and this ability to express itself. And, that's something really at risk now. Because it is so fine, it still tells the truth. It is one of the very few sources that still tells the truth about what is going on in a particular place. I love the fact that the biophony is a source that is still real and reliable regarding what is going on in that particular environment.

E T

When I see your spectrograms, or the videos of the spectrograms linked with the biophonic recordings here in Milan. They do essentially everything that an exhibition-maker could want, but it also doesn't sacrifice any integrity of the scientific recording itself. It teaches without being didactic and it envelops the viewer-listener in an immersive world without relying on cheap technical tricks.

K K

Do you know why that is? We have millions of years of hard-wiring of listening to these sounds. Think of the generations upon generations who have listened to the biophony as the soundtrack of our lives. This is an immense history and intuitively, when we hear it today without other noise or other distractions, it is deeply familiar.

E T

When you see it, as a spectrogram, what you also realize is the immense amount of time that this orchestra took to fill in every niche and every offbeat.

B K

Yes, this took an incredible amount of time to develop; this level of complexity, this level of organization. You can see that intricacy in the spectrogram. But with new acoustic applications, I can separate out different creatures from the biophony to study them without losing that all-important context. When you listen to healthy habitats all of the sound sources are heard in sync with each other in naturally-evolved niches, with each species occupying its own frequency or temporal bandwidth. There is the mouse, there are the bats, then the birds. So, you can separate them out, but we can also play them all together, as a full orchestra. If you're a musician and think of these biophonic spectrograms in that light, they appear like musical compositions by Boulez.

E T

Exactly. I think when you hear it, you hear a rational organization—and I really don't use that word very often—but, if I can, it is both acoustically and visually rational. It is a repeating, variable pattern of complex organization. The realization that capitalism is destroying hundreds of millions of years of evolution, which is so clear in these spectrograms, is overwhelming.

B K

I'm not sure about the "rational" equation. I'd offer an evolved organization.

One of the reasons I've stayed in this field for so long is that I have terrible attention span; I am really a dog when it comes to being able to stay focused on one subject. It's a sympton of what in the U.S. is called ADHD, or Attention Deficit Hyperactivity Disorder. The only thing that ever made me feel good, relaxed, and focused was recording natural sound. When I first went out in the field to record using analog gear in the late 1960s, I could stand quiet for maybe one minute at a time, then I would hear myself slapping mosquitoes, shuffling my feet, or breathing loudly on the recording. So, back in the studio, I ended up having to edit this out all the time because it was ruining the recording. In time, I learned to hold still for two minutes, then five, then ten. Then I got to a full length of a seven-inch reel so that I could last twenty-two minutes without moving. Eventually, incrementally, I got to the point with digital recorders where I could sit for thirty hours straight without moving or making a sound. Recording in the field had taught me to be still and concentrate for very long periods of time.

I figured there had to be something else to this. When I served on the board of Harvard's Institute for Music and Brain Science, which at the time was headed by Mark Tramo (who is now at UCLA), our interest in the biophony led us to propose a double-blind study to see what effected people in positive ways more: music or natural sound. We did not get the funding. But one of the things that we got out of it was the notion that some of these natural soundscapes may be embedded in our DNA. When we think about a vacation, for example, Kat may be dreaming of going to the high desert, while I might want to go to a forest or a lake. You might like the ocean, somewhere on the sea that allows you to hear the rhythms of waves. When we began to look at our desires a little closer, we started to think that there is a lot more to this connection between us and natural sound. We never had the chance to do the study. But that's still a goal.

E T

We are so isolated from natural sound. In our office in Jakarta or our studio in Berlin, while we may hear birds, for example, the predominant sounds are of human activity, much of it fueled by oil and gas. But the incredible, deep calm that I felt after hours immersed in the exhibition, in these worlds of natural sound, is indicative of something more. I completely agree—there was a realization after seeing the work that something is really missing from my everyday life.

B K

I think we have a few clues. There are other things to this as well: there is political resistance and the way that things have unfolded around the world since the fall of the Berlin Wall. It is a big deal, in my mind, because everything began to change rapidly then. I mark the decline of habitats in my archive—the precipitous decline of habitats—from the day that the Berlin Wall fell. It wasn't communism that died; that was moribund to begin with. It was democratic capitalism that died that day. We now have a rampant capitalism that exploits any and every resource, human and natural, a virulant unrestrained system that is totally destructive.

E T

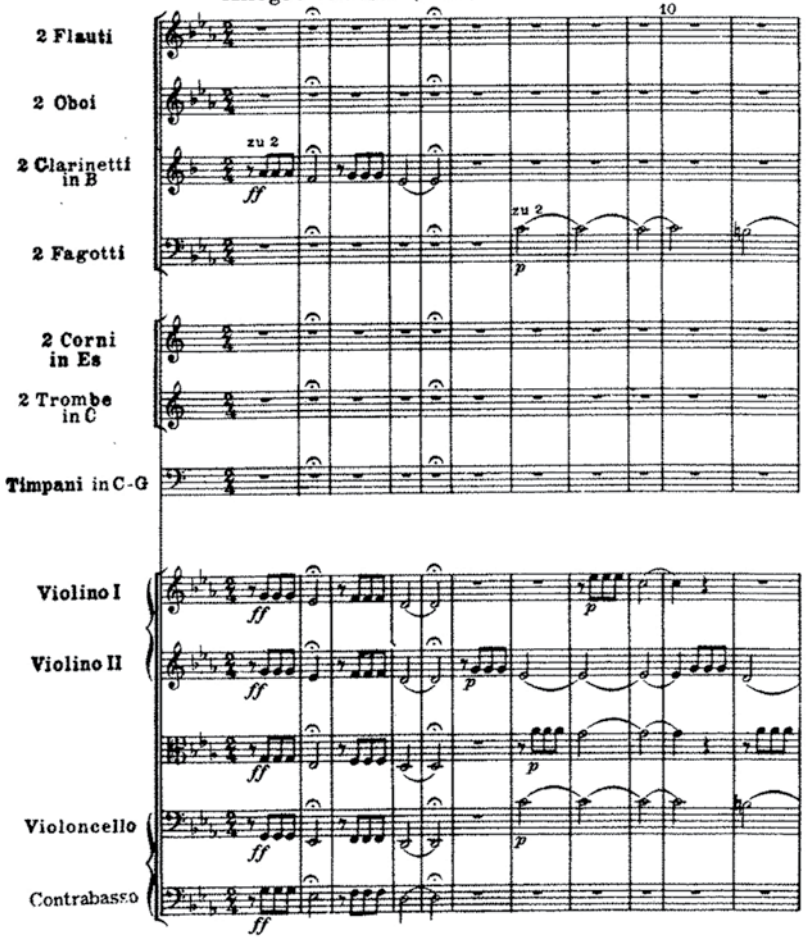
As an activist in the late 1990s and the aughts, I recall some of the messaging we used regarding social, economic, and environmental struggles; at the time, this was provocative language

Symphony No.5

I

Allegro con brio (♩. 108)

L. van Beethoven, Op.67
1770 - 1827



specific to a critique of capitalism (and, as we often said then, globalization), but now it wouldn't be uncommon to hear anyone, even my grandmother, make a similar statement a matter of fact. The Berlin Wall came down in 1989, but within less than three decades it was a commonplace observation that capitalism was well on its way to destroying the possibility of life on earth. That is a radical transformation of opinion that suggests just how rapid the decline has been.

I can see it in my own lifetime. When I grew up, my family spent summers on Manitoulin Island, in a place called Misery Bay. In the *Metamorphoses,* Ovid writes, "They dug their wealth from the earth, and brought misery into the world." I have to agree because not only did my hometown become entirely toxic due to the heavy extraction and smelting of nickel ore, but even that apparently remote island, with no industry whatsoever, has seen a massive decline in biodiversity. I have seen it with my own eyes, and now with the IPBES Biodiversity Report, it is quantified. But, one of the most difficult elements to comprehend is the speed of destruction. People have said I am an alarmist about biodiversity loss, but it is really happening so fast. How do we communicate that?

B K

I did the piece for Cartier in 2016. But if I did the piece today, I would have to add a coda that explained, of these seven habitats, five of them no longer exist. In my book, I argue that this destruction of nature, turning our backs on nature, began under Constantine I at the Nicaea Council in 325, when he charged the bishops to come up with a definition of nature that is unknowable, uncontrollable, and dangerous. This was Natura, in the feminine, and the definition was that it encompassed all that was at enmity with God.

K K

But this is the paradise; this planet is the place. The division between God and Heaven, and Nature on Earth, which defines Christian civilization and culture is part of what is wrong today. The gender divisions it implies are also important because of their legacy: as Bernie said, Natura is a feminine term. But the qualities or practices that have been culturally associated with women, including giving and protecting life, repairing relations, and caring for kin need to be valued again. How do we honor, heal, and repair the natural world when we can't agree on the basic concepts by which to abide?

E T

We have encoded this human supremacy into our language to such a degree that it is almost unnoticeable. When we want to insult people, we might call them spineless, or cold-blooded, or a rat; but, what do we have against invertebrates, reptiles, or rodents? Even outside of zoosemic epithets, to speak in the English language without reverting to anthroposupremacy is actually quite challenging. But, the other problem is that our language for the ecological crisis is very weak. "Habitat loss," for example, doesn't capture the urgency or the violence of this destruction of the natural world.

B K

The lesson that natural science taught me was the collectivity of the natural world, of which humans are a part. We can't separate ourselves from that even if we wanted to. As Paul Shepard said in his book *Nature and Madness,* the more we withdraw from the natural world, the more pathological we become as a culture. If you don't believe that, just watch the news for ten minutes.

K K

When you are talking about language, there are also a lot of secrets in there about how to move forward. But one of the things that is important when you are doing this deconstruction is to bring a feminine balance to the conversation. At some point, we have to stop deconstruction and move toward nurturance.

B K

That is why natural sound works. It isn't language, it is beyond language. It is the essence of what is life-affirming.

K K

This is also where love takes us, but also the feeling of losing a loved one. Some of these moments are our deepest reality, our deepest perception, but they are beyond language.

E T

In my writing, I try to get to a place where we can let things be what they are: pain, struggle, beauty, etc. But, as an exhibition maker, I am also in the game of messaging. So, in that regard, I need language. I know there is much beyond it, but it is also very necessary right now. There are some things that we really don't know how to talk about. For example, when I read about the fire that destroyed Wild Sanctuary, I didn't know how to talk about it or to process the overwhelming emotions I had…

B K

… The collection wasn't lost. 14,000 homes were lost—in a rural area—and over 1,000 square kilometers burned. The winds were 130 kilometers per hour all over the county; it was a Category 1 Hurricane of fire.

K K

I have seen wildfire. I am from the American West and I know wildfires and have seen many before. But I had never seen a firestorm. It was looking into the face of climate change, and it wasn't pretty. The stainless steel refrigerator was completely gone; the slate floor was incinerated.

B K

There was no warning.

K K

The firefighters from our village had been called to another village twenty kilometers away to fight another fire. The fire bell warning had been disconnected six months earlier because it was thought to be unnecessary, so no one could send a warning. We knew we were living on borrowed land, but this was unprecedented. It was in the middle of the night. Since then, we've moved seven times. The disaster isn't just what happens at the time, it is also what comes after.

B K

California is going to get really nasty. We are in the beginning of a climate diaspora and there will be many more of these events. It is picking up speed. We are all going to be environmental immigrants soon, one way or the other.

K K

The amazing thing is that you see people on the news and they've had to leave their home for a variety of reasons and they are carrying their baby on their back and you think how terrible it must be. And then you find yourself in a situation like this, where everything is burned, where everything is gone, and the next day you realize you really have nothing. What it did was open these doors of compassion,

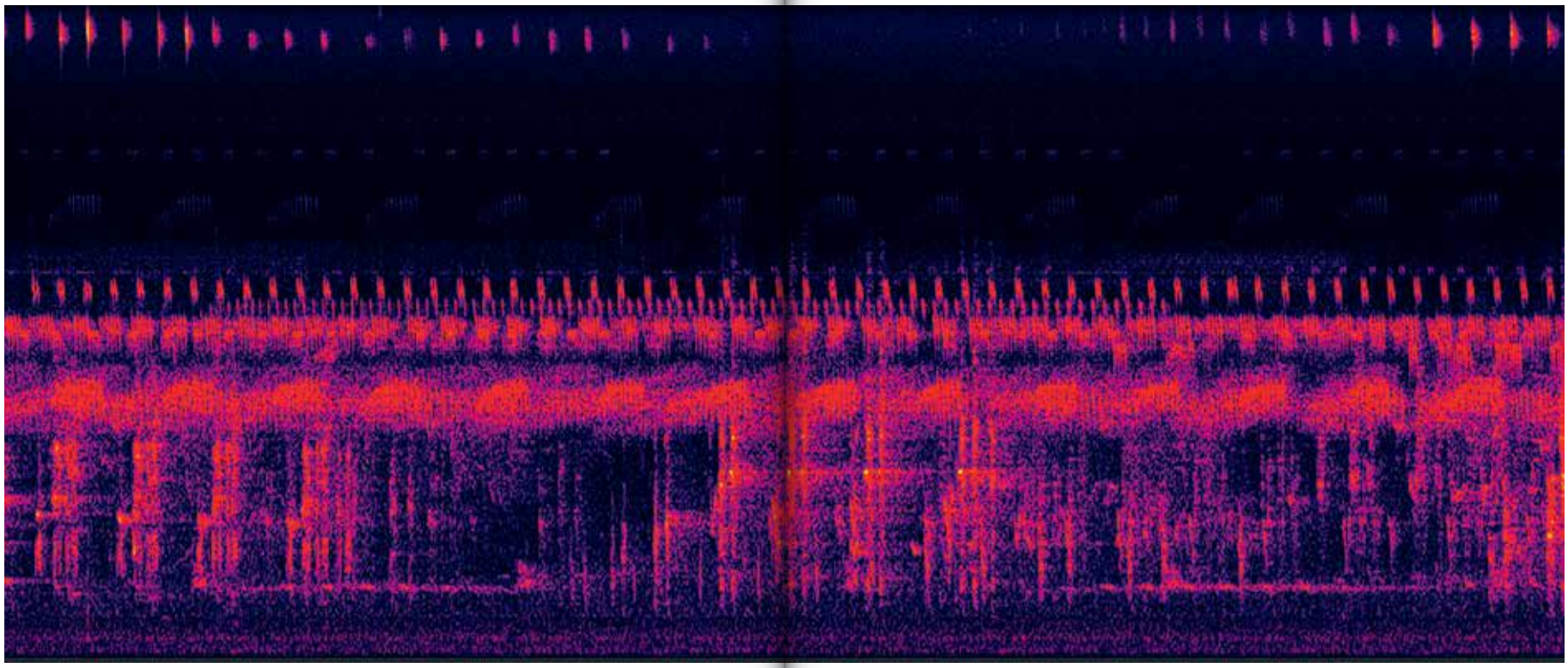


Fig. 02. Bernie Krause, Zimbabwe dawn chorus, courtesy of the artist.

empathy, understanding, and identification, with all these photographs of folks I have seen trying to survive or escape. The compassion that is borne from this type of disaster is extreme and profound …

B K

… in some people.

E T

Yes, in some people, but I also have to say that I think you had this compassion before and that many people won't become compassionate from losing their homes in California. I'm sorry, but I just don't think you needed this event to care for people or the living world!

K K

It is an interesting experience because when global warming showed up at our own front door, at least we could recognize it for what it is.

E T

Finally, would you say a little more about Wild Sanctuary? You use it to refer to the archive but also to your business, as well as the land where you lived before the fire.

B K

Wild Sanctuary was an expression that refers to our home and land that burned and also to our business.

E T

Because the sanctuary for the human is the wild?

B K

Yes, but it is actually a reference to a phrase from the novelist Ellen Glasgow: "Preserve, within a wild sanctuary, an inaccessible valley of reverie."

K K

In 1968, Bernie did an album with synthesizers and wanted natural sounds for the album. They named the album *In a Wild Sanctuary*. It was the first album to use natural sounds as a component of the orchestration. Then, Wild Sanctuary became the name of the business; early on, Bernie did recordings of natural sound for nature company stores, CDs, films, all this kind of stuff, some public spaces and installations, and then began more research and more scientific study.

Then he did his PhD in bioacoustics, and we would self-fund expeditions or try to get commissions. As the research went on, and we made a home for the archive, we also hurried to get baseline studies from endangered ecologies. For years, we made proposals to try to get a caretaker for the archive and there were some really rough years. We needed students in the field. In order to do that, Bernie started writing books, and people started to notice what we were doing.

What we realized in the fire, or after the fire, was that we wanted to ensure the archive and the work would go on if we were gone. So, we are relaunching Wild Sanctuary to ensure the continuity of the work and the biophonic baselines we've collected so far. One of the things we hope to do with the new entity we are creating is to have a few places, or sites, that aren't necessarily formalized, but that can act as field stations for researchers to work on, and from, as a way to create common data …

B K

… because everyone needs a wild sanctuary.

E T

Thank you for such a generous conversation.

1 Bernie Krause, "The Sound of Disappearance," in The XXII Triennale di Milano, *Broken Nature: Design Takes on Human Survival* (20 September 2018); brokennature.org/the-sound-of-disappearance.

2 Alejandra Borunda, "Plunge in carbon emissions from lockdowns will not slow climate change," *National Geographic* (20 May 2020); national geographic.com/science/2020/05/plunge-in-carbon-emissions-lockdowns-will-not-slow-climate-change.

3 "Can we see a change in the CO_2 record because of COVID-19?", Global Monitoring Laboratory; esrl.noaa.gov/gmd/ccgg/covid2.html.

4 Quoted in Adrian Lahoud, "Scale as Problem, Architecture as Trap," *The Avery Review* 15 (April 2016); averyreview.com/issues/15/architecture-as-trap.

5 Bill McKibben, "130 Degrees," *The New York Review of Books* (20 August 2020): 8.

6 R. Barbero, J.T. Abatzoglou, N.K. Larkin, C.A. Kolden, and B. Stocks, "Climate Change Presents Increased Potential for Very Large Fires in the Contiguous United States," *International Journal of Wildland Fire* 24/7 (16 July 2015): 892–99; doi.org/10.1071/WF15083.

7 David Wallace-Wells, *The Uninhabitable Earth: A Story of the Future* (London: Penguin, 2019), and Mark Lynas, *Our Final Warning: Six Degrees of Climate Emergency* (London: 4th Estate, 2020).

8 Bernie Krause, "The Sound of Disappearance."

9 Ibid.

10 E.S. Brondizio, J. Settele, S. Díaz, and H.T. Ngo, eds. *Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (Bonn: IPBES secretariat, 2019).

11 Davi Kopenawa and Bruce Albert, *The Falling Sky: Words of a Yanomami Shaman*, trans. Nicholas Elliott and Alison Dundy (Cambridge: The Belknap Press of Harvard University Press, 2013).

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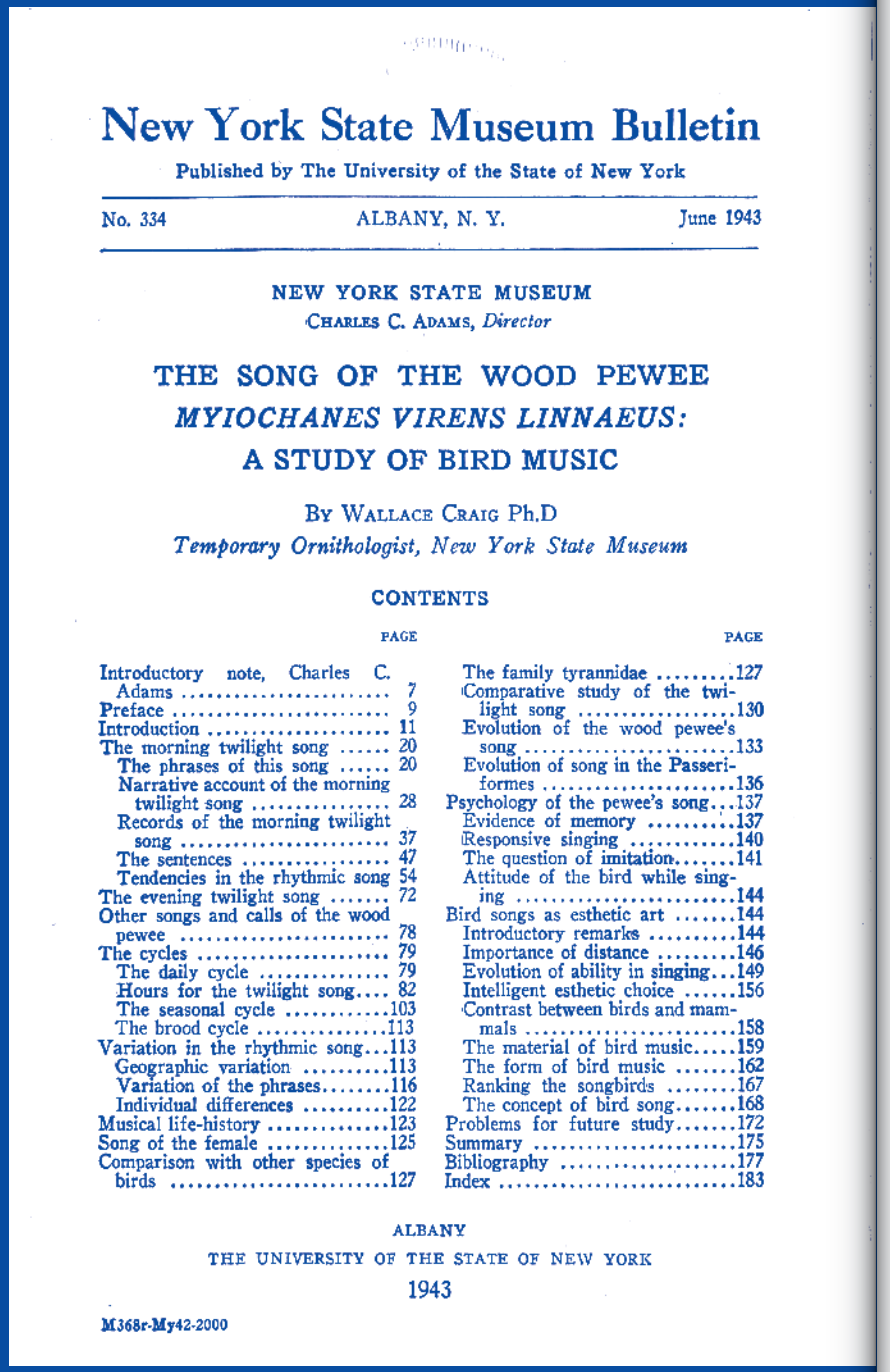

New York State Museum Bulletin

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No. 334 ALBANY, N. Y. June 1943

NEW YORK STATE MUSEUM

CHARLES C. ADAMS, *Director*

THE SONG OF THE WOOD PEWEE

MYIOCHANES VIRENS LINNAEUS:

A STUDY OF BIRD MUSIC

BY WALLACE CRAIG Ph.D

Temporary Ornithologist, New York State Museum

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ALBANY

THE UNIVERSITY OF THE STATE OF NEW YORK

1943

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Wallace Craig: The Song of the Wood Pewee *Myiochanes virens* Linnaeus

Excerpts from the book: *The Song of the Wood Peweee* Myiochanes virens Linnaeus: *A Study of Bird Music* by Wallace Craig. Albany: The University of the State of New York, 1943; selected and introduced by David Rothenberg.

Is the song of the wood pewee the most beautiful of all bird music?

Wallace Craig (1876–1954) was one of the founders of ethology, the scientific study of animal behavior. Through his student Margaret Morse Nice, who herself wrote two 600-page books on the lives of song sparrows, he was introduced to Konrad Lorenz, the Nobel-prizewinning ethologist who popularized the notion of "imprinting" that led flocks of geese to follow him around dutifully. Lorenz often said that he would have gotten nowhere without the pioneering insights of Craig, whose earliest experiments on birds were with chickens and pigeons.

For more than fifteen years, from the late 1920s to the early 1940s, Craig became obsessed with an unusual five-note bird song, the music of the Eastern wood pewee. At dawn in springtime, three extra notes are added, making eight notes, divided into three phrases. Could such a simple song be the most beautiful

creation birds had to offer? To Craig it was, and he wrote a 186-page book to prove it. It is the most detailed book ever written on one single simple song.

In the pages included here, Craig describes this music in careful detail, so we can have a clear sense of exactly how the phrases are formed. In the second excerpt, he wrestles with the common critique that birds are just making simple noises that have nothing to do with the beauty of human music. Craig writes to his friend Konrad Lorenz on the matter. Lorenz notes that the bright colors of certain birds are improbable, surprising, and thus make the animals stand out from the brown fray of the rest of the world. But bird song, Craig notes, is not necessarily pragmatic. It is beautiful, and simply there. Lorenz writes back: "It is certainly 'more beautiful than necessary' and in this is akin to human art in general. Art *is* a fact and after all it would be rather ridiculous from our evolutionistic ideology to deny the possibility that something similar may occur in other species!"

What is most remarkable about this little-known text is how it represents one of the best examples of a scientist trying to quantify art, or to explain and calculate something he experiences as beautiful in the world around him. There is no doubt Wallace Craig was deeply touched by the music of the wood pewee. And he is not afraid to extend his language beyond the strictures of science to describe the glory he experiences. I wish more scientists would do this.

Dear Dr Adams,

The pewee's twilight song has always been to me the sweetest, most soul-searching voice in nature. I have spent many an hour of enraptured listening to it; have made many a sketch in attempts with pencil, wash and what-nots, to give some idea—the best I possibly could, of course—to bring its witchery plaintiveness and spell-binding appeal to the visual sheet. The best picture I have ever worked out in such attempts, I made only a couple of years or so ago. I have since included it in the small exhibitions to university and other select groups. . . .

April 8, 1941 EDMUND SAWYER

That is the drawing reproduced as the frontispiece of this Bulletin. To readers who have heard the pewee's morning twilight song, the picture will make a strong appeal. For the benefit of other readers I have written the following explanation.

It is a great experience to hear the wood pewee, in a natural wildwood, singing his morning twilight song. Three factors contribute to the impressiveness of this experience. First, there is the musical excellence of the song and the sight of the bird himself (if you are lucky enough to see him) sitting peacefully alone, giving his attention to his music. Second, there is the beauty of the forest, with all the living things in it. Third, there is the charm of the early morning in summer. In order to hear the very beginning of the twilight song, you must arrive in the woods in the darkness of night. Listen, and you hear the pewee sing just one sleepy, musical call. All is silent again for several minutes. The time is more than an hour before sunrise. While you are waiting, you observe the changes in the sky: the slow, very slow progress of the dawn and the beginning of a new day. As the light increases, the objects in the landscape gradually become visible. The myriad creatures of the forest are attuned to these changes in the light. The wood pewee is attuned to them, and as darkness gives way to dawn his song develops to its full richness and rhythm. Many pages of our paper will be required for the description of this song and its progressive changes, but Mr Sawyer has caught the very spirit of it and expressed it in his picture.

THE MORNING TWILIGHT SONG

THE PHRASES OF THIS SONG

Three different phrases. The morning twilight song of the wood pewee consists regularly of the three phrases represented in

figure 2. The syllables pee-ah-wee, pee-oh, ah-di-dee are copied from Saunders. The phrases are all alike in tone, each being a clear, sweet whistle.

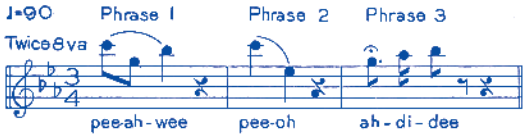


FIGURE 2 The three phrases of the morning twilight song

Phrase 1 and phrase 2 resemble each other more than they resemble phrase 3. In rendering phrase 3 the bird sings three distinct notes, bringing out the rhythm clearly; hence phrase 3 may be called the rhythmic phrase. But in singing phrase 1 or phrase 2 he glides from one pitch to the next with such perfect continuity that there are no distinct notes at all; the entire phrase is just one smooth glide. Hence these are called the gliding phrases. This contrast is important: it is connected with some of the main points of our paper. In the following pages we shall often have occasion to speak of "the gliding phrases," meaning phrases 1 and 2, and "the rhythmic phrase," meaning phrase 3.

Furthermore, phrase 1 and phrase 2 have each a more elaborate form, in which the gliding character is still further developed by an upward glide (a grace-note) at the beginning of each phrase, as shown in figure 3. Mathews ('04) states that "this more complete form of the pewee's song belongs to the nuptial season;" but that is a matter which needs further investigation. Phrase 3 never has a grace-note.

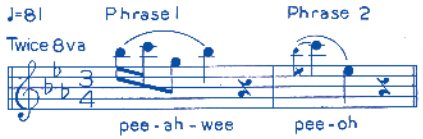


FIGURE 3 Phrase 1 and phrase 2, with grace-notes

The glide or portamento of phrases 1 and 2 is suggested in the musical notations by the slurs over these two phrases, but it can be

FIGURE 4 Graphic representation of the three phrases

represented more adequately by the graphic method, as seen in the first two phrases in figure 4. In this figure, phrases 1 and 2 have the grace-notes, the same as in figure 3. In the graph, the horizontal dimension represents duration. The light vertical lines divide the graph into measures of equal duration, each measure being 1/27th minute; thus the tempo is the same as in figure 3. The heavy lines represent the sound of the bird's voice, and they are made heavier or lighter to represent variations of intensity.

Mr Brand has reproduced the wood pewee's voice on phonograph disk No. 1A, supplied with his book ('34). Most of the bird songs on his records are reproduced beautifully. Unfortunately, the reproduction of the wood pewee's voice is not one of the best. The beauty of the song is lost. Mr Brand wrote to me: "The film of the wood pewee which was transcribed on the record, while not perfect, is really very satisfactory." But for some reason connected with the great technical difficulties, the phonograph disk did not come out as well as the film. Mr Brand tried to improve the record, and he very kindly sent me three different stampings of it. It is very useful for studying certain details of the song. It gives phrases 1 and 2, but not phrase 3. The first record published with the book in 1934 gives seven phrases in the following order: 1—2—1—1—2—1—2. In each of these seven phrases the grace-note is prominent, as represented in our figures 2 and 3. Some later copies of Brand's book are accompanied by a different record, with the phrases in a different order. Mr Saunders tells me that on one of the Brand records the phrase 1 is not typical but rather exceptional, the last note being flat.

Brand ('38) made a microscopic examination of the film of the singing of one individual wood pewee. He found the lowest note to be 3650 vibrations per second and the highest 4375. These notes are respectively *A* and *C*, each about a quarter-tone sharp. They are the four-accented *a* and the five-accented *c*: a'''' and c''''', written also a^4 and c^5; in the notation which Brand uses they are A_6 and C_7. The c''''' is the highest note on the piano. Now, the lowest note

being 3650 and the highest 4375, the ratio of these two notes is 5:6. Therefore the interval is exactly a minor third, or the interval from mi to sol. These are all the physical measurements we have, to date, of the wood pewee's voice. We were hoping that Mr Brand would make many more measurements, when we received with regret the news of his illness and death.

In the above description of the three phrases we have mentioned only their normal form. We shall point out later that there are variations of these phrases; but the variations are in many cases abnormal or subnormal. We shall point out also that the wood pewee utters, at certain times, several other sounds. In his evening twilight song he sings a fourth phrase which he does not sing in his morning twilight song. But all these are minor matters, so far as our main problems are concerned.

Mode of occurrence of the three phrases. The wood pewee has two styles of singing which we shall name his "leisurely style" and his "rhythmic style" (table 2). In his leisurely style he sings only phrases 1 and 2, that is, the gliding phrases, and he always leaves a long rest, commonly 5 to 10 seconds, between each phrase and the next. (We shall always use the word "rest" for the period of silence between one phrase and the next. Some writers call it a "pause," but in music that word has properly a very different meaning, for which see Grove's Dictionary, '27.) In this leisurely singing, phrase 1 is really a complete song in itself and the same is true of phrase 2. They might very well be called "song No. 1" and "song No. 2." But in order not to confuse the reader, we shall not use these terms; we shall speak always of "phrase 1" and "phrase 2."

The pewee's rhythmic style is extremely different. There are no long rests between phrases. Indeed, the phrases follow one another with metronomic regularity. And, so far as I have been able to judge the matter by ear, they are sung in ¾ meter, with only a quarter-rest after each phrase, as shown in figures 2, 3 and 4. All three phrases are used: at the height of the rhythmic song, commonly 50 per cent of the phrases are 3's, 25 per cent are 1's and 25 per cent are 2's (though this varies with the individual singer). The 1's, 2's and 3's follow one another in regular order. Thus the rhythmic song is a continuous musical composition. This continuous song lasts for a long time, often 20 minutes or more, and then co nes to an end.

The sounds of which music is composed are spoken of in esthetic theory as the "material" of music. All sounds can be divided into two classes: tones and noises. It has often been said that music consists of tones only. But this statement is not absolutely true; there is much savage music which consists of noises, the beating of tom-toms and other percussive instruments, and noises constitute a small part of even our best music. The best music of birds and of men, however, consists essentially of tones. There are two reasons why music is composed of tones, not noises: First, tones are more agreeable to the organism, more pleasant. Second, tones have pitch, noises have not; therefore, different tones are related to each other as "lower" or "higher" and successive tones can constitute a meaningful pattern which we call "melody." Songbirds, in their own simple way, show appreciation of these facts.

We shall answer two possible objections to this statement. The first objection is that some bird songs contain unmusical sounds—noises. To this there are many answers. Some songbirds are far less musical than others; for example, some of the flycatchers. And even in the case of the superior singers, there are different kinds of songs; only some of the songs are pure art, others are applied art and may need to be loud or even harsh. We have mentioned this in connection with the importance of distance and also the evolution of ability in singing. Again, some birds' vocal performances, instead of being esthetic art, are more or less playful, as in parrots and other imitative birds. Finally, let us consider those cases in which a certain bird sings exquisite musical phrases interspersed with harsh calls; for example, our catbird, who shocks us by sounding his cat-call in the midst of his singing. In trying to understand this, let us remember that the bird's span of attention and of memory is very short. The wood pewee, as we have seen, has no clear idea of his twilight song as a whole. The catbird can have no clear idea of a half-hour of singing. He attends to only a few phrases at a time. Remembering this, we can understand better the working of the bird's mind when he sings a number of beautiful phrases and then utters his cat-call. In view of all the facts, we still believe that songbirds, especially the superior songbirds, have some appreciation of the value of musical tones in singing.

The student of bird songs must use the concept of music in a very broad sense. This concept, in human esthetics, includes not only songs and instrumental pieces but also the music of poetry (see Parker, '20, p. 206-16). A study of the music of poetry leads to

broader and more general ideas than those derived from an exclusive study of "tone music," as it might be called. We simply make the suggestion here that any one who wishes to understand the music of *all* bird songs will do well to familiarize himself with these broad ideas of the music of poetry. Such a study will help him to see how even the songs of the worst singers, such as the chebec and some of the other flycatchers, are in a broad sense musical. But now we shall return to our thesis that the best singers, among birds, show some appreciation of the musical value of tones.

The second objection to this thesis has been made by Lorenz ('35, p. 318; '37*b*, p. 249) and we must explain it. Lorenz showed that the patches of brilliant color on various species of birds usually function as "releasers" of the reactions of their companions and the reason why these color patches are often of pure spectral hues is not because of their beauty, but simply that such hues are the most "improbable" or in other words the most "distinctive." He then suggested that the pure tones in the songs of birds likewise may be explained on the ground of improbability rather than of musical character.

On January 17, 1940, I wrote to Doctor Lorenz, saying:

You say that the spectral color on a duck's wing has developed because of its improbability. That is an excellent point and your argument is entirely convincing.

But now, when you offer the same explanation for the purity of tone in a bird's song, I don't think that is correct. In this matter, there is an important difference between visual and auditory experience. When a duck sees a companion, he sees him always against a background of various objects, chiefly vegetation and earth. A blue speculum contrasted with the brown earth is very conspicuous. Also, the speculum of the duck's wing is contrasted with the duller colors on other parts of the duck.

In the case of bird songs there is no such background. In the woods and fields where birds sing, there is no inorganic source of sound that is of much importance. The only sounds that compete with a bird's song are the songs of other birds and to a less extent frogs and insects. Nearly all these have pure or beautiful tones; therefore the argument of improbability does not apply.

On April 12, 1940, Doctor Lorenz replied as follows.

I think that you are perfectly right! Your pointing out that there is no inorganic background to releasing sound production, as there is one to visual releasers, is very convincing.

I am very far from interpreting "everything" as a releaser and I have begun to have my doubts about the releasing function of the *details* of bird song. The specific uniformity characteristic of visual releasers, and also of all bird calls which have a specific signal value, is *absent* in bird song. It is certainly "more beautiful than necessary" and in this is akin to human art in general. Art *is* a fact and after all it would be rather ridiculous from our evolutionistic ideology to deny the possibility that something similar may occur in other species! . . . Thus I think that in bird song there are two absolutely independent factors: (1) *its function as a releaser and* (2) its art quality. The more the releasing function drops into the background (as in morning twilight song), the more the *l'art pour l'art* quality comes beautifully and astoundingly to the surface! As you see, I absolutely agree with your thesis!

I wish I might quote the remainder of Doctor Lorenz's extremely interesting letter, which gives some of his new observations in support of the ideas presented. I wrote to him asking his permission, but have received no reply, doubtless due to war conditions.

THE FORM OF BIRD MUSIC

We need now to consider the form or structure of bird music. We must try to determine the principles of musical composition of bird songs.

The first principle is that of *variety* or it might be called the principle of "change." As a general rule, every bird song contains a variety of sounds, the variations being in pitch, time, intensity, timbre or phonetics or in all these. There are a few exceptions, for example, the song of the chipping sparrow and that of the junco, each of which consists of a string of simple notes, all alike. But these songs are very short, lasting only three seconds or less. I believe there is no exception to the rule that long-continued songs consist of a variety of sounds. This rule holds true even of the poorest singers, including the many species of twilight-singing flycatchers. The principle of variety in esthetics is connected with the psychological fact that a man or an animal can not hold his attention on a sound (or other stimulus) for more than a few moments, unless the stimulus changes. In order to hold attention, either the sound must change or else it must cease for a time and then begin again.

Variety and change in bird music may be provided by instinct or may be acquired in the individual's experience. Instinctive variety is well illustrated in the wood pewee in that his twilight song is composed of three different phrases, that the phrases are alternated in a complex manner and that each of the phrases is complex in itself. In some other species, higher songbirds, the number of instinctive phrases is far greater.

Blue Canary: Five Excerpts

by Barbara Marcel & Andreas Doepke

Nós que somos das encruzilhadas, desconfiamos é daqueles do caminho reto.
— Luiz Antônio Simas & Luiz Rufino[1]

Of the many birds that Europeans brought from other parts of the world during the last five hundred years of colonial history—to render them into hats, decorations, or pets—the parrot, the peacock, and the canary have become the protagonists of numerous proverbs and idioms.[2] Perhaps the most well known in English is the "canary in the coal mine," which refers to the bird being enlisted as a sentinel animal—a living forewarning system that was, beginning in the 1880s, deliberately exposed to danger in the coal mines of Europe, Northern America, and Australia, for over a century.

From their original island habitat on the Canary Islands, over 2,000 kilometers from mainland Spain, traces of their

1 [We from the crossroads, distrust those of the straight way.] Luiz Antônio Simas and Luiz Rufino, *Fogo no Mato: A ciência encantada das macumbas* (Rio de Janeiro: Mórula Editorial, 2018).

2 Our cursory review of the German, Portuguese, English languages includes "Er redet wie ein Papagei" [He talks like a parrot]; "Er spielt sich auf wie ein Pfau" [He acts up like peacock]; "Canário na muda não canta" [Canaries don't sing until they change their feathers]; "O pavão, quanto mais levanta a cauda, mais se lhe vê o rabo" [The more the peacock's tail is raised, the more his butt is seen]; "Papagaio come milho, periquito leva a fama" [Parrot eats corn, parakeet takes fame]; and, "As proud as a peacock" or "As sick as a parrot."

← Canaries flying over the Teide volcano on Tenerife in the Canary Islands. Still from the animation video, *Golden Tone* by Barbara Marcel, 2021; reproduced courtesy of the artist.

breeding can be discerned throughout Europe; they are found most prominently, however, in former mining regions, such as Tyrol in Austria and the Harz Mountains in Germany. In these areas, bird catching and rearing was once connected to the cultures and economic survival strategies of peasants, workers, and later, working class families. Within the processes of colonial exploitation, industrialisation, class struggles, and extraction, canaries entered the scene and became witnesses to a radical transformation of the world.

According to economist Felwine Sarr, Western thinking still tends to take for granted the historic transfer of modernist priorities of economic valorization and rationalization to other parts of the world, while overlooking the fact that these values are correlative to concerns that originated from a highly specific historical sequence and geographical space. The Western founding myth, which Sarr calls the "écomythe,"[3] projects a utopia of an entirely predictable and calculable world alongside a belief in infinite societal and scientific progress. All of these visions relate to a very specific historical constellation: a time of leapfrogging technical inventions for natural resource exploitation, extreme social and gender hierarchies within the feudal system, as well as a time in which parts of Europe received fragmented bits of information on newly "discovered" faraway lands which aroused fantasies of desirable places,[4] people, creatures and which were meant to reassure European audiences that those "others" were feeble and incapable of keeping pace. It is a birthing moment for the

3 Felwine Sarr, *Afrotopia* (Paris: Editions Philippe Rey, 2016).

4 Susanne Zantop, *Colonial Fantasies: Conquest, Family, and Nation in Precolonial Germany, 1770–1870* (Durham: Duke University Press, 1997).

idea of the center and its periphery, or what Frantz Fanon would call the metropole and the colony. This essay follows the path of the canaries during a time when Europe's myths of whiteness and domination were first written. While Europeans domesticated, traded, and eventually globalized canaries as pets, the birds also entered into relations and bonds with different social groups as they became part of global historical processes and their inherent contingencies.

Under a method of *situated thinking*—which, as the Argentine feminist Veronica Gago suggests, is always inevitably embodied, partial, procedural, and internationalist—we take into account individual experiences and memories in looking at these minor histories.[5] By positioning ourselves as bodies-territories with subjectivities also partly expropriated by cognitive capitalism in a global system full of limiting boundaries, we reappropriate our vital force of creation and cooperation for the production of boundary thinking together.[6] In the face of the global ecological and epistemological crisis, the following text is written in four hands and seeks to relate themes such as ecology, technology, and coloniality to crisscross the crossroads of narratives on human and non-human relationships and hierarchies, as well as their resources, artifacts, and affections. If the Canaries have enchanted humans all over the globe for centuries with their beautiful singing, their position was not only that of a witness in the romantic yet violent landscape of the history of mining and

5 Verónica Gago, *La potencia Feminista o el deseo de cambiarlo toto* (Buenos Aires: Tinta Limón, 2019), 11.

6 Suely Rolnik, *Esferas da Insurreição. Notas para uma vida não cafetinada* (São Paulo: n-1 edições, 2018), 32.

its technological developments. The "Canary in the Coal Mine" became an involuntary accomplice to resource extraction economies; because of this exposure, their planetary lines of flight may lead us to attend more carefully to the deep call of a land worn out and eager for change.

In what follows, we have excerpted a selection of routes from our book-length essay *Blue Canary*; these lines begin the work of connecting apparently disconnected spaces—places typically located in rural areas, seemingly far away from the accelerated colonial-capitalist-extractivist march. How can we review the making of this specific historicity by revisiting and thereby rethinking it's assembly from the margins?

§1 The Harz

> … *submerged perspectives* pierce through the entanglements of power to differently organize the meanings of social and political life. In other words, the possibility of decolonization moves within the landscape of multiplicity that is submerged perspectives.
>
> — Macarena Gómez-Barris[7]

The Harz is a mountain range about 220 kilometers southwest of Berlin. It was formerly a center of the medieval and early industrial mining in Europe until the nineteenth century, likewise it was the scholarly ground enlightened philosophers of earth and humans' rational powers. The region is, therefore, a landscape that has accumulated much

7 Macarena Gómez-Barris, *The Extractive Zone: Social Ecologies and Decolonial Perspectives* (Durham: Duke University Press, 2017), 11–12.

history on the unruly edges of European imperial space.[8] Schiller, Goethe, Heine and other (predominantly male) thinkers are proudly listed as visitors. Some of their names designate the paths for contemporary tourists on trekking excursions. Meanwhile, numerous tales of witches, and other devilish supernatural entities, stretch out like a densely woven net over every ridge and valley of the massif to feed the tourist imagination. Now globally in use, braided steel cable was invented here in 1834, in the city of Clausthal, as a novel element to enable machine-powered mineral extraction. In 1772, when Johann Beckmann coined the term "Technologie," he held a professorship for Economics at the nearby University of Göttingen; his main object of study was the "science of manufacturing from natural produce or of the knowledge on crafts."[9] Beckmann promoted technology as an applied system of knowledge that required an understanding of raw materials and processing techniques. Because "Technologie" implied a relentless mission to catalogue the utility of the entire physical world, every craftsperson, manufacturer, and banker ought to be familiar with the processes of technological extraction and refinement.[10] To bestow such knowledge on his students, Beckmann would arrange excursions to the mines of the Harz. Touristic marketing until this day has as its corner stones technology, mystic qualities, natural beauty and romanticism.

8 Anna Tsing, "Unruly Edges: Mushrooms as Companion Species," *Environmental Humanities* 1 (November 2012): 141–54.

9 Johann Beckmann, *Anleitung zur Technologie* (Vandenhoek: Göttingen, 1777), §9; translation by the authors.

10 Ibid.; translation by the authors.

Fig. 01. Historical photograph, courtesy of Jochen Klaehn and the Kanarienvogelmuseum St. Andreasberg.

Of the many Harz museums largely devoted to the history of mining technologies, the museum of the Harz canaries—the so-called *Harzer Roller*—is a rather obscure facility hidden in the old machine house of the Samson mine in Sankt Andreasberg. Once the chambers of machine operators whose job was to set into motion huge wheels cables, and ropes to lower workers into the shafts, the rooms are now carefully decorated with objects and documents depicting the tradition of bird-keeping and canary breeding that flourished in the region in close relation to the daily life of miner's families. Bewildered by this unlikely archive, we began to realize there were many crossroad stories latent in the Harz and, as we followed them, we became doubtful that meaningful stories ever follow straight lines.

§2 Amazigh

> The most beautiful world is like a heap of rubble tossed down in confusion.
>
> — Heraclitus[11]

Among the ravines, valleys, and rocky hills of the Canary Islands, sight is often inhibited by stone barriers. The volcanic islands, which lie along the latitude of the Sahara, are geologically a part of the African continent; they have been forming for twenty million years, sustained by the unusual terrestrial occurance of a travelling hotspot. The lava domes that were pumped out of the seabed and pierced through the slow moving oceanic plate eroded in an alteration of rock avalanches and

11 Heraclitus, "Fragment 124," quoted in *Robert Smithson: The Collected Writings*, ed. Jack Flam (Berkeley: University of California Press, 1996), 102.

renewed outbreaks, only coming to halt one million years ago. Extremely slow and occasionally very rapid processes of erosion sent rocks crashing down toward the Atlantic ocean while winds and intense precipitation cut steep ravines, or *barrancos*, into the mountains, creating a variegated, confusing topography.

While visual lines are broken, sound travels more smoothly. Valleys guide the sound waves as they bend around corners; reverberation is measured here in long distances. Among the three archipelagos which European colonists formerly called the Fortunate Islands or Islands of the Blessed in the Atlantic Ocean, the archipelago of the Canary Islands, consisting of seven islands, is the largest, with highest altitudes and most complex biogeography. For reasons of topography, these islands have been unique sites that spurred the invention of whistled languages, that is, whistled versions of pre-colonial languages spoken by the inhabitants of mountain settlements of the archipelago. The diverse communities of insular Imazighen [in the singular, *Amazigh,* translated as "free people," although today often referred to as *Guanche*] used whistling as a means of spoken communication across great distances.[12] With arable farming only prominent in some parts of Gran Canaria, inhabitants of the islands involved in agriculture herded goats and sheep in the uneven terrain. Answering the terrain of the islands, shepherds' whistling was a way to cope with relative isolation

12 Indigenous Canarian People had settled on the Archipelago since the middle of the first millennium BC from Berber's populations from Northern Africa, who also call themselves Imazighen. European conquest led to the almost complete physical destruction of their societies; "Indigenous," for this reason, refers to the populations that occupied the archipelago before European conquest. See Farrujia de la Rosa, *An Archeology of the Margins: Colonialism, Amazighity and Heritage Management in the Canary Islands* (New York: Springer, 2014), 5.

during the daily activities making communication possible while fulfilling duties where none of one's peers or kin was around.[13]

Located only 140 kilometers from the African coast at their closest point to the continent, the islands have been known since antiquity, their name coming from the Latin *Canariae Insulae* [Islands of the Dogs], which marks the curious inter-species encounter between Romans and wild, barking dogs. Throughout the centuries of decline of the Roman Empire and into the Middle Ages, the islands were practically forgotten by Europeans, although the navigators of the Renaissance came back with increasing interest, aggression and eventually, they would transform them into "the laboratory of a kind of European imperialism."[14] Beginning in 1402, many conditions favored the Europeans in their effort to conquer the Canaries although the complete lack of metal weapons among the Indigenous populations is now considered by some historians the decisive factor. Despite the very rich soil that results from their volcanic formation, the Canary Islands have no reserves of ores.[15]

As the forests gave way to sugarcane plantations, settlements multiplied as additional colonists immigrated. Among the first to be involved both in the territorial occupation of the islands, as well as in the making of a distant gaze that's derogatory and eager to rule, were two priests accompanying the colonial expedition of businessman Jean de Bethencourt in 1402. Sailing past the island of La Gomera, they mentioned

13 Julien Meyer, *Whistled Languages: A Worldwide Inquiry on Human Whistled Speech* (Berlin: Springer, 2015), 1.

14 Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986), 90.

15 Ibid., 93.

in their logbook (later published under the title *Le Canarien*) that the island was inhabited by a grand people speaking "with no lips as if they had no tongue."[16] The European monks fascination with whistling quickly shifted from the people to little green-yellow birds, which were named canaries. Already in the fifteenth century, canaries were being shipped to Europe as luxury commodities for the delight of the Spanish aristocracy. Meanwhile, for the original inhabitants living on the islands, the war of conquest would last for nearly a century and nearly eradicate Indigenous people and their culture. According to historian Alfred W. Crosby, the *Guanches* are—with the possible exception of the Arawaks in the Antilles—the first people exterminated by modern imperialism.

Although this genocide is rarely described in European history books, there is little doubt among historians that the violent process of colonization in the Canary Islands constituted a "rehearsal for the Spanish conquest of the Americas."[17] This is not least because colonialism in the Canaries ensured the transformation of the landscape into extensive monoculture sugar plantations, as well as the enslavement of the local population. Even today, in the shadow of increasing Spanish nationalism, it is not hard to find Canarian locals that describe the islands' history as "a European colonial laboratory that foreshadows the age of discoveries."[18]

16 Original transcript: *L'isle de Gomere […] paiis habité de grand peuple qui parle le plus etrange langaige de tous les autes paiis de pardecà; & parlent des beulièvres ainsi que fussent sans langue*. Citation and translation after R.G. Busnel; see A. Classe, *Whistled Languages* (Berlin: Springer, 1976), 6.

17 Enrique Galván Álvarez, "Anarchism and the Anti-Colonial Canarian Imagination: The Missing Flag," *History Workshop Journal* 83 (2017): 256.

18 Ibid.

§3 Goetheweg

Every bird has its decoy, and every man is led and misled in his own peculiar way.
— Johann Wolfgang von Goethe[19]

It is not clear precisely when they first arrived, but canaries made it to the Harz before Johann Wolfgang von Goethe visited in 1777. He came to work as a mining magistrate for the duke in Weimar and gathered inspiration for his long-term writing project, *Faust*. Goethe must have found the visits worthwhile because he returned again in 1783 and 1784. By 1760, small-scale bird traders from mining towns in the Harz were already carrying the little yellow birds in stacks of tiny cages on their backs down the mountain paths and into surrounding cities.[20] Traders from the Harz would sometimes walk distances of 200 or 300 kilometers, heading north to the ports of Bremen, Hamburg, Lübeck, or west to the Netherlands; a document from 1792 mentions Russia and Turkey as export destinations for birds from Harz.[21] Canaries were being kept and bred in family homes of miners in the mountain towns, bringing them into interspecies relationships, characterized both by domination and intimacy, centered around the mining of ores. Charged with supporting the modernization of the mines near Weimar, Goethe turned to the Harz as one of Europe's most technically advanced

19 Johann Wolfgang von Goethe, *Autobiography of Goethe: Truth and Poetry Relating to My Life* [1848 ed.], trans. John Oxenford (Auckland: The Floating Press, 2008), 290.

20 Jochen Klaehn, *Bemerkungen über den Kanarienvogel* (Sankt Andreasberg, 2006), 3.

21 Friedel Knolle, *Mensch und Vogel im Harz* (Clausthal-Zellerfeld: Piepersche Druckerei und Verlagsanstalt 1980), 19.

extractive zones. While mining knowledge had been based on experience and the improvement of inherited techniques, by the time of Goethe's visits more exact calculations and large-scale technical innovations were put into practice to make extraction more efficient and to push deeper into subterranean frontiers. Goethe studied the water management system of adits that drained the mines while an eighteen kilometer tunnel near the city of Zellerfeld was under construction in order to draw water out of the precipitation rich western ridge of the mountains; he compared the Harz system of water wheels to the latest competing inventions, including the steam engine, which he referred to as the "fire machine." Technical tradeoffs presaged more fundamental moral bargains.

Fig. 02. Chaffinch owners walking their birds in the forest. Courtesy of Dieter Spormann and Buchfinkengilde.

Goethe's technical interests can also be contrasted with his fascination for more elusive phenomena. For two weeks, he spoke anonymously to various people and wrote both in his diary and in letters to friends about the charms of the simple life in small towns.[22] Among his interests were also the myths of witches and devils, which were historically connected to many mines because they ressembled entry points to the underworld. The highest mountain of the Harz, the Brocken, was said to be the place where witches went to dance. On his hike up the Brocken, Goethe found himself surrounded by a foggy, cold air instead of ecstactic witches; in fact, he was bewildered by the optical illusion of a *Brocken specter,* an oversized shadow of himself against a halo of light that occurs regularly on the misty mountains.[23] The event inspired his poem "Harzreise im Winter" [Winter Journey in the Harz], considered one of the last in his "Sturm und Drang" period; the spectral phenomenon would also appear in his *Theory of Colors*, published thirty years later in 1810. Despite describing the perspective of a clouded gaze throughout much of the poem, at the outset Goethe compares his boundless vision to that of a vulture hovering over the earth.[24] It is both interesting and awkward

22 Christian Juranek, ed., *Abenteuer, Natur, Spekulation: Goethe und der Harz* (Halle an der Saale: Stekovics, 1999).

23 In German, *Brockengespenst*, also called Brocken bow or mountain specter.

24 It is not clear which bird was specifically referred to in the poem, although the term vulture was widely used at the time for bird of prey, and by the Romans had been as a symbol for divination. In many cultures, the vultures were also funeral agents devoted to the work and care of the deceased, human and non-human. For more on this subject, see Vinciane Despret, "What would animals say if…," a paper given at the major conference in Liège (Belgium) on 17 January 2013 and published in Portuguese in the edition *Chão da Feira: Caderno de Leituras* 45 (Belo Horizonte: 2016).

for a contemporary reader to note that his idealization of the natural world—entrirely characteristic of the Romantic period—occurs at the same time that he is officially attempting to rationalize its exploitation.

The Harz was and remains a place of much traditional knowledge including, among other things, in bird rearing. The Canaries that were brought here were joined in their fates to local birds, especially thrushes and finches, which had long been kept and cared for in miners' houses. The main reason for this was that these birds were a vital part of the autumnal bird trapping; when setting traps for migrating birds, living birds were used as decoys—their singing would lead a flock of birds to deviate from their path and instead into a net that was set up in a suitable location.[25]

Chaffinches are one of the most common songbirds across Europe: different subspecies also live even in western parts of Asia and North Africa. Keeping chaffinches for the purpose of seasonal trapping led to a whole series of culture practices as the people in the Harz, like in many others in Europe, were fascinated by their songs. Chaffinch singing contests were a common activity held on town squares and pubs in many parts of Europe. The standard setup was to pit common male chaffinches against each other by placing them in close proximity but separate cages covered with cloth. The chaffinch that would sing the best, or express the greatest variety of songs in a defined period of time, was the winner. Chaffinches and their male owners could together rise to regional stardom through these contests.

25 Friedel Knolle, *Mensch und Vogel im Harz* (Clausthal-Zellerfeld: Piepersche Druckerei und Verlagsanstalt 1980), 5–6, 19.

In Germany, the Harz is the only region where chaffinch contests are still held; the so-called "Finkenmanöver," as well as the practices of bird rearing connected to them, were recognized by UNESCO in 2014 as an intangible cultural heritage. Historical documentation gives some insight regarding the attention with which bird owners studied their chaffinches' songs. To train them, men would carry their birds into the forest so they could hear and sing with their free living peers. This hobby, its competitions, and attendant clubs, also reveals a curious and intimate relationship between men and birds, with careful listening as a central tenent. When they were not in the woods, bird owners would repeatedly play songs recorded on phonographs, cassettes, or compact discs—echoing perhaps the use of the famous eighteenth century *serinettes*—while listening closely to the performed melodies.[26] Another iconic object of domination strangely compliments this attentive sensibility: the linen cloth with decorative embroidery that was draped around the small cage for weeks at a time. This gesture of concealment shielded the bird from his surroundings during weeks of singing practice, thereby encouraging a rigious regiment of practice and improvement. When listening is isolated as the only active sense, bird song can be optimized until a perfect mimesis is achieved. For whom the caged birds sing in the Harz remains difficult to predict.

26 The *serinette*, a mechanical musical instrument consisting of a small barrel organ, was invented in the eighteenth century in eastern France to teach song birds; its name is derived from the French *serin*, referring to different passerine birds but in its most common usage to the *Serin des Canaris*.

§4 The Harzer Roller

O segredo da lua, quem sabe é o clarão do sol.
Canarinho da Alemanha, quem matou meu curió!

— "Canarinho da Alemanha"[27]

The story of the canary is necessarily one of becoming. The allure which the birds held for Europeans from different social positions brought them into different intimate relations with humans and with that also exposed canaries to and enrolled them in various processes of co-subjectivation. How power is exercised among bodies, as well as their degrees of relative freedom, and their performative roles within different social contexts, are all questions relevant to humans but that extend also to more-than-human worlds. Acknowledging how birds have co-produced our earth and its innumerable socialities also means acknowledging shared histories and processes of becoming-with.

For several decades, Spanish traders maintained a monopoly on the birds by only exporting males; 1485 is cited as the first year they were bred in captivity. By 1555, they were named by the swiss naturalist Conrad Gessner, who described them as *Canariam aviculam*, or the sugary bird [Zuckervögelchen], due to the "sweetness of its singing, and also because it is brought from far remote places, so that it is wont only to be

27 [The glare of the sun knows the sun's secret. It was the German Canary, who killed my *curió* bird!] Excerpt from an old capoeira angola song in Brazil. Capoeira angola is a Brazilian martial art created by enslaved Africans in Brazil in the early sixteenth century. The culture of capoeira combines elements of dance and acrobatics, narrating many stories through songs created and sung collectively, passed on for generations through oral tradition to this day.

Fig. 03. James Archer, *The Girl with the Canary*, 1865; oil on canvas, 61 × 46 cm; © Sotheby's/akg-images.

kept by nobles and great men."[28] Like the Spanish, French royals also bought into the canary trade as Louis XI was a particular fan of them. Even the orphaned son of Marie-Antoinette and Louis XVI, Louis-Charles, who also died by the guillotine in the French Revolution, was depicted in a portrait with his Canary sitting next to him. Italians managed to get ahold of the precious birds in the late sixteenth century by capsizing a trading ship that then deposited its canaries on an Italian island.[29] By way of Italy, the region of Tyrol—historically a borderland to the Habsburgian possession known as Further Austria—would become the first hub of artisanal canary breeding during the late middle ages, introducing them to other German-speaking areas. Tyrolers were the first to boost the Canary trade, carrying them in backpack-cages from the Alps over incredible distances across central Europe.[30]

The fame of the Harzer Roller Canary would never have become so widespread were it not for its very specific song. The refinement of this beautiful bird song, and the conviction that caged birds could be trained to improve their singing skills, was nothing new. In an earlier period, keeping and training song birds was the work of individual specialists in the service of aristocratic tastes. *A New Treatise of Canary Birds*, published in 1705 by Hervieux de Chanteloup, narrates the popularity of the birds among the aristocracy and describes the unusual job of the "siffleur d'oiseaux," or "Governor of Canaries"—a title that Anne of Bavaria, the Princess of

28 Quote by Conrad Gessner, *Historia animalium lib. III qui est de avium natura,* Zürich, 1555; translation from Tim Birkhead, *The Red Canary: The Story of the First Genetically Engineered Animal* (London: Bloomsbury Publishing, 2003).
29 Valli da Todi, *The Song of the Birds,* 1601.
30 Carl Zeller's operetta *Der Vogelhändler* from 1857 alludes to them.

Condé, first bestowed on the author. Since Canaries were, at least until the late eighteenth century, a luxury item, their new habitat was typically a large aviary owned by a king, prince, or duke, but they were also becoming popular with wealthy men and women as domestic pets. In this latter case, they tended to live in a cage kept in their dressing rooms and are represented in paintings from this period as tame birds that trusted their human owners. In fact, the birds appear in many portraits as co-occupants of very intimate settings, often sitting on a women's or children's index finger. The vocal training excercies, invented by Hervieux, were usually guided by a special flute, *the flageolet*, developed for this purpose. As Governor of Canaries, he was most concerned with the care for and reproduction of the birds, while also practicing songs and staging concerts for his patroness's family.[31]

When the breeders from the Harz began working with the birds more intensely in the early nineteenth century, Canaries had already become popular among circles of the new bourgeoisie.[32] The substantial increase in canary exports from the 1830s on met a growing demand and catered to the tastes of emerging capitalist owners and entrepreneurs in Europe's bigger cities. At the same time, zoological gardens were opened with the support of private funding: London in 1828, Manchester in 1836, Berlin in 1841, and New York in 1860. Feathers from exotic birds, like the ibis, ostrich, and birds of paradise, became the sought after accent for women's hats. All the while, Canaries were being moved into their new

31 Tim Birkhead, *The Red Canary,* 80–1.
32 For a fascinating close-reading of a similar process of the budgerigar, see Andrew Dodds, *I, Sparkie,* (York: Information as Material, 2013).

enclosures in bourgeois homes throughout Europe, North and South America, Australia, and Russia.

In contrast to the methods of Hervieux, Harz breeders invented more industrialized strategies than individual tutoring. Breeding and training the perfect bird became a manufacturing challenge that could be optimized like any other. The development of Harzer Roller's singing is thus the result of applying the discipline of the nineteenth century world of industry and commerce. Training began early; during the first four months of their lives, breeders made sure that the young birds were only accompanied by the most accomplished, sonorous adults. A male "cantor" was placed in the room or indoor aviary where parents raised and fed their young for the first four to five weeks; then, for the next three months, during which time the birds could move and feed independently, they would still be surrounded by his songs while enjoying their juvenile freedom as their muscles developed and they were fed a healthy diet of soaked grain.

To understand this process, one must come to terms with the nearly industrial scale of Canary trading in the Harz; exports to countries like the United States and Brazil allowed them to dispatch up to 180,000 birds per year in the 1880s. Paradoxically, however, the site of production remained within the family house of local workers. These exotic birds thereby direct our attention to local logics of subsistence, and the work that was carried out to enable other forms of work. When bird traders came in the spring to collect the young canaries from breeders they would step into houses where families had dedicated a room to the birds, who could fly around freely, mate and hatch their young in incubator cages hanging on the walls

Fig. 04. Jean-Baptiste Simeon Chardin, *La Serinette, dit aussi Une Dame variant ses amusements,* 1750–51; oil on canvas, 50 × 43 cm; courtesy of the Louvre, Paris.

of the so called "Zimmerhecke." As a family business, breeding required not only making space for the birds, but also numerous daily tasks: cages needed regular cleaning, temperatures had to be kept stable, and fresh air needed to circulate to avoid infections caused by moist dejecta and spilled drinking water. Fodder for the small birds also needed to be provided in minuscule amounts: each bird would eat a teaspoon of hemp or wildflower seeds daily, but they also required supplements of limestone in breeding season and regular intervals of protein rich meals comprised of small worms. The birds were provided tiny drinking vessels—half the size of an egg-cup—which needed thorough and regular scrubbing as well. As the breeder families typically had a father who also worked

Fig. 05. Historical photograph from 1932, courtesy of Jochen Klaehn and the Kanarienvogelmuseum St. Andreasberg.

in a mine, smelting facility, or subsidiary trade, women performed most of these tasks.

Another economic activity characteristic of the trade was the production of small transport cages, which heavily relied on light-handed work of children for assembly. Photographs of women carrying stacks of these cages draw a connection between these sub-suppliers within the Canary trade and the longstanding role of female workers within the mining economies of mountain towns. With a large basket attached to their backs by two straps like a backpack, so-called "Kiepenfrauen" transported foodstuffs, gun powder, firewood and nearly everything else up and down the mountains as well as to and from the mines until the late nineteenth century. Despite being from economically marginalized families, or living as single women, they were the mobile figures who connected the towns in the mountains to the commerce of the plains, covering tens of kilometers daily as messengers and arranging for supplies. When snow cut off all other means of transport to the lowlands, these women would walk regardless. They also carried tree seedlings and managed the task of replanting trees and other aspects of silvicultural care.[33]

Notably, written descriptions of them as hard-working and badly dressed in long skirts and headscarves echo other regional folktales about witches dancing atop the Harz mountains under the full moon. More likely, these vigorous women resemble those once persecuted by the Inquisition, which Silvia Federici describes in *Caliban and the Witch*, arguing that, "[T]he mechanization of the world was premised

33 Landkreis Goslar – Referat für Gleichstellungsfragen/Frauenbüro, ed., *Frauen in der Geschichte: Kräuterweiber, Kiepenfrauen und Botengängerinnen im Harz* (Goslar, 1991).

on and preceded by the mechanization of the human body."[34] According to Michael Taussig, diabolical beliefs tend to arise in historical periods when one mode of production is replaced by another, radically transforming the material conditions of life and the foundations of the social order.[35] The rise of rural capitalism and the subsequent expropriation of land, deepening of inequalities, and the deterioration of collective relations all feed these stories of devils and witches, recurring as figures in mining regions all over the world. As Federici demonstrates, women have been persecuted precisely because they perform reproductive labor that, besides being mostly unrecognized and unpaid, also enables the maintenance and sharing of autonomous knowledge; for this reason, women are also a threat to everything that capitalist system comes to divide and accumulate.[36]

34 Silvia Federici, *Re-enchanting the World: Feminism and the Politics of the Commons* (Oakland: PM Press, 2019), 191.
35 Michael Taussig, *The Devil and Commodity Fetishism in South America* (Chapel Hill: The University of North Carolina Press, 1980).
36 Federici, 195.

§5 Metal Fatigue

> What the white people call "minerals" are fragments of the sky, moon, sun, and stars, which fell down in the beginning of time. […] Yet they did not seem to realize that these fragments of the old sky were dangerous! They did not know that the thick yellowish metal fumes emanated from them are a powerful epidemic smoke that thrusts like a weapon to kill those who come near it and breathe it in.
>
> — Davi Kopenawa[37]

Metals and their extraction have carved the region of the Harz mountains. Already in the eleventh century, ores were being extracted and metalworking was happening throughout the year despite cold, snowy winters. When the Canary Islands were "re-discovered" by Europeans in 1402, activities in the Harz mountain range had already gone through several boom periods. In the thirteenth and fourteenth centuries, severe shortages of lumber occured following the demand for construction material and charcoal. This crisis was only resolved by the Great Plague, from 1347 to 1351, which ruthlessly wiped out most of the population. But, beyond this well-known narrative of the regional economy, mining history is also part of a more global history, no matter where it is instantiated. The rarity of metals and the laborious work of refining them means these extractive processes cross cultural and geographical boundaries, reaching many worlds beyond their point of origin.

Silver was, from the late fifteenth century until the beginning of the nineteenth, the dominant means of payment throughout Europe and most of its colonies. It connected distant spaces and allows us to think through the entanglements

37 Davi Kopenawa and Bruce Albert, *The Falling Sky: Words of a Yanomami Shaman* (Cambridge: The Belknap Press of Harvard University Press, 2013), 283.

of living and dying on different continents. When seen from the perspective of the Harz, Iberian colonization in the Americas intensified global connections. The mining sector in both western and central Europe endured detrimental economic effects because of the competition from the New World. No factor was as significant in this transformation as the immense amounts of precious metal from Latin America—first stolen from elites, then produced under barbarous conditions in the mines in central and northern Mexico and the Andes. Already by 1540, silver production in Latin American colonies equaled the whole of Europe.

After the Potosí mine opened in 1545, production skyrocketed, and by 1550 Latin America produced four times as much silver as Europe, with the majority of it being transferred back to Spain. By the middle of the seventeenth century, Potosí was "one of the largest and richest cities in the world," the bowels of its silver-filled mountain feeding what Karl Marx would call the primitive accumulation of European capitalism.[38] The immense transfer of wealth, paid for with millions of lives, was dispersed throught Europe as it created increased competition among mines in Germany and elsewhere. The new market conditions stipulated a continuously crisis-prone trajectory for most central European mining regions like Bohemia, Saxony, and Tyrol.[39] Long years of exploration in the mountains of Europe became cost prohibitive when compared to mining in the newly conquered colonies and exploiting the labour of enslaved populations in the Americas. In the nineteenth century,

38 Eduardo Galeano, *Las venas abiertas de America Latina*, (Barcelona: Ediciones la Cueva, 1978), 19.

39 Ibid. 30.

national campaigns that promised tropical paradise sought to attract experienced miners from the Harz to Brazil to work alongside enslaved Africans, Brazilian labourers, and other migrant workers in mines (frequently owned by English capitalists) in the interior of Minas Gerais. German immigrants not only helped fulfill the Brazilian policy objective of "whitening" the population, they were also targeted because they were as skilled as the British but would work for lower wages.[40] What lays beneath rather innocuous practices like keeping birds in the Harz are far more complex, adaptive strategies of survival within an already globalizing economy. Canary breeding, which began in the mid-eighteenth century and continued as a profitable enterprise until the 1930s, started off as a supplement for the early industrial working class who were forced to constantly invent new ways to secure their livelihood.

The production of singing canaries yielded an excess of birds which were not suitable for the global canary trade. Female canaries sing very little and a breeder only needed a small number of females from each generation to keep up reproduction. Along with the underperforming male singers, most females were a superfluous element. Capitalist imperatives informed the ways both human and animal bodies were employed and demanded that excessive, collateral populations be sold off or put to another use. It is unsuprising then that, in one of the most masculine workplaces in European modernity, female Canaries became underground companions. In this regard, the canary in the coal mine again followed the fate of the chaffinch. Sources mention the chaffinches and other native

40 Rafael de Freitas e Souza, *Trabalho e cotidiano na mineração aurífera inglesa em Minas Gerais. Mina da Passagem de Mariana* (USP: São Paulo, 2009), 111.

birds to accompany miners in the Harz mountains and Tyrol, although other small animals such as mice must have for a time shared this grim destiny. The function of the iconic canary, taken in its small cage down to the depths of the extractive economy, was especially simple. As a sentinel animal, it was meant to suffocate before any human companion would even notice a change in air quality. Canaries are very sensitive to carbon monoxide; their small size and remarkable speed require more oxygen than the average human adult; their respiratory system works extremely fast as air rushes through their lungs while inhaling and exhaling. What this means, in essence, is that the respiratory exchange with their environment happens more than twice as fast as it does in humans or other mammals. This also increases their suseptibilty to carbon monoxide much greater; following their exposure to increased levels of this color- and odorless gas, the birds would faint as they suffocated roughly twenty minutes faster than any human counterpart.[41]

The peak of canary breeding in the Harz, the 1880s, is alligned with a shift toward coal mining across Europe, North America, and within other industrialising countries. Coal, extracted mainly from underground mining, was the energetic basis of Europe's Second Industrial Revolution; in Germany, coal mining underwent a rapid increase, especially in the area of the Ruhrgebiet, roughly 300 kilometers west of the Harz, where coal production grew about fivefold between 1870 and 1913 and employment rose from 50,000 to 440,000 men by 1913.[42] As it

41 Christal Pollack, "The Canary in the Coal Mine," *Journal of Avian Medicine and Surgery* 30/4 (2016): 387–89.

42 Gerhard Gebhardt, *Ruhrbergbau*: *Geschichte, Aufbau und Verflechtung seiner Gesellschaften und Organisationen* (Essen: Glückauf, 1957), 492.

Fig. 06. Cage for reviving canary, with oxygen cylinder, made by Siebe Gorman & Co. Ltd, London. © Science Museum Group, Manchester; reproduced with permission.

already had in Britain, the nexus of steel, iron, railroads, and coal overturned whole landscapes, obliterated ecologies, redefined distance, and standardized time. The coal industry also became the main attractor for processes of urbanisation and proletarianization. A solidarity emerged among the miners underground that would give shape to a new form of social organisation.

It is especially odd then that the Harz Canaries, first bred to delight the salons of the emerging bourgeoise, would join the new proletariat as they descended in ever greater numbers into the earth in search of coal. The scientific validation for this assymetrical collaboration was provided by the physiologist John Scott Haldane in Great Britain and George A. Burrel in the United States. The latter made the matter equivocal:

> The usefulness of small animals in detecting vitiated air in mines is well established […]. The [US] Bureau [of Mines] has experimented with most of the more common small animals such as canaries, guinea pigs, rabbits, chickens, dogs, mice and pigeons and finds that canaries or mice are the most suitable for the work. Of the two the Bureau finds Canaries to be the most sensitive […].[43]

We know very little about how exactly small birds fulfilled their assigned task among miners in the shafts of the Harz; it is likely that various sensitivities were put to use. One account of chaffinches described how they performed a specific song

43 George A. Burrel et. al., *Relative Effects of Carbon Monoxide on Small Animals*, Technical Paper no. 62 (Washington, D.C.: Department of the Interior, 1914).

in response to changes in barometric pressure (in its normal habitat, an announcement of approaching rainfall).[44] With this specific song, the chaffinch would warn miners of gases seeping in. More precise accounts from the twentieth century report that canaries were part of the emergency rescue units that operated in British and US American coal mines. The so called "pit canaries" were brought along after accidents.[45] Roof-falls, explosions, and fires caused by methane or the ignition of coal dust made accidents brutal and common. Carbon Monoxide poisoning was especially common after mine fires; photographs of rescue units show men wearing gas masks, breathing machines, and goggles, all while carrying a bird in a small cage. One account from the Whitehaven William Pit Explosion of 1947 describes how man and bird form an active assemblage, venturing into an underground crisis scene to rescue human lives and restore mining operations:

> The lead man had a cage fastened to the top of his breathing apparatus, so that the man behind him could see when they had entered the "styth" or after-damp area. [Workers] then knew where they needed to start trying to restore the "coursing" of the air-flow, to direct fresh air into that area.[46]

44 *Die Finkenflüsterer – Das Geheimnis von Benneckenstein,* film directed by Galina Breitkreuz; see programm.ard.de/TV/mdrfernsehen/die-finkenfluesterer---das-geheimnis-von-benneckenstein-/eid_282291699937600.

45 Catherine Burton, "Risking Life and Wing: Victorian and Edwardian conceptions of Coal-Mine Canaries," *Victorian Review* 40/2 (2014): 143–59.

46 David Kuchta, "Mine Canaries," in The No. 9 Mine & Museum Lansford, *Mine Stories*, (n.d.); no9mine.tripod.com/main/id11.html.

Catherine Burton points out that even though the bird was used as a Cartesian apparatus, the exploitation of birds by mine owners, and workers, included some form of responsibility, and perhaps even care. In her extensive review of accounts by British rescue units that repsonded to accidents in mines, she notes that miners valued canaries precisely for their animate qualities and sentient reactions to distress, which helped workers to relate to them. At the beginning of the twentieth century, when the use of sentinel animals as gas detectors in British coal mines was debated, miners strongly argued in favor of canaries over mice. This was partly due to the limited sympathies for mice, which were considered vermin that stole food and made the work environment in the mine unsanitary; more importantly though, the stress signals of canary birds were easier to read because they were "human-like." The head of a rescue unit from North Staffordshire argued, "A mouse has a habit of crouching and doubling up and it is difficult to tell whether it is being gassed or merely taking a nap, and the observer has to continually keep poking it to discover what condition it really is in."[47] Comparatively, a canary exposed to high levels of carbon monoxide would stop making any sound and appear dizzy, then close its eyes and breathe rapidly; it would then fall of its perch, vomit, and finally lose consciousness.[48] These reactions to toxicity were easy to relate to. According to Burton, "shared experience of and response to suffering" strengthened the bond between

47 Walter Clifford "Colliery Rescue Work in General: Breathing Apparatus and its Employment," Practical paper delivered to Mining Students Association, England (Nov. 1920); cited in Burton, "Risking Life and Wing," 152.

48 Catherine Burton, "Risking Life and Wing," 153.

humans and birds; this experience was central to an image of solidarity under the earth. Miners took the birds into a hostile environment, but they also depended on a bond of biological solidarity.[49] Burton even cites evidence that members of rescue teams tried to save canaries themselves from dying. To this end, one can discover in the British Science and Industry Museum's collection a canary resuscitator: a cage with a glass window and an oxygen valve attached to the top. A faint Canary could be brought back to life by sealing its open side and starting the oxygen flow. In this regard at least, the canary can hold several positions within the class struggle; if not getting killed at work was an act of reclaiming sovereignty over one's body, canaries and men were comrades.

As we ramble through canary crossroads, it is evident that non-human beings have been fully integrated into the project of European modernity-coloniality and the making of the western écomythe. Throughout the history of science and among the many divisions of labor, Canaries have been sacrificed in the name of accumulation. They have also served as representations, projections, and colonial fantasies, and helped to formulate disciplinary and cognitive regimes. All the while, their bodies and affects served as source of wealth, alongside the bodies of workers and the body of the earth itself, as well as those not even considered workers—women and enslaved men, women, and children.[50]

The structures that maintain hierarchies of race, gender, class, and species—defining the lives that matter and the

49 Ibid., 152.

50 Karl Marx, *Capital: A Critique of Political Economy, Vol. 1*, ed. Friedrich Engels, trans. Ben Fowkes (London: Penguin, 1990), 638.

bodies that are cared for—are still everywhere in evidence.[51] Instead of being overtaken by technological progress, they are ever more precarious in a world which is, as Achille Mbembe describes it, "increasingly dominated by the haunting of its own end."[52] Does our deep immersion in the toxicity of the present reveal a haunting menace to human life (the pandemic) as a form of revenge carried out by other living beings after centuries of abuse and exploitation?[53] Mbembe reminds us that it is not only today that humanity is threatened by asphyxiation and "entire populations are subjected to a difficult and panting breath."[54] The history of mining and Canaries as sentinel sirens is especially telling in this respect. If what is at stake is, as Mbembe suggests, the politics of the living as a whole, perhaps the only way out for us all is to breathe differently and in common. To do so, we do well to follow Juliana Fausto, who asks us "to give back to what we call nature its political, productive, creative powers," under an ecology of attention, tact and concern, an ecology based on the creation of kin and bonds. As Vinciane Despret has stressed, "[b]onds carry stories, in the double sense of the term: that of history and that of stories, which are bonds that we weave between events that give them a meaning, among which some enchant the world."[55] Reviewing what lies beneath our accumulatory illusions can help identify the walls we need toppling.

51 Vinciane Despret, "The Body We Care For: Figures of Anthropo-zoo-genesis." *Body & Society* 10/2–3 (2004): 111–34.
52 Achille Mbembe & Felwine Sarr, *Politique des temps* (Paris: Philippe Rey, 2019).
53 Juliana Fausto, *De quem vingam-se os animais?* (São Paulo: n-1 edições, 2020).
54 Achille Mbembe, *O direito universal à respiração,* (São Paulo: n-1 edições, 2020).
55 Vinciane Despret, *What Would Animals Say If We Asked the Right Questions?,* trans. Brett Buchanan (Minneapolis: University of Minnesota Press, 2016).

Likewise, such historical reflection helps trace the contours of resilience, care, and attention that characterize lives lived on the margins, which depend on living bonds for survival. As exterminations menace the planet, co-existing with other humans and non-humans may mean hearing and being affected by songs that barely survive their asphixiating histories.

Jimmie Durham: Guajalotes

The main difference between Europe and the Americas is that no one domesticated animals in the Americas before the invasion by Europe. That means that we depended much on plants and agriculture. Not only potatoes, maize, beans, tomatoes and squash of all sorts, but also peanuts and all of the chilis and peppers of the capsicum family. When I was a child there was a kind of wild chili that the wild turkeys would eat. They did not seem to notice that the chilis were picante to the point of flame.

Everyone in Mexico had semi-domestic turkeys, called in Nahuatl *guajalotes*. Cherokees and other peoples of the southwest of the U.S. also depended on semi-domestic turkeys. They are good for gardens of beans and corn because they eat insects and provide good fertilizer.

In the autumn, my father would kill very large turkeys for special meals. These could be as large as fifteen or twenty pounds.

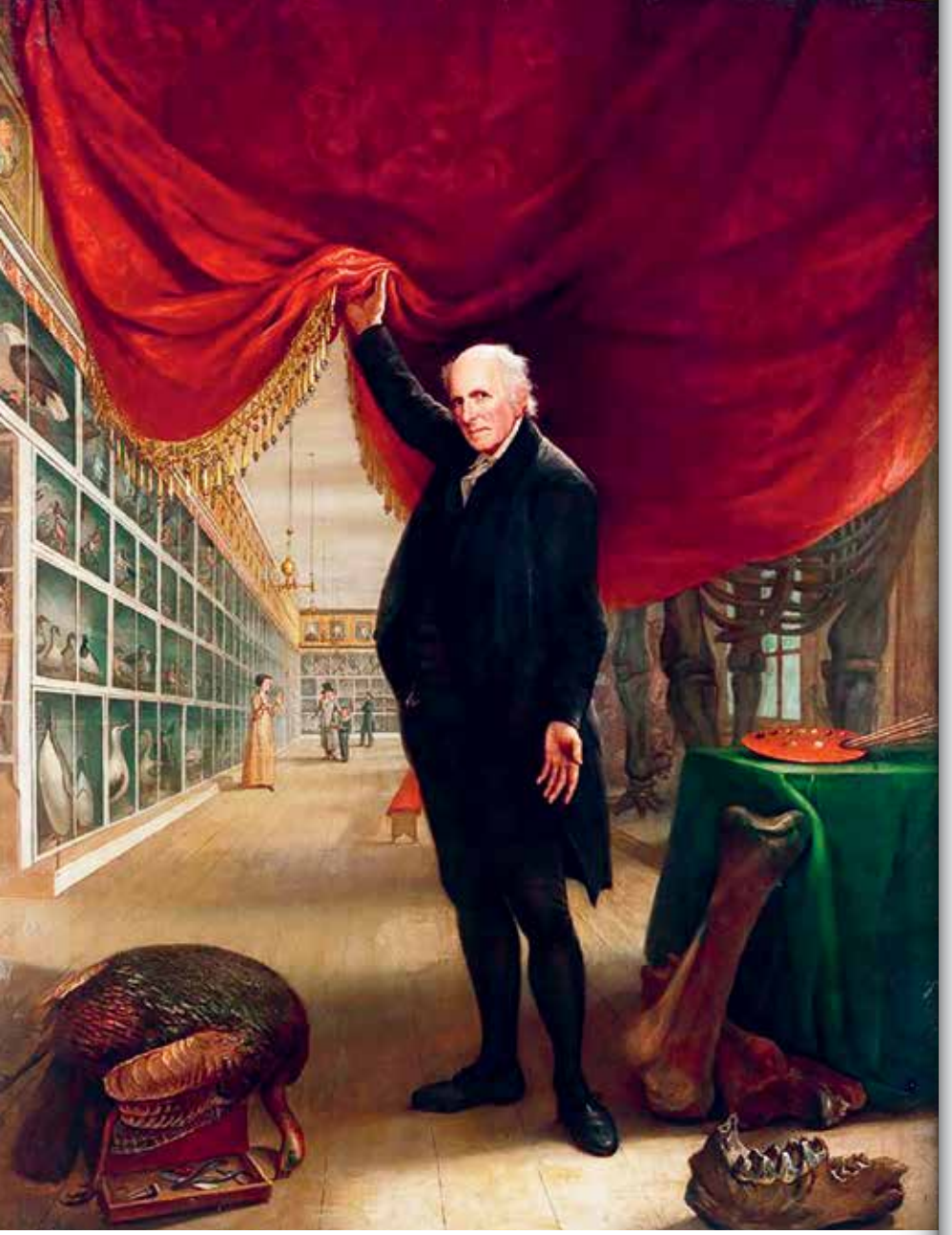
Killing and cleaning one is a hard job. If you shoot it in the forest it is an easier job but still hard to do; they are such magnificent birds in the wild. Native to North America only, they were brought to India and Turkey by the Portuguese, so that in English they are Turkeys, but India birds in French.

Roast a turkey at almost low heat, lightly covered for about five hours. For the last hour, remove the cover and turn up the heat to brown the surface.

Make a stuffing of cornmeal, oil or fat, nuts and seeds—such as sunflower (also an American plant, loved by Van Gogh) and pumpkin seeds—onions, berries, dried fruit, chilis, epazote, sage, and oregano. Make enough of this to cook a dish on the side also…

Boil the neck, gizzard (cut it open and remove the stones and inner membrane first), heart, liver, and tail for about an hour or more. After it cools a bit, debone the neck meat and chop everything small, add some corn flour to the broth and cook with a fork for stirring. This is the gravy.

Before eating, burn some cedar and sage, and say thank you to the turkey and the plants.



Charles Willson Peale, *The Artist in His Museum,* 1822; oil on canvas, 263.5 × 202.9 cm; courtesy of the Pennsylvania Academy of the Fine Arts, Philadelphia; gift of Mrs. Sarah Harrison (The Joseph Harrison, Jr. Collection), 1878.1.2. Reproduced with permission. For context, see essay, page 352.

Inter Folia, Aves

by Anna-Sophie Springer

> Oddly, I cannot remember any single book in the library, but the idea of a library containing books filled with birds caught my attention. The idea stays with me yet.
>
> — John G.T. Anderson[1]

I have long considered birds my companions. As a child, my father would occasionally find injured fledglings and we'd handrear them at home until they could fly off the balcony; as a young adult, I was drawn to watching them as inspirations toward freedom, weightlessness, and open space. More recently, my research on natural history specimens—especially bird skins and bird taxidermy—lent my ongoing fancy with birds and their role in culture a more material form. Faced with these inert bird objects in museums around the world, less sublime questions became the center of attention: against the background of the world's current ecological depletion, I study the history of taxonomy and museum displays of nature to understand geopolitical inheritances of coloniality, hierarchization, and dispossession. So, the more I have explored bird specimen collections, the more I have become interested in what we don't see when we look at them.[2] This is also how

1 John G.T. Anderson, *Deep Things Out of Darkness: A History of Natural History* (Berkeley: University of California Press, 2013), xiii.

2 This theme is elaborated in Anna-Sophie Springer and Etienne Turpin, "Compensatory Postures: On Natural History, Necroaesthetics, and Humiliation," in *Theatre, Garden, Bestiary*, eds. Vincent Normand and Tristan Garcia (Berlin: Sternberg Press, 2019), 161–72.

I view bird books, not least because the historical conditions of "sedentary" naturalists studying birds without much access to fieldwork created very peculiar circumstances. The books and folios one can request in rare book libraries are their legacy. Looking at centuries of bird book creation provides a new angle for thinking more deeply about curatorial-editorial modes of publishing, but it also opens a window into the early beginnings of modern ornithology.[3] In the absence of living birds at the center of this story, in this essay I explore the co-constitutive relationship and frequent feedback loops between bird specimens, descriptions, and illustrations on the page with regards to the shaping of naturalists' mental worlds about the life of these creatures—as little puzzles in a bigger mystery. But, reading this history against the grain, I also look critically at the bird book as a tool of capture: while noticing the live birds around us can open our senses to other-than-human ways of knowing, it is important to pay attention to the different value and knowledge systems that inform the representation of avifauna.[4] In what follows, I unfold these concerns further by revisiting the history of bookmaking through the peculiar lens of ornithology.

3 This essay is an extensively revised and edited version of a previous piece, "*Inter Folia, Aves*: Reading Bird Books as Curatorial-Editorial Constellations," in *Publishing as Artistic Practice*, ed. Annette Gilbert (Berlin: Sternberg Press, 2016), 134–52. In that former iteration, I attend more to the question of how to use the adjacencies, connections, and negotiations observable in the creation of early bird books as a prism for situating curatorial-editorial practice in cultural history.

4 See Thom van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction* (New York: Columbia University Press, 2014); Stephen T. Asma, *Stuffed Animals and Pickled Heads: The Culture and Evolution of Natural History Museums* (Oxford: Oxford University Press, 2001); also, Carol Freeman, *Paper Tiger: How Pictures Shaped the Thylacine* (Hobart: Forty South, 2014).

These Creatures of the Book

The invention of the modern printing press in 1450 caused the first media revolution. While up until then one archetypal Holy Book had dominated the production and interpretation of medieval scholarship in Europe, the introduction of mechanical movable type opened more diverse possibilities for selecting, reordering, and disseminating written texts—frequently published alongside printed images. Soon spreading beyond the realm of the clergy, book production mushroomed in fifteenth-century Europe, gradually turning publishing into a mass medium with an expanding Renaissance public. With religion thus losing its established monopoly on the written word, new types of knowledge infrastructure superseded scholarly religious institutions, such as scriptoria (where books were copied manually by scribes) and their attendant monastic book collections. But in addition to the modern secular library, the modern natural history museum also developed as an institutional corollary of newly accessible printed matter, capturing the world's diversity and disseminating it as news and information.[5] In the

5 Indeed, it seems necessary to reflect on the proliferation of European colonization as aided by the printing revolution. Even if in the early Renaissance printer-publishers may still have focused more on the dissemination of ancient texts, as Elizabeth Eisenstein claims, mechanical printing allowed narrations of voyages to be published and promoted faster and more cheaply than ever before; with sailors diffusing the material across the whole continent and beyond, and inspiring the rich to fund more expeditions. In this context, it is also crucial to remember the dramatic effect on the other shores of the ocean, as Walter D. Mignolo elaborates: "Misunderstanding went together with colonization. Once something was declared new, and the printing press consolidated the idea among the literates, the descriptions of people for whom nothing was new about the place they were inhabiting, except for the arrival of a people strange to them, were suppressed." In: Walter D. Mignolo, *The Darker Side of the Renaissance: Literacy, Territoriality and Colonization* (Ann Arbor: The University of Michigan Press, 1995), 259. See also Elizabeth Eisenstein, *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early-Modern Europe* (Cambridge: Cambridge University Press, 1979).

realm of natural science, the discipline of biology is particularly indebted to print culture as it aggregated from the interplay and negotiation between (zoological) expeditions, specimen collections, and bookish taxonomical arrays.[6]

When considering the European printed book as an art form, the *Nuremberg Chronicle* (originally entitled *Schedel'sche Weltchronik*, 1493) and Peter Apian's *Astronomicum Caesarium* (1540) are well-admired early examples that emphasize the relevant interrelationships between image, text, page layout, and the overall role of gathering ideas that is possible in books. [Fig. 01] In both cases, besides the research and production of the content, the process of assembling the books *as books* (that is, in this case, as bound codices) was also part of the general work of their authors. Apian for instance not only wrote the texts but also produced and prepared the prints of the first editions of his atlas. In this early era of bookmaking, the editorial stages of consolidating material for publication and the various activities of producing printed-matter objects for public circulation were part and parcel—not unlike the case of certain small-scale artistic printing and publishing projects in our times. However, due to our conventional understanding that art and science are "heavens apart,"[7] just as bourgeois painting and scientific illustration were different professions, the fascinating genealogy of the illuminated natural history book usually remains an overlooked kin when considering the history of publishing as an artistic practice. Yet, it turns out

6 Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986).

7 Claus Nissen, *Die illustrierten Vogelbücher* (Stuttgart: Hiersemann Verlag, 1953), 11. This, and all subsequent translations from German, are my own.

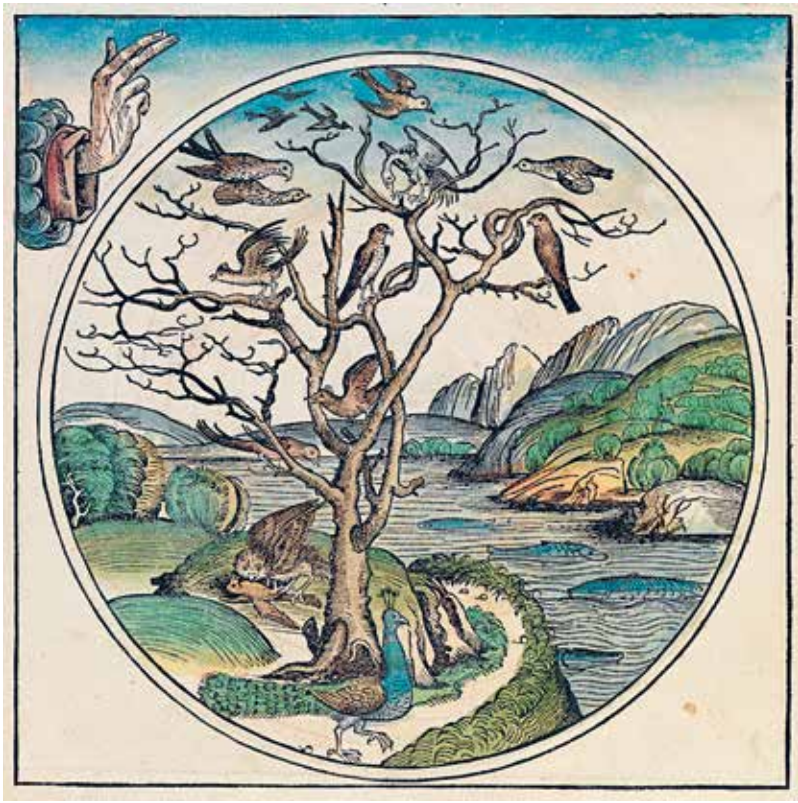


Fig. 01. The *Schedel'sche Weltchronik* or *Nuremberg Chronicle* published in 1493 is an illustrated *incunabulum* and world historical encyclopedia that is considered one of the best-preserved early printed books famous for integrating image and text as narrative means. It was produced in Nuremberg under the leadership of author Hartmann Schedel, (a doctor and book collector) while involving a group of artists including Albrecht Dürer. The image reproduced here depicts and artistic interpretation of the Old Testament's "Fifth Day of Creation," in *Genesis* 1:20–1:23, which begins with the phrase: "And God said: 'Let the waters swarm with swarms of living creatures, and let fowl fly above the earth in the open firmament of heaven." Reproduction from Wikimedia Commons.

that for anyone interested in the book as a space for paginated exhibitions, natural history books do open up a unique trajectory in parallel to art history.

Here, the European bird book stands out as a particularly multivalent publication subspecies. Field naturalists, bird collection curators, and illustrators had to join forces to create early ornithological monographs of bird species only partially known, that is, perhaps never witnessed in their natural habitat by the person describing them to a world of curious readers. Indeed, over several centuries the bird book was a space where zoological taxonomies were proposed, arranged, negotiated, and sometimes overwritten, thus constituting an intellectual device to record, construct, attribute, order, and re-display nature in a cultural format. As historian of science Emma Spary has emphasized with regards to the gradual codification of ornithology, "a species can be made manifest in three ways, as specimen or technological object in a collection, as description (text) or verbal object, and finally as illustration or visual object."[8] Rather than embodying "true" nature, bird books derive from an entangling of birds, things, and words; with Vinciane Despret we could say they are examples of "fabricating science."[9] And because in doing this, bird books purposefully activate multiple levels of perception and meaning at once, I consider them curatorial-editorial devices. They are also tools for the "production of

8 Emma C. Spary, "Codes der Leidenschaft: Französische Vogelsammlungen als eine Sprache der vornehmen Gesellschaft des 18. Jahrhunderts," in *Sammeln als Wissen: Das Sammeln und seine wissenschaftsgeschichtliche Bedeutung*, eds. Anke te Heesen and Emma C. Spary (Göttingen: Wallstein Verlag, 2001), 41.

9 Vinciane Despret, "F for Fabricating Science," in *What Would Animals Say If We Asked the Right Questions?* (Minneapolis: Minnesota University Press, 2016), 37–45.

nature"[10] and, in that context, bear an inherent coloniality held in place by detailed systems of taxonomy and reductive avian display.

Flights of Fancy – Departures

For centuries, tropical birds of paradise were known in Europe merely as dead objects. Bird skins—imperfectly preserved, with bodies incomplete—were brought back as awe-inspiring discoveries by colonial explorers. The first five specimens were carried by Juan Sebastián Elcano upon returning from circumnavigating the globe on the late Magellan's vessel *Victoria* in 1522. Albeit legless, these bird-of-paradise skins stirred a sensation at the Spanish court.[11] Lacking the field experience of observing the animals in their habitat, Europeans for a long time told themselves an exotic and ethereal mythology. These stories incorporated anecdotes from the native hunters in the endemic islands, who claimed that the birds could never be caught alive yet were easily shot when landing on the ground to drink.[12] As

10 Naturalists like Charles Darwin or Alfred Russel Wallace generally use the phrase "productions of nature" to speak of species; with an inflected, double-meaning, it is also the title of a forthcoming book currently being co-written by myself and Etienne Turpin to contextualize and review our exhibition-led inquiry *Reassembling the Natural* (2013–21); reassemblingnature.org.

11 See Erwin Stresemann, *Ornithology: From Aristotle to the Present*, trans. Hans and Cathleen Epstein (Cambridge: Harvard University Press, 1972), 26.

12 According to historians of science Kees Rookmaaker and Maarten Frankenhuis, this was reported for instance by Dutch admiral and explorer Jacob van Heemskerk, who visited the island of Ambon in 1599; "143 – Bird of paradise" in *The World of Jan Brandes, 1743–1808* (Amsterdam: Waanders Publishers, Rijksmuseum, 2004), 425.

a result, people in Europe believed that these birds were paradisiacal creatures that lived in the heavens and only ever landed on Earth when they were about to die. While the legendary sixteenth-century skins have long withered and disappeared, the allure and curious speculation projected onto them remain reflected in some depictions of that period.[13] These images show strange, feathered creatures that undulate among the clouds, a little more piscine perhaps than avian—for they lack spread wings and, as mentioned above, usually have no feet.

The oldest such woodcut image known was published in 1555 by the Swiss polymath Conrad Gessner (1516–1565) in the avifauna volume of his *Historia Animalium*, entitled *De Avium Natura*. Most pictures in this book show the birds in profile (usually perched on a branch or rock and appearing relatively alive and healthy). The entry on "De Paradisea" however models its bird from a severed and stuffed, and anatomically quite deformed bird-of-paradise skin. The caption below the *Paradisea* image states that the depiction is based on correspondence with a humanist from Nuremberg.[14] Indeed, even though Gessner is considered one of the first Renaissance scholars to ever compile a specimen collection for the study of natural history it is unclear whether Gessner ever had a chance to see a bird-of-paradise skin with his own eyes. They were rarities in Europe at that time. But incorporating accounts second-hand was not uncommon. Copying from other manuscripts had been routine in the hand-scribed publishing

13 See Fritz Koreny, *Albrecht Dürer und die Tier- und Pflanzenstudien der Renaissance* (Munich: Prestel, 1985), plates no. 30–34.

14 Conrad Gessner, *Historia Animalium*, vol. 3 (Zurich: C. Froschauer, 1555), 611.

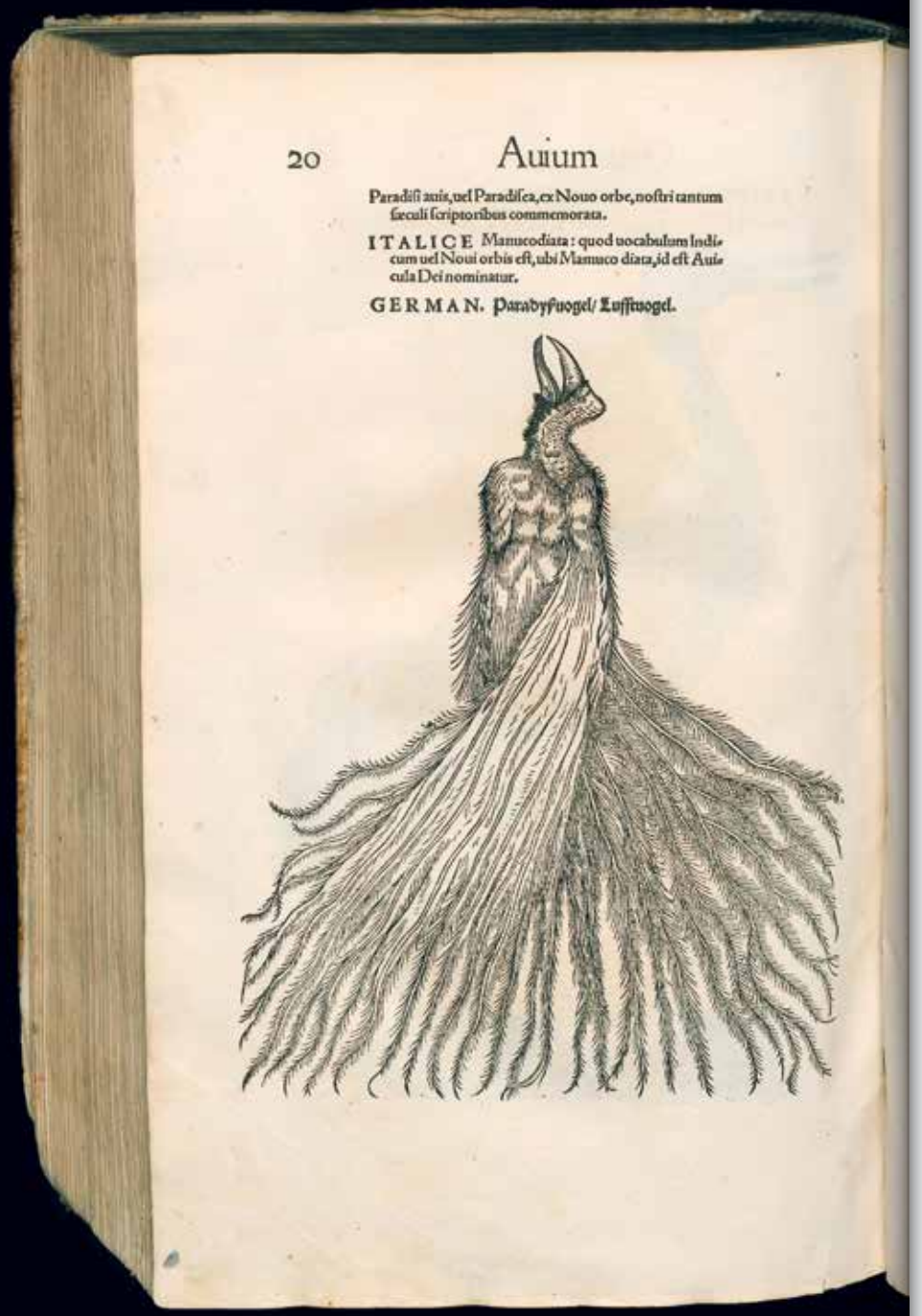
culture of the Middle Ages; to compensate for the paucity of personal experience, this practice easily survived the introduction of the printing press. Gessner in general relayed many scholarly sources, including the writings of Pliny the Elder.[15] His entry on the *Paradisea* includes references to one of the very first written descriptions made about it—a report from 1521 by Antonio Pigafetta, the chronicler of Magellan's voyage.[16] Finding all this material must have been a great passion; the German ornithologist Erwin Stresemann (1889–1972) characterized Gessner as a voracious reader who "combed through classical and medieval literature with unparalleled thoroughness for apposite references […] and […] managed to fill 806 closely printed folio pages with the discussion of only 180 species of birds."[17] His montage of a tale about the birds of paradise imagines fantastical things such as the male and female birds brooding their eggs in a cavity between their bodies while hovering high in the air, bound together by the male's skinny tail feathers.

At the time of Gessner publishing his folio, it would still be another 300 years until European naturalists would begin to observe these animals in the wild, with Alfred Russel Wallace most tirelessly collecting bird specimens in the

15 S. Kusukawa, "The Sources of Gessner's Pictures for the *Historia Animalium*," *Annals of Science* 67/3 (July 2010): 311; Jasmina Mužinić et al., "Julije Klović: The First Colour Drawing of Greater Bird of Paradise *Paradisaea apoda* in Europe and Its Model," *Journal of Ornithology* 150/3 (July 2009): 647.

16 Amanda K. Herrin, "Pioneers of the Printed Paradise: Maarten de Vos, Jan Sadeler I and Emblematic Natural History in the Late Sixteenth Century," in *Zoology in Early Modern Culture: Intersections of Science, Theology, Philology, and Political and Religious Education*, eds. Karl A.E. Enenkel and Paul J. Smith (Leiden and Boston: Brill, 2014), 360.

17 Erwin Stresemann, *Ornithology*, 18.



Malay Archipelago in the 1850s and 60s.[18] In that respect, this early ornithological entry by Gessner is a testimony to the complex negotiation between facts and fabrication inherent in the process of wanting to gain a "complete knowledge" of nature—a representation progressively shaped through the observant research and vivid imagination of scholars, artists, and travelers.[19] However, what is unique about the early ornithological history of codifying the "bird of paradise" in particular, is that their initial presence as nearly "bodiless" specimens indeed somehow resonated with the mystical tales circulating about them. [Fig. 02] Feathers and beaks made the specimens classifiable as birds but, in contrast to more "normal" ones, their immensely colorful plumage, yet disfigured physique encouraged fantastical imaginations.[20] The desire for distant worlds and the strange reality of the physical specimens thus coincided in these early, deformed bird-of-paradise skins more uncannily than in other specimens brought to Europe by colonial navigators. But as the biotic regions in the east of the Wallace Line, which contain the habitats of the birds of paradise, were claimed as

18 The scientific history of codifying the bird-of-paradise species is inevitably a history of colonial collecting. The Dutch VOC employee and draughtsman Jan Brandes (1743–1808) and the French naval apothecary and ornithologist René Primevère Lesson (1794–1849) are considered among the first Europeans to ever encounter the birds of paradise in their natural habitats in the 1780s and 1820s respectively. When Wallace shipped back to London his specimen collection from Southeast Asia this load included two living birds of paradise that became attractions of the aviaries at Kew Gardens.

19 On the colonial construction of "tropical nature," see Nancy Stepan, *Picturing Tropical Nature* (Ithaca: Cornell University Press, 2001).

20 David Attenborough and Errol Fuller, *Dawn from Paradise: The Natural History, Art and Discovery of the Birds of Paradise, with Rare Archival Art* (New York: HarperCollins, 2012).

← Fig. 02. The bird-of-paradise illustration from Conrad Gessner, *Icones Avium Omnium, Quae in Historia Avium Conradi Gesneri Describuntur Cum Nomenclaturis Singulorum* (Zurich: Froschauer, 1555). Universitäts- und Landesbibliothek Sachsen-Anhalt, Halle; VD16 G 1732.

colonial conquests by different European nations, including the Spanish, Portuguese, Dutch, British, and Germans, it is necessary to process this history critically. There is neither naivety nor nostalgia in environmental philosopher and extinction scholar Rick De Vos's words: "The bodies of birds of paradise became discursively and figuratively hollowed out and dismantled [...], leaving skin and feathers, signs of allure and desire achieved through the death of other [possible signs]. Birds of paradise were returned as plumes: signs of a transferable beauty and rarity."[21] In contrast, birds-of-paradise have played a vast role in vernacular and Indigenous cultures of the expansive island region for a very long time, reflected in language, lore, dance, song, and ancestral spirituality; these life ways and traditions became overwritten or at least sidelined by the extractivist and racist projections of the colonizers—even as sedentary ornithomaniacs were at work far away.[22]

21 Rick De Vos, "Extinction in a Distant Land: On the Question of Elliot's Bird of Paradise," in *Extinction Studies: Stories of Time, Death, and Generations,* eds. Deborah Bird Rose, Thom van Dooren, and Matthew Chrulew (New York: Columbia University Press, 2017), 109. See also Christian Freigang, "Margaretes Paradiesvogel: Vereinnahmungen des Fremden und Wunderbaren aus der Neuen Welt im frühzeitlichen Kunstdiskurs," in *Wechselseitige Wahrnehmung der Religionen im Spätmittelalter und in der Frühen Neuzeit*, vol. 1, eds. Ludger Grenzmann et al. (Oldenburg: De Gruyter, 2009), 78–9.

22 Nancy J. Jacobs makes the point that despite the misreadings, inappropriate interventions, and racialized exclusions, western colonial science and Indigenous knowledge cannot easily be separated. See Nancy J. Jacobs, "Intimate Politics of Ornithology in Colonial Africa," *Comparative Studies in Society and History* 48/3 (July 2006): 564–603; jstor.org/stable/3879437.

Early Constellational Thinking

Conrad Gessner compiled some of the most respected illustrated encyclopaedias of flora and fauna of his time. This work seems to have grown out of an earlier project also driven by a desire for obtaining a "complete knowledge" that was achieved before publishing the first edition of his 1555 bird book. In the sixteenth century, texts were becoming more available and the holdings of libraries expanded; so Gessner aimed to provide librarians and readers with a detailed, comprehensive overview of all hitherto published eruditions in Latin, Greek, and Hebrew. In the 1540s, he thus set out to produce a publication series that would eventually amount to twenty-one *books on books*. Entitled *Biblioteca Universalis*, these volumes contain a lengthy bibliographic index referencing printed texts that Gessner looked for in Swiss, Italian, and German libraries. From today's point of view it appears to be a Borgesian dream of universal knowledge, for the *Biblioteca*'s scope surpassed the already existing device of a library catalog organized per authors' names. With great ambition, Gessner delivered annotations that offered evaluations, summaries, and para-textual descriptions of more than 10,000 written works. These were arranged by subject and thematic keywords, thus promising extensive insight and understanding without accessing the original work itself—kind of like a Renaissance version of a contemporary book-summary subscription app like Blinkist. Writing in 1951, Erwin Stresemann described Gessner as someone deeply "motivated by an urge to assemble and organize facts."[23] Print

23 Erwin Stresemann, *Ornithology*, 19.

culture historian Elizabeth Eisenstein characterizes: "To collect and present 'facts' required mastery of records made by observers in the past."[24] With respect to the *Biblioteca Universalis*, this tendency and deftness is reflected in Gessner's invention of a visual system used for ordering and classifying the evaluated scholarship. Unsatisfied with a merely linear list of available library material, in 1549 he devised a tree structure [Fig. 03] similar to those later designs known from Linnaeus, Darwin, or Haeckel (who all created tree diagrams to visualize living beings in hierarchical sequences). Gessner intended to use this structure for drawing out connections between possible relationships among the accumulated information. Indeed, the tree diagram visualizes a constellation of things; and it organizes these things by situating them spatially. By foregrounding that meaning emerges from actors, contexts, and places coming together, the *constellation as method* can be one facet of what today we might associate with a curatorial-editorial practice.

To some extent, a curatorial-editorial method involves creating discursive and aesthetic proposals by gathering and arranging various authors, sources, and materials (i.e., things, images, and texts) hosted within a space-time context of performativity, design, collaboration, and public exposure. While there are many forms of curatorial practice, as a publisher and editor with experience in exhibition-making I have long been invested in better understanding the "paginated" realm of books and libraries. Looking at Conrad Gessner's bibliographic work is interesting here because it seems to present an early

24 Elizabeth Eisenstein, *The Printing Press as an Agent of Change*, 483.

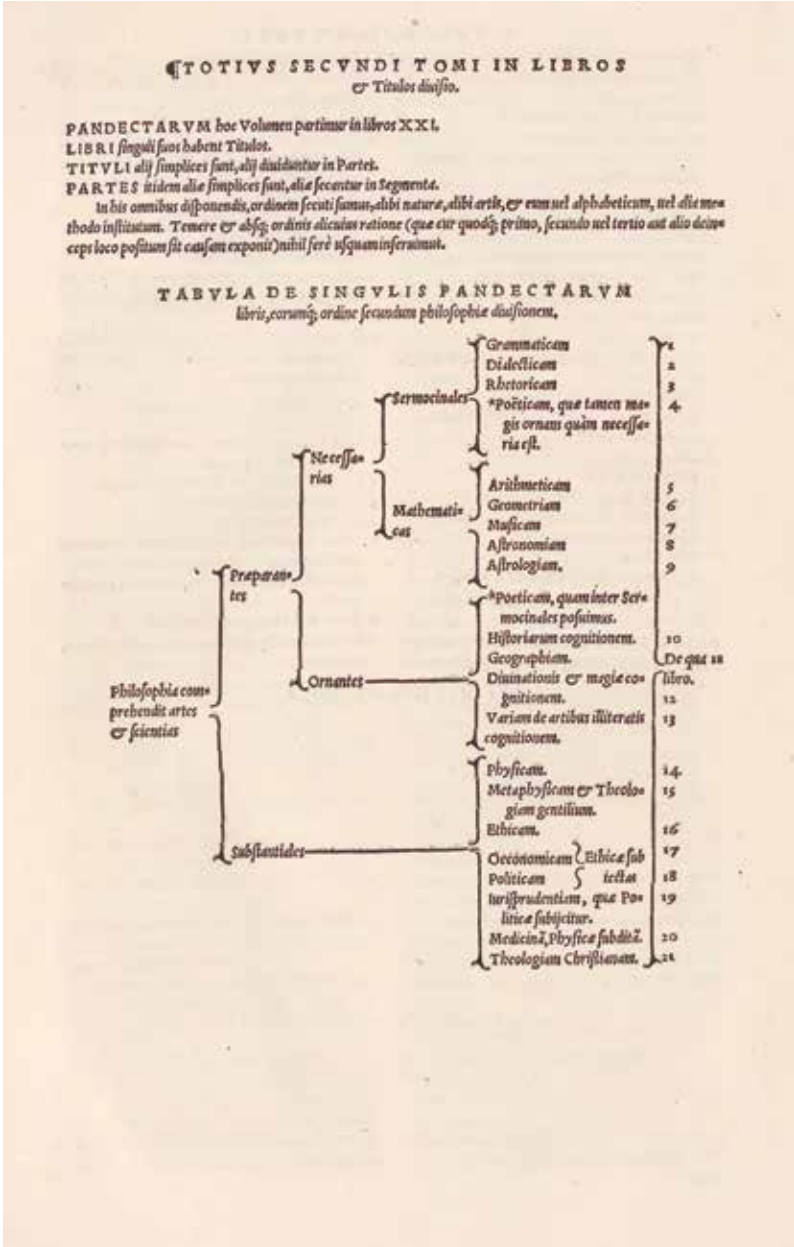


Fig. 03. The diagram in Conrad Gessner's *Biblioteca Universalis*, the so-called "Pandectae." In addition to serving as a table of contents, it displays a taxonomical division of philosophy suggesting interconnections between content levels. Conrad Gessner, *Partitiones theologicae: pandectarum universalium Conradi Gesneri liber ultimus* (Zurich: Froschauer, 1549). Zentralbibliothek Zürich; VD16 G 1700.

form of "constellational thinking" that cuts across the library, the books it holds (and those held elsewhere) as well as the individual chapters and pages themselves. Like the journals of researchers holding notes and data to be excerpted and reorganized later, the *Biblioteca Universalis* also represented a tool for referencing and producing ideas and scholarship in the future. In that sense, it was meant as a kind of manual for how reader-writers were supposed to approach and incorporate the mediated material for their own work. One recommendation suggested the use of a special folder to collect one's compiled, essentially loose and potentially nonlinear excerpts. The pages could then be arranged and rearranged for one's own texts and lectures. In Gessner's words:

> Whether they need to write or to give lectures, they may arrange the accumulated raw material for their paper in this way: Either they have recently collected material or they arrange material accumulated on slips of paper according to thematic aspects of reuse, so they can take out paper slips for the treatment of the respective object, selecting from the many cards those that are best suited for the present subject. Using small needles, they fixate the slips in the desired order for the respective lecture and write down what seems appropriate, or use it according to desire; finally, they restore the slips of paper to their place for reuse.[25]

25 Conrad Gessner, *De Indicibus Librorum* (1548), quoted in Markus Krajewski, *Paper Machines: About Cards & Catalogs, 1548–1929*, trans. Peter Krapp (Cambridge: MIT Press, 2011), 13.

Gessner essentially describes the possibility of articulating new hypotheses by developing temporary relationships among the contents of a collected archive/repository of sources. The author's focus is also on the originality of the constellation rather than on presenting individual sources in their original form. This emphasis on the usefulness of reproduction evokes the curatorial-editorial approach of composing on and with the mass-printed page.[26] And yet, from a current point of view it is also important to consider the specific ecologies of those elements accessed so as not to tear them out of context and impose meaning and/or sever meaningful connections that are already there.[27]

Flights of Fancy – Arrivals

Returning to the legacy of Gessner's ornithological work, the book on avifauna was a true success—no matter the amount of verbose half-knowledge it contained. The original Latin version was quickly translated into a very popular German *Vogelbuch* whose first, second, and third editions were published in 1557, 1582, and 1600 respectively. The birds portrayed in this oeuvre seemed to have shared Gessner's bibliomaniacal

26 See Markus Krajewski, *Paper Machines*, especially chapter two, "Temporary Indexing." Here, I am also reminded of the black boards of Aby Warburg's *Mnsemosyne* panels that I have written about in the context of the *intercalations* series, see Springer, "Melancholies of the Paginated Mind" in *Fantasies of the Library*, eds. Anna-Sophie Springer and Etienne Turpin (Berlin: K. Verlag & Haus der Kulturen der Welt, 2015), 37–97.

27 See Jan Nikolai Nelles, "The Beheaded Buddha" in *intercalations 5*: *Decapitated Economies*, eds. Anna-Sophie Springer and Etienne Turpin (Berlin: K. Verlag & Haus der Kulturen der Welt, 2021).

spirit of existing among books, for they continued to flutter into the pages of numerous later naturalists' subsequent publications. Ulisse Aldrovandi was among the first of these authors to eagerly recycle from Gessner; in 1599, 1600, and 1603, he published three volumes entitled *Ornithologia*. [Fig. 04] In the mid-seventeenth century, John Johnstone compiled yet another bird book containing almost entirely borrowed material, including many aesthetically pleasing illustrations copied directly from the books published by both Gessner and Aldrovandi.

In any case, originality in the context of these illustrations must be understood as a collaborative and ongoing interplay both regarding the artists and recurring visual referents. For instance, most of the 217 woodcuts in the first edition of *De Avium Natura* were not made by Gessner himself but were produced for him as he maintained a whole network of aesthetically gifted international correspondents, many of whom with more field experience with birds than Gessner.[28] While other publications such as the Frenchman Pierre Belon's folio *L'histoire de la nature des oyseaux* (also published in 1555) presents visual material meticulously created by its author, Gessner's *De Avium* much rather resembles a curatorial-editorial space gathering artistic productions made by several different colleagues. Furthermore, also the individual images of the birds themselves often constituted a kind of pastiche or collage of already existing visual cues, including myths and documentary errors.

28 Erwin Stresemann, *Ornithology*, 19; S. Kusukawa, "The Sources of Gessner's Pictures for the *Historia Animalium*," 20–22.

→ Fig. 04. The bird-of-paradise illustration in Ulisse Aldrovandi's *Ornithologia* (1599) bears a striking resemblance to Gessner's illustration (see Fig. 02). Image from *Ornithologiae hoc est de avibus historiae libri*, 12. Bononiae: Apud Franciscum de Franciscis Senensem, 1599. Biblioteca Università di Bologna.

Indeed, before bird taxidermy was improved with the aid of arsenical soap by the end of the eighteenth century, bird specimens tended to be fragile and prone to decay.[29] In a certain way, this physical problem made handcrafted illustrations of birds on the page of a book a much more reliable means for conserving visual characteristics, especially about species endemic to other continents that hardly anyone working in natural history could behold. At the same time, these images themselves relied on aesthetic interpretation and changing values; they were also often created by combining impressions from several different specimens serving as models; sometimes they represented artistic amalgamations of both living and dead animals causing some rather strange discrepancies.[30] Thus, the illustrations must be considered as the results of potentially quite heterogeneous materials compiled and arranged to represent a legible form (i.e., a bird with a specific look and name). Here, the various sources used to codify a bird—its specimen as well as the respective visual and textual languages used to describe it and the taxonomic system and collection within which it was

29 In 1771, Tesser Samuel Kuckahn lamented the difficulty of producing satisfactory bird taxidermy in several letters to the Royal Society in London: "They [bird specimens] never fail to become humid in moist air and long continued wet weather, suffer the flesh to rot and even corrode the wires made use of to confine the birds to their natural attitudes, till the whole drops to pieces on the least touch or motion." *Philosophical Transactions LX* (London: The Royal Society, 1771), 304. "Four letters from Mr. T.S. Kuckhan, to the President and members of the Royal Society, on the preservation of dead birds"; royalsocietypublishing.org/doi/10.1098/rstl.1770.0028.

30 See Heinrich Geissler, "*Ad Vivum Pinxit*: Überlegungen zu Tierdarstellungen in der zweiten Hälfte des 16. Jahrhunderts," *Jahrbuch der Kunsthistorischen Sammlungen in Wien* 82 (1986/7), 101–14; and Karl Schulze-Hagen et. al., "Avian Taxidermy in Europe from the Middle Ages to the Renaissance," *Journal für Ornithologie* 144 (2003): 463.

placed—all inflected and co-influenced the process of shaping the scientific, artistic as well as curatorial-editorial notion of a species. As a special case of paginated exhibition but also a type of colonial space, the bird book thus permits the visibility of birds within the environment of a co-produced ornithological discourse.[31] As early ornithologists assembled and distributed their knowledge about birds across the spectrum of bird specimens, bird pictures, and bird descriptions, the bird book became a kind of second-nature aviary—*inter folia, aves*.

Nature's Modular Library

For the longest time the library—a much more ancient institution than the natural history museum—embodied the image of a storehouse of all knowledge about the world. As historian Lorraine Daston points out in her essay "The Sciences of the Archives," some have argued that the more "hands-on" natural sciences, due to their inclination toward the newness of data, virtually manifested a disengagement with historical scholarship stored in books and libraries. She critiques this by showing that in fact there never was such a break—as if modern science no longer needed a recourse to the books and other knowledges. Architectural floorplans of nineteenth-century natural history institutions reconfirm that libraries did remain

31 Ornithologist and poet Drew Lanham makes the point that beyond Western ornithology there are *many* ornithologies; "Drew Lanham: I Worship Every Bird I See – Conversation with Krista Tippett": onbeing.org/programs/drew-lanham-i-worship-every-bird-that-i-see.

Fig. 05. The earliest known xyloteque is the *Schildbachsche Holzbibliothek* (1771–99) at the Ottoneum, the natural history museum of Kassel. For dOCUMENTA (13) in 2012, the artist Mark Dion designed a hexagonal oak wood display cabinet for its 530 different volumes. Photo: Mark Dion, *Xylotheque* (2011–12). Wood, glass, electric lighting, porcelain cabinet knobs, wood inlay, plant parts, paper, papier-mâché, clay, wax, paint, wire, vellum, leather, plastic, ink. Installation view at dOCUMENTA (13). Image courtesy of the artist and Tanya Bonakdar Gallery, New York. Photo by Anders Sune Berg.

"at the heart" of most of their buildings even at a time when empiricism had fully developed. Yet, as disciplines were formed and parsed, institutions certainly reorganized the arrangements of their repositories; book and specimen collections were increasingly separated.[32]

The metaphorical correlation between the library and the representation of the natural world, however, stuck. Three examples evoke this: When the zoology professor Hinrich Lichtenstein (1780–1857), a contemporary of Alexander von Humboldt, was appointed the first director of Berlin's new Zoological Museum in 1811, he claimed that a "zoological collection is completely similar to a library."[33] He also lauded the Parisian Museum national d'histoire naturelle for presenting the animal kingdom neatly across "all steps and links" rather than perpetuating the otherwise common "accumulation of randomly gathered curiosities."[34] A statement about collecting by Wallace from 1863 echoes these ideas. Arguing why collecting is important in the prospect of habitat loss and extinction, he said: "[The naturalist] looks upon every species of animal and plant now living as the individual letters which go to make up one of the volumes of our earth's history."[35] Another instance is the *xylotheque*, a type of encyclopedic

32 Lorraine Daston, "The Sciences of the Archive," *Osiris* 27/1 (2012): 156–87. Notably, in the chapter "The Book of Nature Transformed," Elizabeth Eisenstein also fleshes out the dispute between sixteenth-century humanist "book-hunters" and the empiricists who claimed second-hand knowledge in "old books" should be discarded to make firsthand observations; see *The Printing Press as an Agent of Change*, 453–88.

33 Carsten Kretschmann, *Räume öffnen sich: Naturhistorische Museen im Deutschland des 19. Jahrhunderts* (Berlin: Akademie Verlag, 2006), 34.

34 Ibid., 33.

35 Alfred Russel Wallace, "On the Physical Geography of the Malay Archipelago," *Journal of the Royal Geographical Society* 33 (1863): 233.

wood collection in which each wood sample is crafted to resemble a book in a library. [Fig. 05] Those objects most directly illustrate that natural history specimens were considered equivalent to the role and function of books, that is, as usable and decipherable documents holding clues and stories about nature—though one must also ask: decipherable and readable to whom?

*

Anyone who has ever tried to clean up their bookshelves will know that such an activity soon leads to conundrums of classification, categorization, and hierarchizing—by color, read/unread, genre, theme, etcetera… In the history of science, Carl Linnaeus (1707–1778) set some lasting standards for ordering the so-called Book of Nature with publications such as *Species Plantarum* (1751) and the twelve editions of his *Systema Naturae* (1758). Although Linnaeus is not considered a major figure in the advancement of ornithology, in 1758 he chose a name for the Greater bird-of-paradise in use until this day: *Paradisaea apoda*, footless bird of paradise. It is only one example for the lasting influence of his methods, nomenclature, and schematic visualizations to subsequent natural history publishing, books about birds included.[36] A cabinet with movable herbarium shelves developed in Uppsala, Sweden, formed a central innovation that enabled him to draw conclusions between his botanical collections and his taxonomical tables on the page: whenever new plant samples were added it was possible to

36 Paul Lawrence Farber, *Discovering Birds: The Emergence of Ornithology as a Scientific Discipline, 1760–1850* (Baltimore: Johns Hopkins University Press, 1997), 72.

Fig. 06. One of Carl Linnaeus's herbarium cabinets with movable shelves that allowed for the rearrangement of material in response to new insights. Photo: Åke Erikson Lindman, Museum in Altis, Hammerby, Sweden. Reproduced with permission.

Fig. 07. A herbarium sheet documenting the plant *Coelogyne macroloba* J. J. Sm. (an orchid species), collected by Hans Winkler in West-Borneo in 1924; high resolution scan from the Herbarium Hamburgense, coll. no.: 860. Courtesy of Herbarium Hamburgense, University of Hamburg.

create a space for them in the tentatively right place—while aiming to develop and publish a rank-based—even somewhat static—taxonomic system. [Figs. 06, 07]

Linnaeus's adjustable herbarium cabinet performed his "order of things" through shifts, adaptations, and changing neighbors. In this process, some conceptual translating and (re)editing must have often been done between the three dimensions of the cabinet and its 16,000 botanical samples and the two dimensions of the charts. The collations and constellations produced with the help of the cubbies changed how Linnaeus looked upon and read nature in the outside world; this in turn fed back into the conclusions of his own books. Historian of science and Linnaeus expert Staffan Müller-Wille describes the new role of the specimens and the collection in this context: "What thus counts for the collector is no longer the individual objects in the collection, but their place in an endless, serial system whose links mutually represent themselves as well as their respective species."[37] The effect was that it "[…] was the herbarium in its totality, rather than arbitrary type specimens, which served as a tool in the determination of plant species and genera."[38] Müller-Wille also points out that up until Linnaeus's movable shelves naturalists would commonly organize their herbarium sheets by binding them into book-like objects, thus lending the plants a certain finite or at least linear order. In contrast, the cabinet allowed a more open-ended research without tearing apart the entire

37 Staffan Müller-Wille, "Carl von Linnés Herbarschrank," in *Sammeln als Wissen: Das Sammeln und seine wissenschaftsgeschichtliche Bedeutung*, eds. Anke te Heesen and Emma C. Spary (Göttingen: Wallstein Verlag, 2001), 36.

38 Staffan Müller-Wille, "Linnaeus' herbarium cabinet: a piece of furniture and its function," *Endeavour* 30/2 (2006): 63; doi.org/10.1016/j.endeavour.2006.03.001.

collection.[39] Like Gessner, Linnaeus employed a form of constellational thinking—even though neither notions of ecology nor species evolution were relevant at that time. From this point of view, Linnaeus's cabinet also evinces a curatorial-editorial quality because it broke with the former tradition of the botanical quasi-book as too stubborn, replacing it with a significantly more multistable reading machine—something we are familiar with both in the context of 1970s conceptual art's experiments with unbound publications and, more mundanely, in the way we nowadays file research in folders on the computer.

One Bird, Four Hands: Brisson & Buffon

Concurrent with the naming of the *Paradisaea apoda* L., one of the largest European bird collections of its time was changing ownership in Paris upon the death of the influential René Antoine Ferchault de Réaumur (1683–1757) whose private *cabinet d'histoire naturelle* was enormous for the period. Relying on an international network sending birds from all corners of the world, Réaumur was an esteemed pioneer in modern bird taxidermy and one of the first naturalists to stuff and mount bird skins using wire to imitate more life-like poses. In addition to the sheer extent of the bird collection itself this new display method encouraged new avifaunal assumptions. Two emerging illustrated bird book series are particularly fascinating examples for the way in which collection curators

39 Ibid., 61.

entwined birds, things, and words during the early history of modern ornithology.

Created in the 1760s to 70s, both these publications have been lauded as the "vanguards of a new type of study of birds."[40] Their respective authors were Mathurin Jacques Brisson (1723–1806) and Georges-Louis Leclerc Compte de Buffon (1707–1788), two rivaling naturalists who each accessed and employed Réaumur's bird collection—albeit at different times. Even though they studied birds using the same bird-objects, their respective conclusions were quite different, both in scientific information and aesthetic approach. Whereas Brisson aimed for seemingly more objective descriptions in the tradition of the Renaissance encyclopedia, Buffon preferred to enrich his passages with literary interpretations and metaphorical embellishments. While Brisson's six-part *Ornithologie* (1760) was the last publication he ever produced, Buffon's *Histoire naturelle des oiseaux* (1772) would be one early element in a monumental natural history writing project that had expanded to thirty-six volumes by the time he died in 1788.

Brisson was employed as a collection curator by Réaumur until the latter's death in 1757. His research position was not unlike that of Conrad Gessner's—in that both lacked experience with living birds in the wild but nevertheless were inspired by the promise of a *complete* survey. Brisson carefully studied Réaumur's birds as well as the skins in other collections in Paris, and in this process far increased the number of known bird species; for instance by three times in comparison to those included in *Systema Naturae*.[41] Beyond this

40 Paul Lawrence Farber, *Discovering Birds*, 7.
41 Erwin Stresemann, *Ornithology*, 53.

broadening of natural history's horizon of avifaunal diversity, however, Brisson applied a deeply introspective gaze on the organization of the collection itself. The important historian of ornithology Paul Lawrence Farber quotes the following statement: "I have been led to think of arranging the animal kingdom into an order different from those used up to the present time. My intention in this labor was solely to instruct myself and to place myself in the position of being able to judge the most convenient place to put a specimen of a new animal which would arrive to be placed in a cabinet."[42]

Like Linnaeus's herbarium, Brisson's engagement with the bird collection created a kind of curatorial-editorial loop with regards to his bird book: His insights in the bird collections fed a complex ornithological writing project, which in turn led to the rearrangement of the specimens under his care based on the intellectual system he was devising for them as he researched. According to Emma Spary, "[n]aturalist treatises such as Brisson's not only constituted a discourse *about* the collection, but also a level of the collection itself."[43] Yet, what does it mean for the legacies of ornithology that so many naturalists were privileging a collection curator's perspective and resulting agency over a careful, slow experience in a bird's natural habitat and life world? For Farber, Brisson's writing conventions reflect a "stiff museum posture" as the descriptions are limited to the birds' external appearance, remaining unanimated by lived or habitat experience. Farber also says that "Brisson's *Ornithologie* is a good example of the collection-catalogue approach to natural history. The selection of

42 M.J. Brisson, quoted in Farber, *Discovering Birds*, 10, with further references.
43 E.C. Spary, "Codes der Leidenschaft," 47.

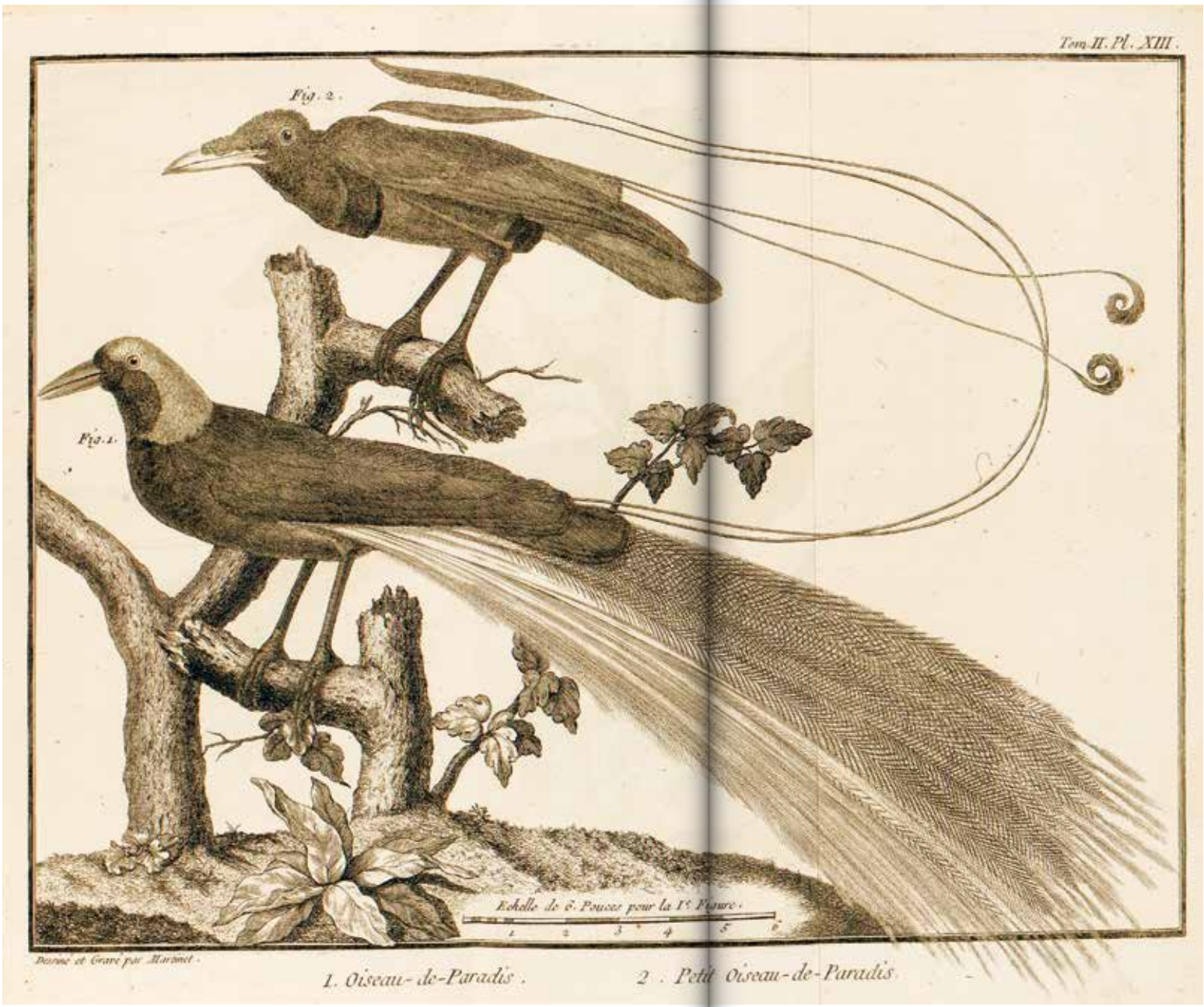


Fig. 08. Bird-of-paradise engraving by François-Nicolas Martinet for Mathurin Jacques Brisson, *Ornithologie, ou méthode contenant la division des oiseaux en ordres, sections, genres espèces & leurs varieties*, vol. 2 (Paris: Quay des Augustins, 1760), plate XIII. SCD de l'Université de Strasbourg.

material, the style, the scope, and its audience are all linked to a particular famous collection."[44] Echoing this, Spary points out that the internal organization of Brisson's volumes as well as the individual descriptions and visual renderings of the birds "function as distinguishable units like the material objects"; here, associations between the bird specimen objects, established taxonomies, printed bird images, and ornithological texts form a kind of closed system.[45] The result is a sense of artificiality and estrangement that is not even easily counterbalanced by more than 200 fine bird engravings commissioned from the esteemed illustrator Francois-Nicolas Martinet (1731–1800). [Fig. 08]

Whatever the case, Brisson's career ended abruptly with the death of his employer Réaumur when the ambitious and successful Comte de Buffon took over. The collection was moved to the Cabinet du Roi located at the Jardin du Roi that was directed by Buffon since 1739. Professional enmity between Buffon and Réaumur caused Brisson to lose access to the birds, while Buffon was keen on increasing the Jardin's influence through this precious addition. He was also one of the harshest critics of Réaumur and Brisson's methods; unsurprisingly, his *Histoire naturelle des oiseaux* is quite at odds with Brisson's approach. This is interesting because, as mentioned before, both had recourse to the same bird specimens and Buffon even hired the same engraver, Martinet, to create bird images in supervision of nearly eighty other artists. Where Brisson had tried to soberly describe species and fit them into a classificatory order, Buffon wanted to assemble an encyclopedia of living beings

44 Farber, *Discovering Birds*, 14.
45 Spary, "Codes der Leidenschaft," 47.

that would be capable of philosophically grasping the aliveness of the natural world. In this regard, Spary writes that "Brisson's text was supposed to appear scientific thanks to its minimal aesthetics; Buffon however enveloped his species' groupings and efforts for exactitude regarding body sizes and physical features in a narrative context, which tended to focus on luxury, rarity, and a preciousness that was considered the result of nature's limitless creative ability."[46] In this sense, Buffon often described a bird by lending it a certain literary affect and comparing it to a fancy gemstone or, in other cases, to monstrosities and absurd errors. At the same time, he doubted that extensive written descriptions were the appropriate and sufficient means to portray a bird and is quoted by Farber lamenting: "There are not even the proper terms in any language to express the nuances, the hues, the reflections, and the blendings."[47] This might explain why the illustrations in Brisson and Buffon are mostly so different. Brisson had wished to limit visual representation to the factual, objective. While made with great attention to detail, Martinet's birds created for Brisson evoke the less animated style already known from Renaissance depictions: Here, the birds are usually perched on branches, shown in profile, stiff-legged and upright, their wings held tightly against their bodies and the heads erect with a lifeless gaze.

Buffon, on the other hand, imaged nature as a "grand tableau filled with interesting and complex relationships"[48] and commissioned elaborate and artful color plates from Martinet; images now known as *Planches eluminées* or illuminated plates.

46 Ibid., 46.
47 Buffon, quoted in Farber, *Discovering Birds*, 22, with further references.
48 Farber, *Discovering Birds*, 24.

Figs. 09, 10. Colored bird-of-paradise engravings by François-Nicolas Martinet for Georges-Louis Leclerc, Comte de Buffon, *Histoire naturelle des oiseaux* (Paris: de l'Imprimerie royale, 1771–86). BPU Neuchâtel.

Depicting a total of 1,239 birds, some have lauded this set of illustrations as the onset of a new era of ornithological iconography, considering them to mark a transition from ornithological draughtsmanship presenting species for identification and classification's sake to ornithological affect, where the birds' liveliness and variation is conveyed through a painterly artfulness. Indeed, Martinet's engravings for Buffon appear luminous, colorful, and animated. They inspired other natural history illustrators to also emphasize artistic composition and aesthetic consideration. In Buffon's *L'Histoire naturelle des oiseaux*, most birds are situated within complex landscapes including water, plants, and dramatic skies while striking a variety of poses: some swim in ponds, some sit in front of high steeples, and others look straight at the beholder—even though this happens to not be the case in the two bird-of-paradise pictures reproduced here. [Figs. 09, 10]

But what if this blankness served to emphasize their enigmatic status? Rick De Vos has a grave point: "Representations of birds of paradise as rare and exotic, shrouded in mystery, allowed a lack of knowledge about their distribution and behavior to be normalized and their slaughter and transformation […] to continue […]."[49] With decolonial scholar Walter D. Mignolo's concept of "epistemic destitution" we can scale this up to a globalized "colonial politics of knowledge" that relies on asymmetrical hierarchies of suppression, exclusion, and disavowal "demonizing co-existing ways of knowing, sensing, believing and living/being in the world" in order to extract and consume.[50] By the end of the nineteenth century, birds of paradise were pushed towards extinction as the plumage of the males had become a high-priced fashion accessory among city folk in imperial centers such as Paris, Vienna, London, Amsterdam, Berlin.

In a broader trajectory of museological display culture, Buffon's more vivacious and—as philosopher Etienne Turpin likes to say—*viviscopic* depiction of species can be seen as a precursor to the "habitat dioramas" that would be created in the soon emerging public natural history museums. Among these were the Leverian Museum in London (opened in 1775) and Charles Willson Peale's museum in Philadelphia (opened in 1786), which both included large bird collections. [See image on page 314] Peale happened to be both a painter and a naturalist; a combination of these skills led to the design of a bird exhibition

49 Rick De Vos, "Extinction in a Distant Land," 109.

50 Walter D. Mignolo and Alvina Hoffmann, "Interview – Walter Mignolo/Part 2: Key Concepts," *E-International Relations* (21 January 2017); e-ir.info/2017/01/21/interview-walter-mignolopart-2-key-concepts.

worth mentioning here. First, Peale mounted the birds in a more realistic, *necroaesthetic* manner by carefully carving wooden bodies and exhibiting them with rocks and dried plants in front of painted landscapes.[51] The 140 bird cases were arranged according to the Linnean taxonomy published in *Systema Naturae;* a "framed Linnean catalog […] keyed by number to the cases" was available to visitors.[52] Birds classed lower were nearer to the bottom and birds classed higher, such as raptors, were up at the top. On the walls above were portraits of famous social and political figures. With time, such displays concerned with the limits and classification of species may have become more concerned with dynamic relations and transformation. But, contemporary panopticon's such as the floor-to-ceiling "Biodiversity Wall(s)" at the natural history museums in Berlin, Frankfurt, or Hamburg to some extent still call forth these earlier experiments in cross-mapping specimens and taxonomic charts as means for their beholders to gasp at nature's abundance.

Of Birds, Books, and Decolonial Practice

The question that remains is how to learn from these insights about the inner logics of bird books and natural history

51 Apparently, Peale's technique "would not be used again until the early twentieth century, when the American artists Carl Akeley and James Lippitt Clark developed a similar sculptural approach to taxidermy." Here quoting Robert McCracken Peck, "Preserving Nature for Study and Display," in *Stuffing Birds, Pressing Plants, Shaping Knowledge: Natural History in North America 1730–1860*, vol. 93, pt. 4, ed. Sue Anne Price (Philadelphia: American Philosophical Society, 2003), 17.

52 Robert E. Schofield, "The Science Education of an Enlightened Entrepreneur: Charles Willson Peale and his Philadelphia Museum, 1784–1827," *American Studies* 30/2 (1989): 31.

specimens so they can support us with regards to taking agency towards the challenges of our current situation. First of all, I believe that there is yet something else at play in the lineage of these display techniques—something beyond the exercise of experiencing beauty, wonder, and reverence in the face of these empirical (and dead) specimens as well as pictures. For, despite of all possible good intentions and fascinating outcomes, the history of natural history also still carries the legacies of wanting to grasp the whole of nature, to exercise dominion over it—both mentally and physically—and in that way, take license to use and treat other life forms both as a natural resource and a backdrop for differentiation and hubris. Grappling with the meaning of museum specimens in the context of their actual species' more recent extinction, environmental studies professor James Hatley writes with regards to the emergence of the scientific enterprise of biology:

> That we humans had verified a species to have existed was deemed more important than the fact that it might continue to exist without our having known it as doing so. As a result, the face of the Earth became in principle the planetary backroom for a great and celebrated complex of museums, botanical gardens, and zoos. This is, it strikes me, not a very polite manner in which to conduct oneself in the presence of all the other living kinds.[53]

53 James Hatley, "Walking with Ōkami, the Large-Mouthed Pure God," in *Extinction Studies: Stories of Time, Death, and Generations*, eds. Deborah Bird Rose, Thom van Dooren, and Matthew Chrulew (New York: Columbia University Press, 2017), 28.

In this essay, I have shown that scientific bird images, ranging from the illustrated page to the avian habitat diorama, are the result of heterogeneous exchanges and processes of abstraction—usually also incorporating avifaunal specimens. As we are now faced with the rapid demise of many bird species (due to the metabolic accumulation of insecticides and the destitution of habitats around the world), it is crucial to re-evaluate which stance and conduct one takes in this more- and other-than-human world—both individually and collectively. I believe that a helpful, recursive step is remembering that representations such as those I've discussed are not natural—meaning, that the image of a certain bird species and the birds themselves are not the same—and that for this reason they also do very different things.

By exploring the curatorial-editorial dynamics that undergirded the production of the early bird book as a pre-museological artifact in the context of objectifying methods such as the index, the taxonomic list, the nomenclature, and the collection catalog, I have tried to emphasize their role in the production of a coloniality that privileges certain standards, views, and visions while suppressing many others. To some degree, historical bird books functioned as tools of capture, or *second-nature aviaries*. They are early exemplars of a habitus towards the living world that has been effective in western thinking for centuries: a false familiarity born from the reduction of its "perplexity and complexity […] to an amorphous set of words and a collection of fleeting images,"[54] a reduction that in the context of ornithology—as I would

54 Ibid., 32.

add—often presupposed the killing and subsequent recompositioning of the birds as the very objects of desire. … and all of that while we are so accustomed to associating the beautiful image of the bird with poetry, with thought, with the imagination![55]

As a writer, curator, and the co-editor of this book, I am not only invested in better understanding the visual economies of scientific knowledge cultures; in this climate crisis and mass extinction event called the Anthropocene, I also want to actively contribute to an urgent biocultural, socioecological, and multispecies recalibration by finding, gathering, and supporting practices of living, being, and thinking that not "only" de-naturalize, but which also reassemble and reanimate as well. So, how then does all of that inflect the meaning and process of making a book *filled with birds* today?

*

A scene from *Frères des arbres* [Siblings of the Trees], an award-winning film about the vastly disruptive effects of deforestation in Papua New Guinea co-directed by French filmmakers and photographers Marc Dozier and Luc Marescot, left its mark on me.[56] Near the very end of the story, the film's narrator and main protagonist, Mundiya Kepanga—a charismatic Huli chief and "man of the forest" from the Southern Highlands of Papua New Guinea campaigning for the preservation of his ancestral lands at the UN—is led by

55 Tim Dee and Simon Armitage, eds., *The Poetry of Birds* (London: Penguin, 2009).

56 Marc Dozier and Luc Marescot, *Frères des arbres—l'appel d'un chef papou*, ARTE France and Lato Sensu Productions, 2017, 85 min; freresdesarbres.com.

scientists into the Zootèque, a vast subterranean storage facility of the Musée d'histoire naturelle in Paris. [Fig. 11] Reaching six floors down, this repository houses more than eight million zoological taxidermy objects and other specimens. Kepanga, upon entering a row of shelves in the bird collection, is evidently overwhelmed by the appearance not of one, but of *eight* Cassowary birds—his revered and feared ancestors, as he describes them. He is also astonished by facing a sheer multitude of mounted birds of paradise packed tightly into shelves. Beside wondering out loud how all these birds "from my forest" have ended up down here, Kepanga is struck by being both in a sort of "library of birds" and among a "gathering with family." For his community, the forest belongs to all inhabitants and the people are mere stewards, like all the other beings, including seed-dispersing paradise birds. Kepanga respectfully praises the great care and maintenance with which the birds have been kept in Paris for more than a century. But, when he wistfully remarks that it is impossible to hear any of their songs, it is a somber reminder that a (dead) bird object that has been *dis-membered* from its nested ecologies isn't a *real* bird any longer.

As he walks among the endless rows of the collection, Kepanga expresses his shame and sorrow for the animals by directly addressing them in his language as "you ghosts" and himself as "a fellow animal." The scene is indicative of the different traditions, approaches, and positions of being, sensing, and knowing that are possible (and practiced) in and towards the living world. While a museum specimen of a tropical bird of paradise can enable a certain form of scholarship for generations after that bird's endemic forest may have been

Fig. 11. Mundiya Kepanga, a chief of the Huli in Papua New Guinea, visits the underground Zootèque, the vast subterranean storage facility of the Musée d'histoire naturelle in Paris. Still from the narrative documentary *Frères des arbres—l'appel d'un chef papou* by Marc Dozier and Luc Marescot, 2017. Film still courtesy of Marc Dozier © Frères des arbres / Lato Sensu / Marc Dozier / Luc Marescot

destroyed, Indigenous communities have inherited the skills to care for the intergenerational reproduction of a habitats from their multispecies ancestors. Like many other moments in the film, the scene in the Zootèque is also a reminder that animals—birds—living organisms—are multi-contextual and multi-scalar, nested kin[57] that require radically multi-disciplinary, and increasingly *un*-disciplined and *counter*-disciplinary, modes of encounter, response, understanding, and responsibility if we humans seriously want to remediate the old logics of dis-memberment and taxonomical domination that such artifacts as the European bird book and the zoological specimen depot memorialize.

When we think of these other ways of knowing, Kepanga's remark about the birds' songs also foregrounds the importance of *listening*. To listen is to partake in the most essential qualities distinguishing living beings from inorganic things: our inherent interdependence and *sociality*. Its significance is perhaps summarized most beautifully by Paul Shephard, who writes: "Animals stand forth as actors or the symbols of action, perceived as verbs and bearing consequences in their tissues."[58] An epistemological shift towards the active and generative role of relationality and reciprocity allows us to experience the living world as events, constellational and metabolic circumstances, and temporal dimensions. Such perspectives deal with impact, affect, intimacy, and becoming, which I consider as deeply relevant

57 "Shaking the Viral Tree: An Interview with David Quammen," *Emergence Magazine* Podcast (25 March 2020); emergencemagazine.org/interview/shaking-the-viral-tree.

58 Paul Shephard, *The Others: How Animals Made Us Human* (Washington D.C. & Covelo: Island Press/Shearwater Books, 1996), 202.

for a curatorial-editorial practice that is geared towards ecological and decolonial work.

By way of a conclusion, a question by environmental philosopher and author of the book *Flight Ways*, Thom van Dooren, strikes me as inescapable:

> *What* is to be lost and what retained? Which losses will we accept, and in the name of which continuities (and vice versa)? From within a time of colonization and extinction—a time in which so much of this bioculturel diversity is being lost, often violently—what does it mean to inherit responsibly, and how might we live up to our inheritances?[59]

Such a responsible inheritance in the context of a new bird book would require that we be attentive to its historical weight of a certain coloniality and matrix of power—and thereby dis-habituate certain ways of seeing and knowing as the normal, given practice. At the same time, it also seems requisite to fill its pages with a madrigal of song, gathering so many wildly different voices that the book would virtually resound in the mind with songs of being-with, mourning, dance, and intraspecies solidarity.

59 Thom van Dooren, "Spectral Crows in Hawai'i: Conservation and the Work of Inheritance," in *Extinction Studies: Stories of Time, Death, and Generations*, eds. Deborah Bird Rose, Thom van Dooren, and Matthew Chrulew (New York: Columbia University Press, 2017), 204.

"Birds" is excerpted from Bruno Schulz, *The Street of Crocodiles* [Sklepy cynamonowe, 1934], translated by Celina Wieniewska. New York: Walker, 1963, 33–39. Reprinted with permission.

Birds

Came the yellow days of winter, filled with boredom. The rust-coloured earth was covered with a threadbare, meagre tablecloth of snow full of holes. There was not enough of it for some of the roofs and so they stood there, black and brown, shingle and thatch, arks containing the sooty expanses of attics—coal-black cathedrals, bristling with ribs of rafters, beams and spars—the dark lungs of winter winds. Each dawn revealed new chimney stacks and chimney pots which had emerged during the hours of darkness, blown up by the night winds : the black pipes of a Devil's organ. The chimney-sweeps could not get rid of the crows which in the evening covered the branches of the trees around the church with living black leaves, then took off, fluttering, and came back, each clinging to its own place on its own branch, only to fly away at dawn in large flocks, like gusts of soot, flakes of dirt, undulating and fantastic, blackening with their insistent crowing the musty-yellow streaks of light. The days hardened with cold and boredom like last year's loaves of bread. One began to cut them with blunt knives without appetite, with a lazy indifference.

Father had stopped going out. He banked up the stoves, studied the ever elusive essence of fire, ex-

perienced the salty, metallic taste and the smoky smell of wintry flames, the cool caresses of salamanders that licked the shiny soot in the throat of the chimney. He applied himself lovingly at that time to all manner of small repairs in the upper regions of the rooms. At all hours of the day one could see him crouched on top of a ladder, working at something under the ceiling, at the cornices over the tall windows, at the counter-weights and chains of the hanging lamps. Following the custom of house painters, he used a pair of steps as enormous stilts and he felt perfectly happy in that bird's eye perspective close to the sky, leaves and birds painted on the ceiling. He grew more and more remote from practical affairs. When my mother, worried and unhappy about his condition, tried to draw him into a conversation about business, about the payments due at the end of the month, he listened to her absent-mindedly, anxiety showing in his abstracted look. Sometimes he stopped her with a warning gesture of the hand in order to run to a corner of the room, put his ear to a crack in the floor and, by lifting the index fingers of both hands, emphasise the gravity of the investigation, and begin to listen intently. At that time we did not yet understand the sad origin of these eccentricities, the deplorable complex which had been maturing in him.

Mother had no influence over him, but he gave a lot of respectful attention to Adela. The cleaning of his room was to him a great and important ceremony, of which he always arranged to be a witness, watching all Adela's movements with a mixture of apprehension and pleasurable excitement. He

ascribed to all her functions a deeper, symbolic meaning. When, with young firm gestures, the girl pushed a long-handled broom along the floor, father could hardly bear it. Tears would stream from his eyes, silent laughter transformed his face and his body was shaken by spasms of delight. He was ticklish to the point of madness. It was enough for Adela to waggle her fingers at him to imitate tickling, for him to rush through all the rooms in a wild panic, banging the doors after him, to fall at last flat on the bed in the furthest room and wriggle in convulsions of laughter, imagining the tickling which he found irresistible. Because of this, Adela's power over father was almost limitless.

At that time we noticed for the first time father's passionate interest in animals. To begin with, it was the passion of the huntsman and the artist rolled into one. It was also perhaps a deeper, biological sympathy of one creature for kindred, yet different forms of life, a kind of experimenting in the unexplored regions of existence. Only at a later stage did matters take that uncanny, complicated, essentially sinful and unnatural turn, which it is better not to bring into the light of day.

But it all began with the hatching out of birds' eggs.

With a great outlay of effort and money, father imported from Hamburg, or Holland, or from zoological stations in Africa, birds' eggs on which he set enormous broody hens from Belgium. It was a process which fascinated me as well—this hatching out of the chicks, which were real anomalies of shape and colour. It was difficult to anticipate in

these monsters with enormous, fantastic beaks which they opened wide immediately after birth, hissing greedily to show the backs of their throats, in these lizards with frail, naked bodies of hunchbacks, the future peacocks, pheasants, grouse or condors. Placed in cotton-wool, in baskets, this dragon brood lifted blind, wall-eyed heads on thin necks, croaking voicelessly from their dumb throats. My father would walk along the shelves, dressed in a green baize apron like a gardener in a hothouse of cacti, and conjure up from nothingness these blind bubbles, pulsating with life, these impotent bellies receiving the outside world only in the form of food, these growths on the surface of life, climbing blindfold towards the light. A few weeks' later when these blind buds of matter burst open, the rooms were filled with the bright chatter and scintillating chirruping of its new inhabitants. The birds perched on the curtain pelmets, on the tops of wardrobes; they nestled in the tangle of tin branches and the metal scrolls of the hanging lamps.

While father pored over his large ornithological textbooks and studied their coloured plates, these feathery phantasms seemed to rise from the pages and fill the rooms with colours, with splashes of crimson, strips of sapphire, verdigris and silver. At feeding time they formed a motley, undulating bed on the floor, a living carpet which at the intrusion of a stranger would fall apart, scatter into fragments, flutter in the air, and finally settle high under the ceilings. I remember in particular a certain condor, an enormous bird with a featherless neck, its face wrinkled and knobbly. It was an emaciated ascetic,

a Buddhist lama, full of imperturbable dignity in its behaviour, guided by the rigid ceremonial of its great species. When it sat facing my father, motionless in the monumental position of ageless Egyptian idols, its eye covered with a whitish cataract which it pulled down sideways over its pupil to shut itself up completely in the contemplation of its dignified solitude—it seemed, with its stony profile, like an older brother of my father's. Its body and muscles seemed to be made of the same material, it had the same hard, wrinkled skin, the same desiccated bony face, the same horny deep eye sockets. Even the hands, strong in the joints, my father's long thick hands with their rounded nails, had their counterpart in the condor's claws. I could not resist the impression, when looking at the sleeping condor, that I was in the presence of a mummy—a dried out, shrunken mummy of my father. I believe that even my mother noticed this strange resemblance although we never discussed the subject. It is significant that the condor used my father's chamberpot.

Not content with the hatching out of more and more new specimens, my father arranged the marriages of birds in the attic, he sent out matchmakers, he tied up eager attractive brides in the holes and crannies under the roof, and soon the roof of our house, an enormous double-ridged shingle roof, became a real birds' hostel, a Noah's ark to which all kinds of feathery creatures flew from far afield. Long after the liquidation of the birds' paradise, this tradition persisted in the avian world and during the period of spring migration our roof was besieged by whole flocks of cranes, pelicans, peacocks

and sundry other birds. However, after a short period of splendour, the whole undertaking took a sorry turn.

It soon became necessary to move my father to two rooms at the top of the house which had served as box rooms. We could hear from there, at dawn, the mixed clangour of birds' voices. The wooden walls of the attic rooms, helped by the resonance of the empty space under the gables, sounded with the roar, the flutterings, the crowing, the gurgling, the mating cries. For a few weeks father was lost to view. He only rarely came down to the flat and, when he did, we noticed that he seemed to have shrunk, to have become smaller and thinner. Occasionally forgetting himself, he would rise from his chair at table, wave his arms as if they were wings, and emit a long-drawn-out bird's call while his eyes misted over. Then, rather embarrassed, he would join us in laughing it off and try to turn the whole incident into a joke.

One day, during spring cleaning, Adela suddenly appeared in father's birds' kingdom. Stopping in the doorway, she wrung her hands at the foetid smell that filled the room, the heaps of droppings covering the floor, the tables and the chairs. Without hesitation, she flung open a window and, with the help of a long broom, she prodded the whole mass of birds into life. A fiendish cloud of feathers and wings arose screaming and Adela, like a furious Maenad protected by the whirlwind of her thyrsus, danced the dance of destruction. My father, waving his arms in panic, tried to lift himself into the air with his feathered flock. Slowly the winged cloud

thinned until at last Adela remained on the battlefield, exhausted and out of breath, along with my father who now, adopting a worried hang dog expression, was ready to accept complete defeat.

A moment later, my father came downstairs—a broken man, an exiled king who had lost his throne and his kingdom.

The Virtue and Value of Disappearance: Muse-ecology and Invisible Flight of the Birds

by John Paul Ricco

> That which can never be first let him glimpse, in its fading the glimmer of a beginning.
>
> — Giorgio Agamben[1]

In *Language and Death*, published in 1982 and based upon a seminar that took place over eight days in winter 1979 and summer 1980, Giorgio Agamben advances a philosophical critique of negativity, that, as indicated by the subtitle of the book ("The Place of Negativity"), is waged in terms of the problematic of place.[2] For Agamben, negativity is not only the *force* but also the *place* in terms of which the metaphysical tradition structures the relation between language and death—a relation that has typically resorted to notions of the ineffable or silence. The problem then, is one that not only pertains to the concept of negativity but also to that of place within post-Hegelian dialectics, and Agamben critically

1 Giorgio Agamben, *Idea of Prose* (Albany: State University of New York Press, 1995), 34.
2 Giorgio Agamben, *Language and Death: The Place of Negativity*, trans. Karen Pinkus and Michael Hardt (Minneapolis: University of Minnesota Press, 1991).

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Above the harbour a gull creates flight
as flight has created him. He arises
and results from his work.
He is the circle that violates logic
that's where his soul is
— Karen Solie, "A Western"

Immanent cause of the soul. The bird's self-constitution of self—its being itself there in the infinitive of flying. To fly. The flight of flying—of what only exists (flies) in and as flying. The flight of the birds is the temptation of pure means without end, consecrated to what cannot be conserved. Even though the gull must fly or not be, does not this pure potential of the bird harbour within it, along the shore as well as way up in the sky, the potential not-to? Is this "circle that violates logic" not the vortex of animality in which both human and animal are caught up? The vortex as that place where, as Karen Solie tells us, the soul is? The soul as less than the result than it is the workless heart of flying. Or, again echoing Solie, how we might finally bear witness to what of the bird cannot be un-flown and yet does not appear. Disappearance, its movement: that is the soul.

addresses and comes to redress this problem by turning to the notion of a "no-place (nowhere) without a not" that he derives from the Eighth Elegy of Rilke's *Duino Elegies*, and that is echoed by Heidegger in paragraph 40 of *Being and Time* [*Nirgends ohne nicht,* "nowhere without nothing"].

The "no-place without a not" is, at once, not a place and without negativity (it is also, obviously, without positivity—hence, it is non-dialectical). Instead Heidegger takes "no-place without a not," as a description of the mood, disposition, and attunement (*Stimmung*) of *Dasein*, in *Dasein's* directional opening, dis-enclosure or exposure to the Outside, that is without terminal destiny or completion. In other words, we can understand "no-place without a not" to be the "there" (*Da*) of being-there (*Da-sein*). The *Da-* of *Dasein* is in no place, it is nowhere, it is the no-place without a not—and this marks the openness and freedom of *Dasein's* being-in-the-world.

I want to argue that this attunement can be further understood as the spacing of separation, in which separation is in turn understood to be not the place of negativity, but the absolute patency of existence and its sense. Separation is the irreducible condition or spacing of the sheer fact there is a multiplicity of singularities in the world. Which is to argue that the spacing of separation is more originary than the place of negativity, and as such can only be shared or destroyed but not negated (e.g. dialectically *placed*).[3] As I see it, the only way in which one might concede to a language of negativity in the context of this discussion of the *Stimmung* of *Dasein* would be

3 See Jean-Luc Nancy, *A Finite Thinking* (Stanford: Stanford University Press, 2003), 78–88.

in terms of the unemployed negativity that we inherit from Georges Bataille, and that intimately and deeply resonates with Agamben's own notion of in-operativity (even though he refuses to see it).

Access to this disposition (*Stimmung*), to "this being delivered to [self] that which refuses itself,"[4] is via a call that takes the form other than that of a voice, Voice (*Stimme*) or utterance, yet also other than Heideggerian "conscience." Instead, it is simply the demand or exigency of existence in its opening and shared exposure and separation. It is the original/ontological dis-enclosure of being as *Da-sein*, and thus marks what I take to be an essential and irreducible separation, dis-articulation, or dis-connection that structures being in the world.

For Agamben, "voice" (lower case "v"), is the natural or "mere" voice from which humans are estranged in their acquisition of language. The human is without a word or language that would be its voice similar to that of the animal for whom its voice is its only sounding (e.g. the chirp of the cicada, the hoot of the owl, etc.).[5] The only "voice" of the human is language, and language is the distancing from the very taking place of language as the purely sayable or Voice. The latter (capitalized) Voice, is, for Agamben, the withdrawal from the mere voice of animality, and it is this retreat in and by language, that opens up a division between the linguistic and the non-linguistic, the merely sonorous and articulate speech.

4 Martin Heidegger, *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*, trans. Nicholas Walker and William McNeil (Bloomington: Indiana University Press, 1995), 140–51.

5 According to Agamben, in hearing the voices of animals, humans also hear their own lack of access to this mere voice, to this freedom from presupposition and capture in history, tradition and language.

As Agamben makes clear in a recent essay on "Vocation and Voice," *Stimmung* is anterior to conscious knowledge or sensible perception and is more originary than voice (*Stimme*). Since as he reminds us, *Stimmung* "originally belonged to the sphere of musical acoustics"[6] and not to the realm of the psychological, we can say that the attunement (*Stimmung*) that we are interested in here, is existence's sonorous resonance—its mood, mode, and rhythmic modulation—which is other than a place, and closer to the *rhuthmos* (rhythm) of an *ethos* (i.e. no place without a not).[7] For Agamben, this can only happen when the division between mere animal voice and purely sayable Voice collapses, thereby opening up a zone of indistinction that is not a place, but rather an attunement, disposition, ethos, or way of dwelling in resonance with each other and other things in the world. In essence, this would amount to an eclipsing of human language and the human-animal divide by what I am here calling *muse-ecology*.

As Agamben writes in "The Eighth Day" of *Language and Death*:

> To exist in language without being called there by any Voice, simply to die without being called by death, is,

6 "The word *Stimmung*, as is evident in its proximity to *Stimme* (voice), originally belonged to the sphere of musical acoustics. […] This musical signification develops, without ever completely losing contact with the original sense, into the modern meaning of mood. […] It deals, namely, with a word whose meaning has been displaced, in the course of time, from the sphere of the acoustic-musical—to which it is bound by its proximity to the voice—to that of psychology." Giorgio Agamben, "Vocation and Voice," trans. Kalpana Seshadri, *Critical Inquiry* 40/2 (Winter 2014): 493.

7 "We could say then that more than being itself in a place, *Stimmung* is itself the place of the opening of the world, the place of being itself." Agamben, "Vocation and Voice," 494–95. Ethos can be translated as: dwelling, way, habit, form-of-life, and thus as aesthetics of existence. It is not psychological but ecological and, as I will ultimately argue, *muse-ecological*.

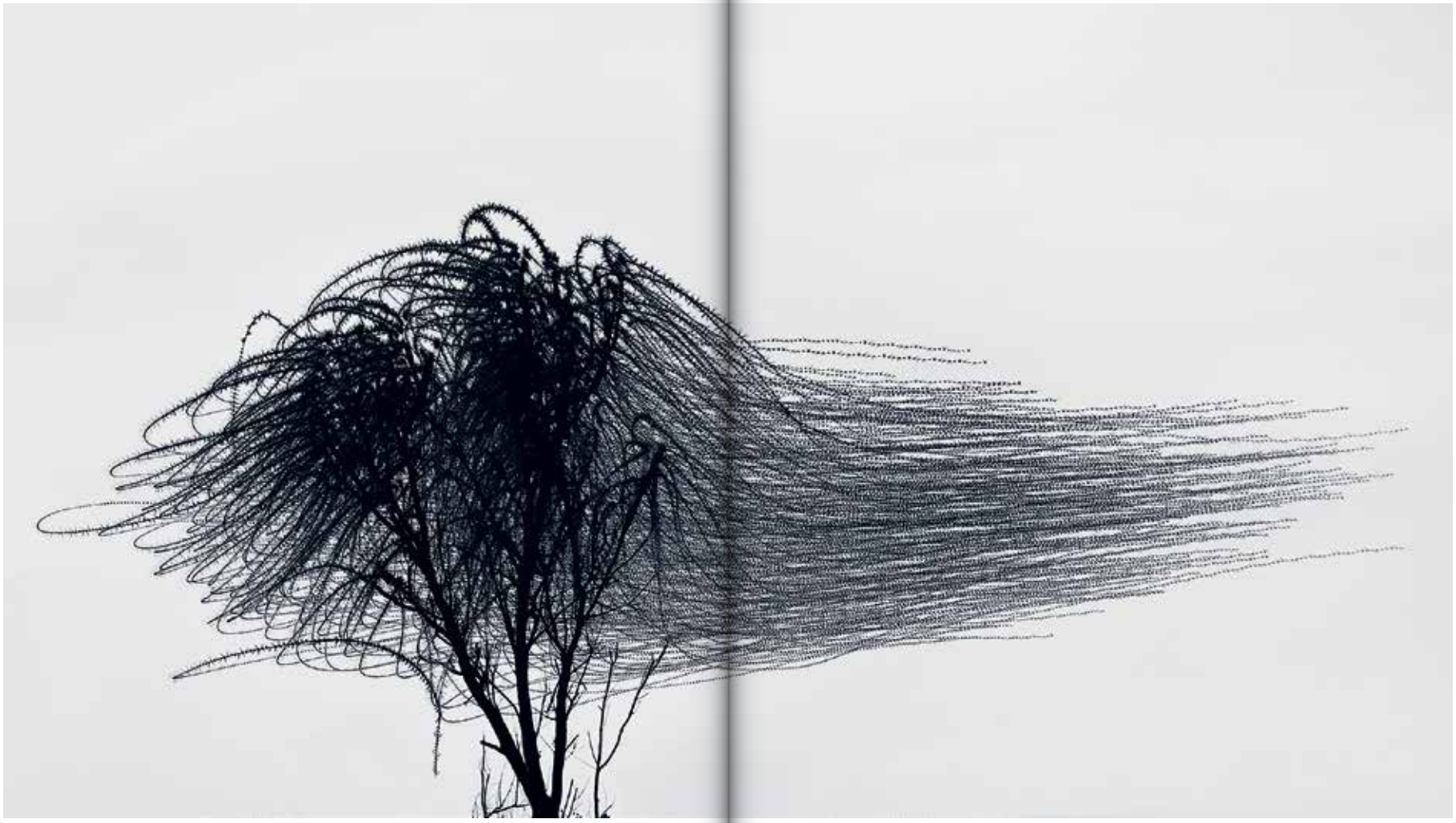
> perhaps, the most abysmal experience; but it is precisely, for man, also his most *habitual* experience, his *ethos*, his dwelling […] perhaps only beginning with the eclipse of the Voice, with the no longer taking place of language and with the death of the Voice, does it become possible for man to experience an *ethos* that is no longer simply a *sigetics* [silence, i.e. negativity].[8]

As Heidegger told his students (including Agamben) during the seminar at Le Thor in summer 1968: the self cannot see its own limit, including the outer limit of its thought. It is a limit that, years later in *The Coming Community*, Agamben will find in the figure of the halo.[9] Only the other can bear witness to the intimacy of this outer limit, for instance by calling the other by name (as in the vocative case). It is in the other's testimony of my limit, that is, in the vocative address (being called) of the other to me, that I come to bear the sense of my vocation—my calling (*Bestimmung*). Vocation, precisely in response to the demand for *virtue*, which is the ethical category of the exigent self, according to Walter Benjamin.[10]

8 Giorgio Agamben, *Language and Death,* 96.

9 Giorgio Agamben, *The Coming Community*, trans. Michael Hardt (Minneapolis: University of Minnesota Press, 1993), 53–56.

10 "That which is in question in *Stimmung*, that which one stages in the passions, is, we could say, the *in-vocation* of language, in the double sense of situation in a voice and of the call, of the historical vocation that language addresses to man [sic]. Man has *Stimmung*, he is impassioned and anxious because he holds himself without a voice in the place of language. He [sic] is in the opening of being and of language without any voice, without any nature; he is thrown and abandoned in this opening and of this abandon he must make his world, of language his own voice." Agamben, "Vocation and Voice," 498 (emphasis in original). The English translation of Benjamin's "Notes Toward a Work on the Category of Justice" (from an unpublished notebook lent to Gershom Scholem), appears as an Appendix in Peter Fenves, *The Messianic Reduction: Walter Benjamin and the Shape of Time* (Stanford: Stanford University Press, 2011), 257–58.



Tree becoming-bird and bird becoming-tree. Deleuze and Guattari: “They transform themselves and may even cross over into one another. Rhizome.” The tree has its lines of flight as do the birds, and together they make each other escape: the bird to fly away from the nest, but only when the tree shoots off from the arborescent. They leave themselves and each other, as they become indistinguishable from each other, and this is how they are neither mutually negated nor sublimated, but simply are each other’s double. Like the palm and the gold-feathered bird in Wallace Stevens’s “Of Mere Being,” the tree and the swarm race off “at the end of the mind, beyond the last thought,” and we sense that, like Robert Lowell’s dark swallows, “they’ll not come back.”

For Agamben, this is never a matter of destiny or a conclusive end. Instead, as he writes in the chapter "The Idea of Vocation," in his book *Idea of Prose;* "This attitude, this reverse embrace of memory and forgetting which holds intact the identity of the unrecalled and the unforgettable, is vocation."[11] For Agamben, to sustain the unrecalled and unforgettable as that which is unrecalled and unforgettable, is justice, which, again following Benjamin, he understands as the ethical category of the existent. In other words, justice is precisely not forgetting that there is forgetting—of that which remains unforgettable (in-appropriable) in every monumental or memorial remembrance. Such that in a separate chapter on "The Idea of Justice," Agamben, writes:

> Thee Forgotten [… is] not be delivered over to memory or language, but to remain immemorable and without name [… thus, as he goes on to say] justice […] is born not as a discourse to be passed over in silence or made widespread, but as a voice; not as a testament in one's own hand, but like a heralding gesture or a vocation.[12]

It is based upon this that Agamben arrives at the startling and bracing insight as to "why every attempt to envisage history as a court of justice fails."[13]

To briefly summarize: virtue is what is demanded, justice is the state of the world in the sense of that which remains in-appropriable (justice = "just the world"), and the value of

11 Giorgio Agamben, *Idea of Prose,* 45.
12 Ibid., 79.
13 Ibid.

virtue and justice lies in ethical vocation. In turn, the ethics of vocation lies precisely in in-operative use, that is, in the tiny displacement by which the outer limit or halo of bodies, places, and things is affirmed as in-appropriable. Which is also, at the same time, the affirmation of the essential incompletion and inevitable disappearance of whatever singularities. This is the opening and spacing by which the admixture of singularities is possible and that comes to constitute a sense of the common as separated (ethical decision), rather than being the sacred inclusion of exclusion or the sovereign ban that is the place of negativity. Drawing from Heraclitus's definition of "ethos anthropo daimon," that Agamben argues should be translated as "'Ethos, the habitual dwelling place of man, is that which lacerates and divides,'"[14] Agamben points to that which affirms what I said above about separation, division, distance, and decision being the shared spacing (or dwelling place/ethos) of ethical decision. Another word for this spacing is *khôra*.[15]

In the seventh and final excursus in *Language and Death*, Agamben makes clear that,

> the *ethos*, humanity's own, is not something unspeakable or *sacer* that must remain unsaid in all praxis and human speech. Neither is it nothingness, whose nullity serves as the basis for the arbitrariness and violence of social action.[16]

Rather, *ethos* is the virtuous and just vocation that finds value in disappearance, in something like the animal in flight. Not the

14 Ibid., 119.
15 Jacques Derrida, *Khôra* (Paris: Éditions Galilée, 2006).
16 Giorgio Agamben, *Language and Death*, 106.

tracks or footprints of the animal, but the animal as the very path of the *intractable*, precisely as that which leaves without leaving a trace, path, or tract—i.e. disappearing without negativity.

By excavating a remnant of the Latin term *cogitare* (thought) in the word *intractable*, Agamben beautifully articulates the audible and therefore traceless path of disappearance that is thinking.

We walk through the woods: suddenly we hear the flapping of wings or the wind in the grass. A pheasant lifts off and then disappears instantly among the trees, a porcupine buries in the thick of the underbrush, the dry leaves crackle, as a snake slithers away. Not the encounter, but this flight of invisible animals is thought.[17]

In 1982, the same year that Agamben published the seminar on the place of negativity, Michel Foucault was completing his lectures at the Collège de France on "The Hermeneutics of the Subject." In the first hour of his lecture on 24 February 1982, Foucault embarks on a close reading of Marcus Aurelius's *Meditations*, in order to develop an argument for the virtue and value of disappearance.[18] As Foucault makes clear, the Roman emperor's spiritual exercise—distinct from what, in the wake of Descartes, will become the "intellectual method"—consists of three moments. The first is the analysis of the reality, complexity and temporal fragility of the thing, via the two-pronged definition and description of the object, whose image appears in the mind. The second entails assessing the *value* of the thing specifically in terms of its use and usefulness (*chresis*). The third

17 Ibid, 108.
18 Michel Foucault, *The Hermeneutics of the Subject: Lectures at the Collège de France, 1981–1982* (New York: Palgrave-Macmillan, 2005), 289–314.

moment consists of decomposing the thing as nothing but discontinuous moments.

It is here, in an indifference to the thing—the reality of which exists in a series of discontinuous moments and the eternity of their passing—that the spiritual value and ethical virtue of disappearance can be most readily perceived, including as an opening onto freedom. As Foucault explains, "*value* is the place, relations, and specific dimension of things within the world, as well as their relation to […] the human subject insofar as he is free."[19] This, in turn, is not only a matter of the multiplicity, discontinuity, and incommensurability of each whatever singularity, but also of the latter's in-appropriability in its very disappearance. Hence it is any one singularity's *inestimable value*, which is also to say, its capacity to be loved.

For example, as Marcus Aurelius stated: "If we take to loving one of those sparrows flying past, it has already vanished from our sight."[20] We might read this as saying that the love we have is not for the sparrow itself (or not only), but for its vanishing when, in its flight, it passes in the sky and from our sight. We love the departing sparrow; we love that it goes—and hence this is how we, virtuously, come to value it.

Regardless of any actual correspondence, the turn to images of birds in flight on the part of these two thinkers, within the same year or so, is quite remarkable. Not least as these scenes of disappearance are taken to be topoi for the ethical adventure of love, defined as the relation to the inaccessible and the unattainable. That is to say, to the *nothing* (no thing) that is shared in and as the space of intimacy—the *no-place without a not*. More

19 Ibid., 308.
20 Ibid.

broadly, Marcus Aurelius's *Meditations* point to a fundamental ethical principle that wholly pertains to life and its extinction, given that, for the emperor, *pneuma* and *anima* are nothing more material and lasting than breathing's momentariness—its rhythmically syncopated inhalation and exhalation; its respiration, inspiration, and expiration. Foucault glosses the latter as follows: "As body, even as *pneuma*, we are always something discontinuous in comparison with our being."[21] As Foucault goes on to explain, Marcus Aurelius's spiritual exercise introduces "an important inflection in Stoicism," as distinct from that of Seneca. One that shows the extent to which the identity of any self consists only of "singular, distinct elements, which are separate from each other, and [thus] basically we are dealing with a false unity."[22] This corresponds fairly closely with the position that I, Agamben, and Leo Bersani, in different respects, take to the question of the self. For each of us, it is this discontinuity and expropriation of self ("the dissolution of individuality")[23]—opposite the continuous, appropriating and unitary identity of self—where ethical virtue is located. If there is still something of eternity here, it belongs to the infinity of finitude.[24]

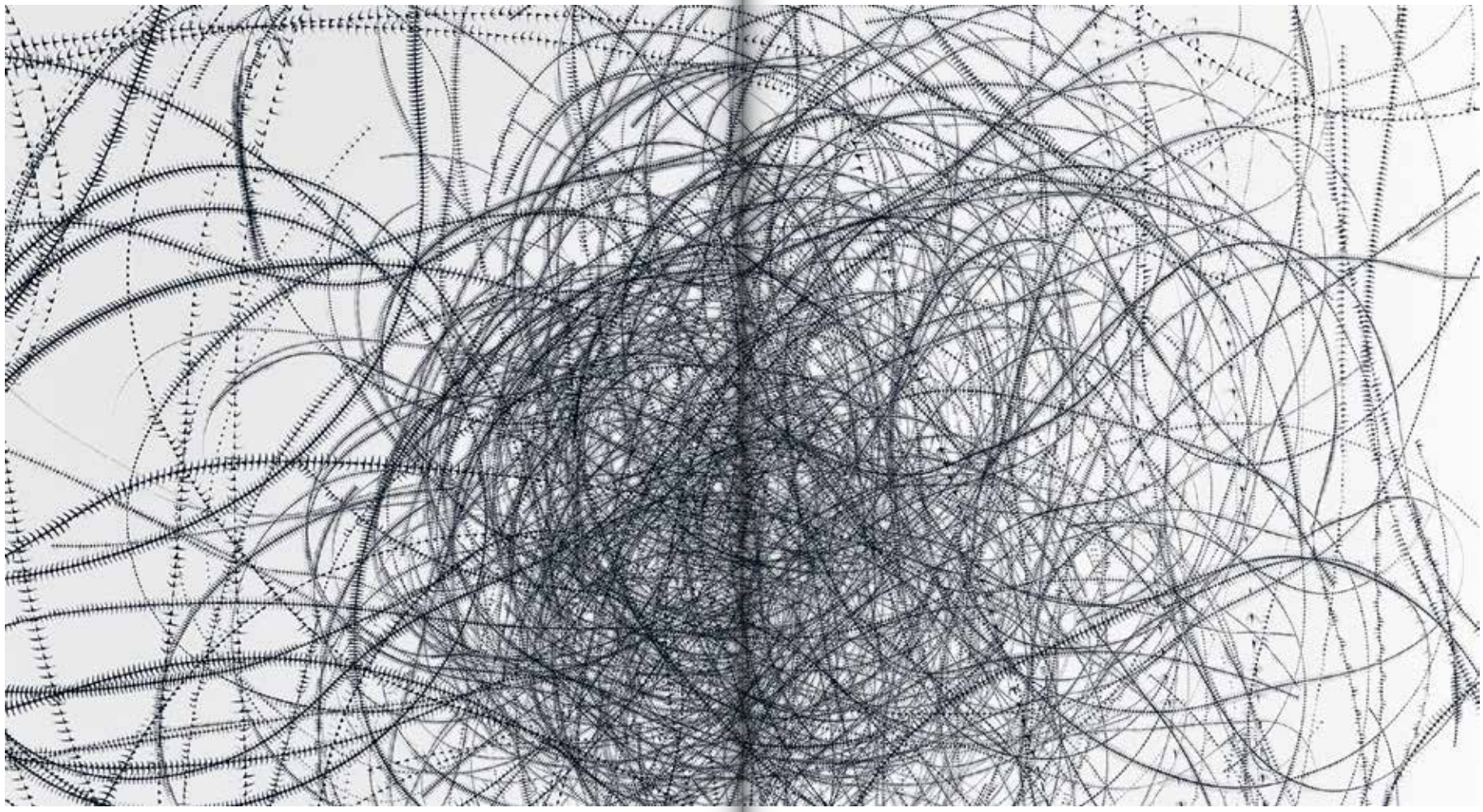
No doubt it was more than simply the etymological link between *experience* and *expiration* that lead Agamben, in an

21 Ibid., 304.
22 Ibid., 306–7.
23 Ibid., 307.
24 In *Idea of Prose*, Agamben, relates an anecdote from the emperor Justinian, that combines these motifs of breath, image, conclusion, halo, and something other than a place: "And so it was that as he was writing one night the image suddenly sprang to mind that would guide him—so he thought—through the conclusion of his work. It was not, however, an image, but something like the perfectly empty space in place. Or, rather, it was not even a space, but the site of a place, as it were, a surface, an area absolutely smooth and flat, [a *halo* as he writes further on] on which no point could be distinguished from another." Giorgio Agamben, *Idea of Prose*, 33.

early essay, to turn to two fabled incidents in which a philosopher accidently has his breath knocked out of him.[25] I am referring, of course, to Montaigne's anecdote of being knocked down off his horse by the rider of another in the second book of his *Essays*, and the story related by Rousseau in his *Reveries of a Solitary Walker* of being knocked down, out, and senseless by a large dog that unexpectedly bounded across his path. Both of these are stories about coming to oneself, not from out of oneself, but from out of a sudden, accidental, and entirely unforeseen intrusion from the outside. This "coming to" is part of the inner sense to which Daniel Heller-Roazen's masterful reading is dedicated of these stories in his book *The Inner Touch*.[26] It is the sentiment or aesthesis of existence that is an in-comparable feeling, a seemingly first sensation, birth, burst, and affective moment, precipitated by the movement and momentum of a force from the Outside.[27]

The precise moment of "coming to" is an intermediary state of awareness on the verge or zone of indistinction between consciousness and unconsciousness; a state that is without object or subject and consists of something other than the knowledge of the cogito. It is what Agamben understands by *experience*, and what in the essay from 1978, he

25 Giorgio Agamben, *Infancy and History: The Destruction of Experience*, trans. Liz Heron (London: Verso Books, 2007), 43–47.
26 Daniel Heller-Roazen, *The Inner Touch: Archaeology of a Sensation* (Cambridge: MIT Press, 2007).
27 This "coming to oneself" corresponds with Foucault's reading of the Stoics on the "conversion to self" and the "return to the self," outlined in, *The Hermeneutics of the Subject*, in particular the first hour of the lecture on 24 February 1982. In turn, the intrusion of the horse and the dog are stories of what Amitav Ghosh might describe as "the urgent proximity of non-human presences." Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (Chicago: University of Chicago Press, 2016).



An assemblage that is either knotting or un-knotting its seemingly infinite strands, the dark center marking paths of return as well as overlap. This is the web of methexis, of mixing, and in the force of the looping and swirling, of a melee. Is this a diagram of the centrifugal or the centripetal? Of things spinning inward or outward; toward or away from a center? Will the center hold, and if so, for how long? This “no-place without a not” diagrams the a-grammaticality of the flight of the birds, including from language. Tracing erasing. That tangled knot.

will theorize as "infancy." In relation to the question of voice and language that Agamben takes up here and in *Language and Death* and that remains to this day one of his principal philosophical-political preoccupations, but also in light of my own previous work on the mouth, sleeping, and drooling, it is intriguing to note that Montaigne describes this moment as though "it held on to me only just at the edges of my lips."[28] That is, right there on the very rim of his mouth, similar, as he writes, to the feeling "felt by those who let themselves slide into sleep."

Rousseau also speaks of such an edge experience, when he describes himself sitting on the shore of a lake in Switzerland where, as night fell, he listened to the undulating sound of the waves. It was this rhythmic ebbing and flowing that resonated with his inner sense, and the feeling of pleasure at the sense of his very own existence. Rousseau wants to claim that this sense was in relation to nothing external to him, but clearly this was not the case. It is, as Heller-Roazen concludes, "a matter of a psychic topography," yet one that I want to further define not as the inner depths of psychology, but as the openness of the exposed edge of the aesthetic-ecological, there where one is never oneself yet does not coincide with another alterity either.[29] There is then, no such thing as a solitary walker, especially in the conventional sense of solitude in which the latter is

28 John Paul Ricco, "Drool: Liquid Fore-Speech of the Fore-Scene," *Scapegoat: Architecture, Landscape, Political Economy*, no. 5 "Excess" (Spring/Summer 2013): 234–41.

29 This shift from the psychological (and even psychoanalytic) subject to the aesthetic subject has been theorized by Leo Bersani in his essay, "Psychoanalysis and the Aesthetic Subject," originally published in *Critical Inquiry* 32 (Winter 2006) and reprinted in Leo Bersani, *Is the Rectum a Grave? and Other Essays* (Chicago: University of Chicago Press, 2010), 139–53.

confused with a state of isolation or radical autonomy. For the walker is the intruder, and as Rousseau's experience affirms, the intruder always stands the chance of being unexpectedly intruded upon. When that happens, when the walker-intruder is trespassed against, when the animal comes crashing into its path only then to disappear, the walker stands the chance of experiencing the pleasure of the sensation of coming to himself. Which is to say, of having an experience, including of thought.

Aesthetic experience, as part of what Foucault began to elaborate, based upon his reading of ancient Roman texts as an "aesthetics of existence," is the pleasurable reception of the world's intrusion or trespass.[30] What I theorized years ago as the logic of the lure is the experience of being drawn out of oneself by the force of withdrawal and potential disappearance of the other.[31] And thus of wandering—inconclusively (in-operatively)—in the non-negative space of the unintelligible and the non-evidentiary (i.e. without a trace).[32] Here thought bears upon an ecology of sense rather than an anatomy of mind, and as Bersani has recently framed it, is

30 In writing about his deceased father, Karl Ove Knausgård brings together trespassing and breathing when he writes: "He no longer poached air, because that is what you do when you breathe, you trespass, again and again you trespass the world." Quoted in Martin Hägglund, *This Life: Secular Faith and Spiritual Freedom* (New York: Pantheon Books, 2019), 118.

31 The logic of the lure is opposite the deductive logic of the idea. See John Paul Ricco, *The Logic of the Lure* (Chicago: University of Chicago Press, 2002).

32 In his reading of *What is Philosophy?*, Leo Bersani enumerates the terms by which Deleuze and Guattari define logic as a form and a force: as that which is without a scientific function (in the Cartesian sense); is not a logical proposition; doesn't belong to a discursive system; and, doesn't have a reference. See "Staring," in Leo Bersani, *Receptive Bodies* (Chicago: University of Chicago Press, 2018), 125–26.

tied to ontological loss rather than epistemological gain (i.e. appropriation).[33]

In the summer of 2019, Gail Bradbook, one of the founders of Extinction Rebellion, was speaking to protesters in central London. As reported in *The New Yorker* magazine, seen wearing "a large earring fashioned from a sparrow's wing," Bradbook said:

> "I absolutely fucking love sparrows. […] House sparrows were in packs in my parents' garden." Since the seventies, British house-sparrow populations have declined by half. "Every time I think about it, I want to cry. I miss them so deeply. It's really unhinging and unsettling when you're in the middle of it. Love has a cost, and it is grief. Because we will always be separated from things we love. at's the nature and price of life, right? But, when you love something deeply, then you're courageous."[34]

Existential ethos lies in an aesthetic and auditory attunement to the sonorous sound of the invisible flight of the animals. The latter of which, as provocation and inspiration (i.e. muse)

33 "The inherent otherness of thought to itself is what prevents it from being fully realized." Leo Bersani, "I Can Dream, Can't I," *Critical Inquiry* 40/1 (Autumn 2013): 33. Also: "The incessant vanishing of mental events is inseparable from the multiplication of virtual connections." (Ibid., 39). In an early essay, "Sociability and Cruising" (1992), Bersani names what I am theorizing here as "metaphysical sociability," which he suggests we call "an ecological ethics, one in which the subject, having willed its own lessness, can live less invasively in the world." Bersani, *Is the Rectum a Grave?* (Chicago: University of Chicago Press, 2010), 62.

34 Sam Knight, "Does Extinction Rebellion Have the Solution to the Climate Crisis?" *The New Yorker* (21 July 2019); newyorker.com/news/letter-from-the-uk/does-extinction-rebellion-have-the-solution-to-the-climate-crisis.

for thought, is less a trace than it is a call before speech, voice, and language. This is what Agamben has named *museic*. To listen to this *museic* would be to respond to a call that is the exigency of the ecological. It would return us to dwelling in the world, absent the place of metaphysical negation, and finally alert to the real extinction that is taking place. At that point, ecology becomes muse-ecology.

If, following Agamben, Foucault, Marcus Aurelius, and others, thought has always equaled the invisible flight of the birds, then in the midst of the sixth great extinction—now—we are called upon as our vocation and in the name of climate justice, not only to think *about* the innumerable die-offs and extinctions of species, but to understand and fully embrace the extent to which disappearance, including in the form of extinction, is the provocation for thought—precisely in its inoperative and inconclusive force.[35] In this way it is not a matter of simply thinking about extinction, but *to become*—through the provocation of disappearance that is thought—*the one who is becoming extinct in the very practice of one's thinking*.

35 Towards the end of his essay "Staring," Leo Bersani asks: "Why not welcome the pleasure in repeatedly failing to conclude—in our thinking, in our writing, in our sexuality? Essayistic writing does not develop and push to its conclusion a critical or a philosophical argument. It moves speculatively." Bersani, *Receptive Bodies,* 128. For Bersani, Agamben, and I, thought relies upon its essential inconclusive incompletion and im-potentiality—as does aesthetics, love, and intimacy (to name just a few). The temporality of which pertains to the moment (stillborn or aborted) and the contemporary (in-actual, irrelevant). Which is to say that thought lies not only in the capacity to develop but also in the potential not to be developed to the point of conclusion. In this regard, each thought is always on the verge of being the last thought, its present being enunciated as "now no more." For the latter formulation, see Jacques Khalip, *Last Things: Disastrous Form from Kant to Hujar* (New York: Fordham University Press, 2018).

Not all photographs are silent. Like each of the other images by Xavi Bou featured in this volume, this is a sonograph of the inaudible flight of the birds. Here is a sort of ornithographic sheet music, in which the infinite sky of mere sound is sonorously ex-scribed. Neither bird flight nor their birdsong, these are the calligraphic remains of those birds and that song in flight. These are what poet Karen Solie might describe as "signatures and responses on yet another frequency we cannot hear." This "skyscape" does not "demand from the spectator his [sic] 'understanding,' his imputations of significance, his anxieties and sympathies; it demands, rather, his absence, it asks that he not add anything to it." To respond to this exigency is to be left with nothing to do but contemplate the sky as never silent and as irreparable, at once. Following Wallace Stevens, which do you prefer: "the beauty of inflections/or the beauty of innuendos,/the blackbird whistling/or just after"?

Contributors

EDDIE BARTLEY is founding partner and lead naturalist for Nature Trip, a wildlife and birdwatching, natural history and photography company based in San Francisco. His wildlife photography has been published in *Bay Nature Magazine*, the *Presidio Times*, the *San Francisco Chronicle*, the San Francisco Field Ornithologist's *Field Journal* and Golden Gate Audubon's newsletter, the *Gull*. He is an active volunteer researcher for the Golden Gate Raptor Observatory and the Golden Gate Audubon Society. Eddie has performed wildlife research with Point Blue Conservation Science (formerly Point Reyes Bird Observatory), the Hungry Owl Project, and the San Francisco Bay Bird Observatory. He has been featured in several articles in the *San Francisco Chronicle*. Eddie is a visiting researcher and instructor for the "Master Birding Program" at the California Academy of Sciences (since 2013) and Golden Gate Audubon Society (since 2004). He has also taught natural history and ornithology classes for more than fifteen years at numerous organizations such as Point Reyes Field Seminars and the University of San Francisco. Eddie is also the President of the Farallones Island Foundation and the President of the Yerba Buena Chapter of the California Native Plant Society. He was the principal photographer and co-author of *A Field Guide to 100 Birds of Heron's Head: Islais Creek to Candlestick Point, San Francisco*, available from the San Francisco Public Library, and as a downloadable PDF document. His website is naturetrip.com.

ARI BAYUAJI was born in Indonesia in 1975. Moving permanently to Canada in 2005, he studied Fine Art at Concordia University Montreal (2005–10). Dividing his time between Montreal and Bali, the artist is known mainly for his installations, which incorporate the use of his painting, photography works, found and ready-made objects that he finds in different parts of the world, thereby exposing himself also to the different mechanisms of the politics cultures. Bayuaji is an expert in conveying aspects of daily life, as his works usually try to show the overlooked artistic value in everyday life through objects and places and their roles within society. These objects as his creative material might be old, but the "content" as a work of art is completely new as he injects his work with emotion that is also influenced by contemporary issues he seeks to address. His work has been exhibited in some major international solo exhibitions including Montreal Museum of Fine Art (2019), The Esplanade Theatre on The Bay, Singapore (2014 and 2019), Parkhaus im Malkastenpark Düsseldorf, Germany (2019), Nunu Fine Art Taipei, Taiwan (2018), A collaboration with Agnes B. Fondation Paris in Sainte Alvère, France (2017), Redbase Foundation Yogyakarta in Indonesia (2016), and Kunsthal Rotterdam in the Netherlands (2017).

BIK VAN DER POL have worked collectively since 1995. Through their practice they aim to articulate and understand how art can produce a public sphere, and to create space for speculation and imagination. They seek to create encounters and continuous reconfigurations of places, histories, and publics. Their collaborative practices puts a particular value on the development of dialogues. Dialogues not only as a mode of transfer and gathering new understandings but also as a means towards an active experience of art which remains powerfully in process. In 2016, Bik Van der Pol were Visiting Lecturers at Massachusetts Institute of Technology's Art, Culture, and Technology program. They are also currently advisors at the Jan Van Eyck Academie, Maastricht. Furthermore, Liesbeth Bik is a core tutor at Piet Zwart Institute, Rotterdam. From 2013 to 2015, Bik Van der Pol ran the temporary M.A. program The School of Missing Studies at Sandberg Institute, Amsterdam. Recent exhibitions include the Gwangju, Istanbul, Lyon, Mercosul, and São Paulo Biennales; at Creative Time, New York and Frieze Projects London; Perez Art Museum, Miami; Power Plant, Toronto; SEMA, Seoul; Van Abbe Museum, Eindhoven; and, "Disappearing Legacies: The World as Forest" (2017/18). They were awarded the Enel Contemporanea Award 2010. Bik Van der Pol are based in Rotterdam.

DAVID BONTER is an Avian Ecologist focused on mentoring undergraduate research, teaching field courses, and engaging the public in scientific research. He serves as the Arthur A. Allen Director of Citizen Science at the Cornell Lab of Ornithology in Ithaca, USA.

XAVI BOU's grandfather instilled him with a passion for nature from the time he was a little boy. That passion impelled Xavi toward the natural sciences, and in 2003 he graduated with a degree in Geology from the University of Barcelona. In 2004 he went on to complete his studies in photography at Grisart International School of Photography, and for the next decade, Xavi worked in the advertisement and fashion industry, combining it with teaching photography. However, Xavi's love of nature was always present, so in 2012 he embarked on *Ornitographies;* photography inspired by his curiosity about the invisible patterns traced by birds in flight. "My intention is to capture the beauty of the bird's flight in a single moment, making the invisible visible. Ornitographies moves away from the purely scientific practice of Chronophotography that 19th century photographers Eadward Muybridge and Étienne Julies Marey developed. It is the balance between art and science, a project of naturalist discovery, and, at the same time, an exercise of visual poetry." In his work, art and science unite to capture a moment that is past, present and future, all at once. Xavi's 2015 debut of *Ornitographies* instantly caught the attention of international publications and collectors, and his work has since been published in National Geographic, The Guardian, Der Spiegel, Geo, and Sonntag, among many others. Xavi has exhibited *Ornitographies* in Australia, Holland, the United States, Spain, Switzerland, France, Russia and Greece. When Xavi is not setting up his tripod on a roof, rock, or windswept plain, he is at work in his studio in the center of Gracia, Barcelona, preparing future exhibitions and editing a book of his work.

TIFFANY BOZIC is a California artist whose work has been described as John James Audubon on acid. Her work evokes the tradition of tightly rendered nature illustration, which she explodes with highly emotional, surreal metaphors. Not so much departing from reality as articulating it more deeply, Bozic makes paintings in which a faun can simultaneously be alive and dead. A population of blackbirds become as one in a perfect sphere of black oil. As nature is ever more subjugated by human impacts, Bozic corrects the balance sheet. She establishes inescapable chains of consequence among the myriad species whose interactions create the world. The work is beautiful, celebratory, but can also be quite difficult. The complexities of natural processes like death and decomposition

percolate through pictures of otherwise shining life. Painting on masked and stained maple panels with watered-down acrylic, Bozic summons the grain of the wood into her compositions. With her ornithologist husband and school-aged daughter, Bozic spends significant time in wild places, the rhythms of which are evident in her vision. The subject of several solo exhibitions and included in many group shows across the country, Bozic is at the forefront of artists today redefining the aesthetics and imperatives of global change. Her work has been collected in two books, both published by Gingko Press: *Drawn By Instinct* (2012) and *Unnatural Selections* (2019).

LÊNA BÙI's works are sometimes amusing anecdotes and other times in-depth articulations of the impact of rapid development on people's relationship with nature. She reflects on ways that intangible aspects of life, such as faith, death, and dreams influence behaviour and perception. She often relies on drawing and video but is open to whatever medium she perceives as appropriate to a work. Her work has been shown in a number of solo and group exhibitions at the Sharjah Art Foundation, UAE; Wesleyan University, USA; Les Rencontres Internationales Paris/Berlin; The Factory Contemporary Art Center, Vietnam; Carré d'Art-Musée d'Art Contemporain, France; and the Wellcome Collection, London. Bùi received a BA in East Asian Studies from Wesleyan University (2007). Since 2009 she has lived and worked in Saigon, Vietnam.

MARK DION was born in 1961 in New Bedford, Massachusetts, USA. He initially studied in 1981 to 1982 at the Hartford Art School of the University of Hartford in Connecticut, which awarded him a BFA (1986) and honorary doctorate (PhD) in 2002. From 1983 to 1984, he attended the School of Visual Arts in New York and then the prestigious Whitney Museum of American Art's Independent Study Program (1984–85). He is an Honorary Fellow of Falmouth University in the UK (2014), and has an Honorary Doctor of Humane Letters (PhD) from The Wagner Free Institute of Science in Philadelphia (2015). Dion's work examines the ways in which dominant ideologies and public institutions shape our understanding of history, knowledge, and the natural world. The job of the artist, he says, is to go against the grain of dominant culture, to challenge perception and convention. Appropriating archaeological, field ecology, and other scientific methods of collecting, ordering, and exhibiting objects, Dion creates works that question the distinctions between "objective" ("rational") scientific methods and "subjective" ("irrational") influences. The artist's spectacular and often fantastical curiosity cabinets, modelled on the *wunderkammern* of the sixteenth and seventeenth centuries, exalt atypical orderings of objects and specimens. Dion also frequently collaborates with museums of natural history, aquariums, zoos, and other institutions mandated to produce public knowledge on the topic of nature. By locating the roots of environmental politics and public policy in the construction of knowledge about nature, Mark Dion questions the objectivity and authoritative role of the scientific voice in contemporary society, tracking how pseudo-science, social agendas, and ideology creep into public discourse and knowledge production. Dion lives with his wife and frequent collaborator Dana Sherwood in Copake, New York and works worldwide.

ANDREAS DOEPKE is a cultural worker and researcher from Berlin. Andreas holds degrees in political science and geography and works on projects across the environmental humanities and different approaches interrogating the coloniality in archives, landscapes and historical narratives. He worked on the management and production of the three-part exhibition *Disappearing Legacies: The World as Forest* (2017–2018), an intervention in various natural history museums, as a researcher in the development of the digital archiving platform Ocean-Archive.org (2019) and as a copywriter on the project *Owned By Others* (2020) that looked at the history of Museum Island in Berlin. At the time of publishing he is occupied within the long-term project Anthropocene Curriculum at HKW Berlin (2021–2022). When he finds time, he collaborates conceptually with artists on publishing and workshop formats that use performative and biographical methods to relate differently to landscapes and the social relations that anchor in disrupted environments. With the poet H.N. Lyonga he currently looks at the nexus of agriculture, belonging and translocal perspectives on rurality, contributing amongst others to the New Alphabet School #4: Caring, HKW, in 2020; the digital storytelling project *Field Narratives,* will premiere in 2021 or early 2022 in collaboration with curator Sascia Bailer and visual artist Lene Markusen.

JIMMIE DURHAM (b. 1940, USA) is an artist, poet, and writer who currently lives in Europe. Durham has taken part in numerous international exhibitions such as Documenta (1992, 2012); Whitney Biennial of New York (1993, 2003, 2014); the Venice Biennial (1999, 2001, 2003, 2005, 2013); the Istanbul Biennial (1997, 2013); and many other group shows. Moreover, multiple solo exhibitions at different museums such as the ICA in London; Palais des Beaux-Arts in Brussels (1993); Madre Museum in Naples (2008, 2012); Portikus in Frankfurt (2010); Serpentine Gallery in London (2015); Neuer Berliner Kunstverein (n.b.k., 2015); Fondazione Querini Stampalia, Venice (2015); MAXXI Rome (2016); and Migros Museum Zurich. Retrospectives of his works were shown at MuHKA in Antwerp (2012); Musee d'Art moderne de la Ville de Paris (2009); MAC in Marseille and Gemeentemuseum in The Hague (2003). In 2017, a retrospective, covering the 1970s to today, was exhibited in the Hammer Museum, Los Angeles; the Walker Art Center, Minneapolis; the Whitney Museum of American Art, New York; and the Remai Modern, Saskatoon. Among numerous books of his poems and essays are *Columbus Day, (*Albuquerque: West End Press, 1985); *A Certain Lack of Coherence,* (London: Kala Press, 1993); *Poems That Do Not Go Together,* (Berlin: Wiens Verlag & Edition Hansjörg Mayer, 2012); *Waiting To Be Interrupted,* (Milano: Mousse Publishing, 2014); and *Particle/Word Theory,* Berlin: (Wiens Verlag & Edition Hansjörg Mayer, 2020). Jimmie Durham received the emperor's ring of the city of Goslar [Goslarer Kaiserring] in 2016 and the Robert Rauschenberg Award in 2017. He was also awarded The Golden Lion for Lifetime Achievement of the 58th International Art Exhibition of La Biennale di Venezia in 2019.

ANNE GEENE (b. 1983, Breda, Netherlands) archives, organizes, interprets, and arranges the world around her with photography. Later, she analyses and catalogs this information in a seemingly logical way. Seemingly, because interpretation of the collected data is essentially personal and an ironic

reference to our eagerness to organize and know everything. In her work, the relationship between the photographic image and science is a central theme. She explores the issues of scientific objectivity and of photography as a medium used for this purpose. Although photography's objectivity has been questioned many times, it is exactly this objectivity that gives it this probative power. Here's where she finds her inspiration. She studied photography at the Royal Academy of Arts in The Hague and graduated in 2010 at Sint Joost, Breda. She concluded her photography studies with a Master's degree in Photography at the University of Leiden in 2012. Her graduation project, *No 235 / Encyclopaedia of an Allotment*, was chosen as the best photobook of 2010 by the Dutch national newspaper *NRC*. Subsequently, the project was purchased by the Nederlands Fotomuseum. In 2014, she won the ING Unseen Talent Award and her work was selected for several national and international exhibitions and collections. She lives and works in The Hague.

SOPHIA GRÄFE is a media culture scholar, assistant curator and freelance text editor based in Marburg and Berlin. Her academic work explores the social and epistemological meaning of pictures within cultural processes. This includes work within the fields of video and digital art. As an assistant curator she has worked with various media and experimental film festivals such as the transmediale festival, Werkleitz festival, and Internationale Kurzfilmtage Oberhausen as well as with galleries and artist studios. For instance, she was Curatorial Assistant for the thematic programme "Shooting Animals: A Brief History of Animal Film" of the 57th International Short Film Festival Oberhausen as well as the Werkleitz Festival "ZOO" in Halle (Saale) in 2011. She took part in the 2015 workshop "Ape Culture" of the SYNAPSE – The International Curators' Network at Haus der Kulturen der Welt. Between 2015 and 2018 she was a Research Assistant at the Department of Cultural History and Theory at Humboldt University Berlin. Since spring 2018, she has done research within the DFG-Heisenberg project "Transdisciplinary Networks of Media Knowledge" at Philipps-University Marburg and is a visiting scholar at the Berlin Museum of Natural History. Sophia is a member of the Junior Research Network "Cultural and Literary Animal Studies" (CLAS) and is currently working on a doctoral project on the media history of the behavioral sciences.

MARY ELLEN HANNIBAL is an award-winning author and journalist. Her most recent book, *Citizen Scientist: Searching for Heroes and Hope in an Age of Extinction*, was named one of the best titles of 2016 by the San Francisco Chronicle. Reporting deeply, Hannibal digs into the origins of today's tech-savvy citizen science movement—tracing it back through centuries of amateur observations by writers and naturalists. Prompted by her novelist father's sudden death, she connects the activity of bearing witness to nature today with a broad inquiry into time, place, and purpose. Hannibal's previous books include *The Spine of the Continent*, about which *Publisher's Weekly* said, "This is what science writing should be: fascinating and true." Her work has appeared in *The New York Times*, *Science*, *Anthropocene*, *Nautilus*, and many other publications. She is working on a book tracing Vladimir Nabokov's butterfly questing across the United States.

NINA KATCHADOURIAN is an interdisciplinary artist whose work includes video, performance, sound, sculpture, photography, and public projects. Her video *Accent Elimination* was included at the 2015 Venice Biennale in the Armenian pavilion, which won the Golden Lion for Best National Participation. Group exhibitions have included shows at the Serpentine Gallery, London; Turner Contemporary, Margate; de Appel, Amsterdam; Palais de Tokyo, Paris; Istanbul Museum of Modern Art; Turku Art Museum; Museum of Contemporary Art San Diego; ICA Philadelphia; Brooklyn Museum; Artists Space, New York; Sculpture Center, Long Island City; and MoMA PS1, Long Island City. In 2016, she created *Dust Gathering*, an audio tour on the subject of dust, for the Museum of Modern Art, New York, as part of their Artists Experiment program. A solo museum survey of her work entitled *Curiouser* traveled to three American museums in 2016–17. The artist's works in public and private collections, including The Metropolitan Museum of Art and The Morgan Library, New York; San Francisco Museum of Modern Art; Margulies Collection, Miami; and the Saatchi Gallery, London. She has won grants and awards from the New York Foundation for the Arts, the Anonymous Was a Woman Foundation, the Tiffany Foundation, the American-Scandinavian Foundation, and the Nancy Graves Foundation. She lives and works in Brooklyn and Berlin and is an associate professor at NYU Gallatin. She is represented by Catharine Clark Gallery and Pace Gallery.

Since 1968, BERNIE KRAUSE has traveled the world recording and archiving the sounds of creatures and environments large and small. Working at the research sites of Jane Goodall (Gombe, Tanzania), Biruté Galdikas (Camp Leakey, Borneo), and Dian Fossey (Karisoke, Rwanda), he identified the concepts of the *Acoustic Niche Hypothesis* (ANH), and *biophony*—the collective and organized acoustic output as each species establishes unique frequency and/or temporal bandwidth within a given habitat. To round out the definitions of soundscape sources, Krause and a colleague added the terms, *geophony* (non-biological natural sounds), and *anthropophony* (human-generated acoustic signals). Krause is also a founder of the new ecological discipline, soundscape ecology. In the world of fine art, Krause has produced over fifty natural soundscape CDs and designed interactive, non-repetitive environmental sound sculptures for museums and other public spaces worldwide. As a professional studio musician, Krause filled the late Pete Seeger slot in The Weavers during their final year (1963). With his late music partner, Paul Beaver, he helped introduce the Moog synthesizer to pop music and film on the West Coast in the mid-1960s. Aside from their own charted recordings, the team's work can be heard on over 250 albums, including those of Mick Jagger, Van Morrison, Peter Gabriel, Brian Eno and David Byrne, George Harrison, the Doors, and 135 feature films released since 1967, including *Apocalypse Now*, *Performance*, *Rosemary's Baby*, *Shipping News*, and *Castaway*. Krause, who holds a PhD in Creative Arts with an internship in Bioacoustics, was a key figure in implementing natural soundscapes as a resource for the U.S. National Park Service. His recent book, *The Great Animal Orchestra: Finding the Origins of Music in the World's Wild Places*, was published by Little Brown/Hachette, March, 2012, and has been translated into eight languages. In July, 2014, the Cheltenham Music Festival premiered

a new symphony by Richard Blackford and Krause featuring the BBC National Orchestra of Wales. *The Great Animal Orchestra: A Symphony for Orchestra and Wild Soundscapes*, is based on Krause's book and is the first live performance piece to incorporate natural soundscapes as a component of the orchestration. (CD available on Nimbus Records.) In the spring of 2015, Biophony, a music score composed entirely of natural sounds, was commissioned, choreographed and premiered by the Alonzo King's LINES Ballet, an internationally-renowned corps based in San Francisco. In June 2021, his book, *The Power of Tranquility in a Very Noisy World*, will be published by Little Brown/Hachette. His art and science exhibition, *Le grand orchestre des animaux*, commissioned by Fondation Cartier pour l'art contemporain in Paris, opened 1 July 2016. The piece has since been exhibited at the Seoul Museum of Art in South Korea; Shanghai, China; and opened MoMA's (NY) Triennale in Milan, 1 March 2019. In late 2019, it was featured at London's 180 The Strand Gallery and will have its U.S. East Coast premier in November, 2021 at the Peabody Essex Museum, Salem, Massachusetts. In May, 2022, it will open in Lille, France, and in November, its West Coast U.S. premier at San Francisco's Exploratorium. He lives with his wife and partner, Katherine Krause, in Sonoma, California.

BARBARA MARCEL (1985, Rio de Janeiro, Brazil) is an artist and filmmaker interested in the cultural roots of nature and the troubled heritage of colonial imagery. Marcel graduated in Film Studies in Rio de Janeiro, holds an MA from the Art in Context Institute at the Universität der Künste Berlin (UdK) and is currently a PhD candidate at the Bauhaus-Universität Weimar as a research fellow of the Heinrich Böll Foundation. Her work is based on the relationship between artistic and scientific research, investigating spaces or specific events with social and political concerns. Her PhD project investigates the essay film as a historiographical tool for decolonial ecological thinking with and through images, focusing on issues related to the history of botanic between Germany and Latin America. Parallel to her individual research, she often collaborates with other artists, researchers and activists on projects resulting in visual and sound pieces, installations, lectures, publications and participatory workshops about ecological relations and processes of thinking and practicing in times of environmental crisis and increasing social inequalities. Recent exhibitions and screenings include: *Critical Zones: Observatory for Earthy Politics,* Zentrum für Kunst und Media ZKM, Karlsruhe (2020–21); Berlinische Galerie, Berlin (2020); Museu de Arte Contemporânea de Niterói, Rio de Janeiro (2020); Galeria Metropolitana, Santiago de Chile (2019); *Agropoetics: Soil is an inscribed Body,* Savvy Contemporary (2019); *Licht Luft Scheiße. Perspektiven auf Ökologie und Moderne* NGBK and Prinzessinnengarten Berlin (2019); *Fractured Landscapes: Broad Underground Film Series* at Broad Art Museum, Michigan U.S.A. (2019); *Disappearing Legacies: The World as Forest* at the CeNak Centrum für Naturkunde Hamburg and the Tieranatomisches Theater Berlin (2017–18); Rencontres Internationales Paris/Berlin: New cinema and Contemporary Arts at the Haus der Kulturen der Welt and the Centre Pompidou (2018); *La voluntad de la forma* at Espacio Pla, Buenos Aires (2018); *Tropic Matters* at V240, Amsterdam (solo show 2017); and Omonoia Athens Biennial (2016); Vision and Fear Station at Galerie für Zeitgenössische Kunst Leipzig (2015);

On Projection at Kühlhaus Berlin (2015); *Through the looking screen* at 175 Gallery Seoul (2015); *Desvenda* at Galeria Marta Traba – Fundação Memorial da América Latina, São Paulo (2013).

ARJAN DE NOOY (b. 1965, Goes, Netherlands) studied chemistry and photography. One could say that his work is related to both fields: the scientific and the artistic. Using his own images as well as found images, he constructs histories, archives, scientific theories, and other stories. Those works often include a level of fiction and his own role may vary from art historian to feminist, from curator to ornithologist. Presently, his main project is a new history of Dutch photography. Oeuvres of fictitious photographers are presented as discoveries by "collector and photo historian de Nooy" (see also denooycollection.com). In 2016, together with photographer Anne Geene, he published *Ornithology*. This book can be seen both as an ornithology from a photographers' point of view or a work of art by ornithologists.

MEGAN PRELINGER is the author of several books and is co-principal of the Prelinger Library and Archives in San Francisco. From 2000 to 2010 she was on staff at International Bird Rescue (birdrescue.org), an animal hospital in California specializing in the care of aquatic birds. Since retiring from IBR, she has led naturalist field trips for the public through San Francisco Nature Education, and teaches seabird workshops through Golden Gate Audubon Society.

JOHN PAUL RICCO is the author of *The Logic of the Lure*, and *The Decision Between Us: art and ethics in the time of scenes.* Recently published essays include: "Mourning, Melancholia, Moonlight," in *CR: The New Centennial Review*; "The Commerce of Anonymity" in *Qui Parle;* and chapters in the collections: *Nancy and the Political* (Edinburgh); and *Porn Archives* (Duke). His essay: "Moths to the Flame: Photography and the Capitalocene" is in the edited volume *Capitalism and the Camera* (Verso, 2021) and that, along with essay in this volume of *Intercalations*, are part of a book project he is completing on extinction aesthetics, titled *The Collective Afterlife of Things*. He is Professor of Comparative Literature, Art History and Visual Culture at the University of Toronto.

DAVID ROTHENBERG makes music live with the sounds of nature, records music with other species, and writes books and makes films about the process. His books and recordings in the field of interspecies music include *Why Birds Sing* on birds, *Thousand Mile Song* on whales, and *Bug Music* on insects. These works have been translated into many foreign languages and have been the subject of documentary films and radio programs in many countries, including Germany, France, Finland, Denmark, the UK, and the United States, including the BBC feature-length TV program *Why Birds Sing*. David has also written *Sudden Music*, *Blue Cliff Record*, *Hand's End*, and *Survival of the Beautiful*. As a musician, Rothenberg has performed and recorded with Pauline Oliveros, Peter Gabriel, Ray Phiri, Suzanne Vega, Scanner, Elliot Sharp, Iva Bittová, and the Karnataka College of Percussion. His CD, *One Dark Night I Left My Silent House*, a duet with pianist Marilyn Crispell, came out on ECM in 2010. Rothenberg is a distinguished professor of Philosophy and Music at the New Jersey Institute of Technology. He has also collaborated with neuroscientists on a series of projects trying to bring musical

understanding to scientific methods of deciphering animal sounds and he is working on new ways to visualize animal music as he continues to bring an ever larger assortment of international collaborators together to interact with the sounds of other species.

JULIANA SPAHR edits the book series *Chain Links* with Jena Osman, the collectively funded Subpress with nineteen other people, and Commune Editions with Joshua Clover and Jasper Bernes. With David Buuck she wrote *Army of Lovers*. She has edited, with Stephanie Young, *A Megaphone: Some Enactments, Some Numbers, and Some Essays about the Continued Usefulness of Crotchless- Pants-and-a-Machine-Gun Feminism* (Chain Links, 2011); with Joan Retallack, *Poetry & Pedagogy: The Challenge of the Contemporary* (Palgrave, 2006); and, with Claudia Rankine, *American Women Poets in the 21st Century* (Wesleyan University Press, 2002). With Joshua Clover, she has twice organized somewhat free schools, the 95 cent Skool (summer of 2010) and the Durruti Free Skool (summer of 2011), written on politics, on manifestos, applied for a job at the Poetry Foundation, and organized, with Chris Chen, too, the conference Poetry and/or Revolution. Her books include, *Du Bois's Telegram: Literary Resistance and State Containment* (2018), from Harvard University Press; *That Winter the Wolf Came* (2015), from Commune Editions; and, *The Transformation* (2007), Atelos Press. She lives in California.

ANNA-SOPHIE SPRINGER is an independent exhibition maker, author, editor, and publisher. Since 2011, she has directed the publishing atelier K. Verlag in Berlin, advancing new forms of the book-as-exhibition. Together with Etienne Turpin she initiated *Reassembling the Natural,* an exhibition-led research platform on the role of natural history in these times of climate change, social injustice, and environmental depletion; projects include *125,660 Specimens of Natural History* (at Komunitas Salihara, Jakarta in 2015); the three-part touring exhibition and university museum intervention, *Disappearing Legacies: The Word as Forest* (at the Zoological Museum Hamburg, Tieranatomisches Theater Berlin, Zentralmagazin Naturwissenschaftliche Sammlungen, Halle/Saale in 2017–18), and *ponds among ponds: an exhibition of threshold ecologies and nested life* (Institute for Contemporary Art, NYU Shanghai in 2021). She is the co-editor of the *intercalations: paginated exhibition* series (K. Verlag and Haus der Kulturen der Welt, 2015–21) and *Fantasies of the Library* (MIT Press, 2016). In 2020, her work with K. Verlag was honored with a prestigious Deutscher Verlagspreis [German Publishing Prize] by the Federal Ministry of Culture.

FRANK STEINHEIMER accomplished studies in biology, zoology, and ecology at the Universities of Erlangen and Vienna. In 2005, PhD on the history of ornithology with special focus on nomenclature at the University of Rostock. 1994–98 Student assistant at the Natural History Museum of Vienna; 1998–2002, Curator of the Bird Collection, The Natural History Museum London/Tring; 2002–04, Curator, Bird Collection, Natural History Museum Berlin; 2004–08 free-lance ornithologist, working for BirdLife International in Myanmar, for the Max Planck Institute for Ornithology at the American Museum of Natural History New York, and as documentalist and Assistant to the Editor for Lynx-Edicions Barcelona for the *Handbook of the Birds of the World*. Since 2008 he has worked at the Central Natural Sciences Collections of the Martin-Luther-University Halle-Wittenberg: first as Head of Project and since 2010 as its Director. He is the author of more than 200 articles and has co-curated several temporary exhibitions.

KATHARINA TAUER is a German graphic designer living and working in Berlin. After completing her M.A. in Art Direction with a focus on type design at ECAL (École cantonale d'art de Lausanne) in 2012, she moved to London and built up a solid, year-long work experience at Zak Group. Katharina now works on self-initiated projects, as well as commissions and freelance jobs, maintaining a focus on book design and the cultural sphere. Since 2014, she is a regular, close collaborator of Anna-Sophie Springer, Etienne Turpin, and K. Verlag; together, they have been awarded several design awards, including a "25 Most Beautiful German Books 2019" for *On Reconciliation* (ed. Dora Garcia) from Stiftung Buchkunst Frankfurt and the "Best Book Design Award 2019" for *The Work of Wind: Land* (eds. Christine Shaw & Etienne Turpin) from the Ontario Association of Art Galleries, Canada.

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