# IMAGE OCCULOGY

C|O Berlin SPECTOR BOOKS

The catalog's tale unfolds throughout the book.

# GREETINGS

Christiane Riedel
Member of the Executive Board,
Crespo Foundation

The *Image Ecology* exhibition marks the start of *After Nature: Ulrike Crespo Photography Prize*, jointly awarded by C/O Berlin and the Crespo Foundation in memory of photographer and philanthropist Ulrike Crespo (1950–2019).

As a fine-art photographer, Ulrike Crespo was primarily concerned with themes of nature, such as the macrocosms of landscapes and the microcosms of flora. But she also took an active interest in the environment. Over the course of two decades, she and her partner, Michael Satke, established gardens in Ireland that contain artfully designed, renaturalized, and wild areas, making her equally in touch with the wonders of the natural world and the wonders of (photographic) technology.

The gardens in Ireland now serve as a space for international artist residencies. Her work in nature photography is to be continued through the prize named in her honor and devoted to photography "after nature," now expanded further to include current perspectives.

Humankind has created a broad expanse of technologies, from telescopes and AI to bio-media, with which they extend evolution and expand the faculties of their natural senses. They view nature through cameras and from satellites, creating images of nature that they not only see differently through a technological lens, but also often alter or even destroy.

This cycle of human, nature, and technology is the subject of (self-)critical reflection by artists making use of photography in the *Image Ecology* exhibition. What gaze have they themselves—as humans—cast upon nature? How consciously do they respond to the expansion of their senses through apparatuses, and how aware are they of their own responsibilities when using these technologies?

How do they see humankind's relationship to nature: are they designing or even destructive actors of the Anthropocene, coinhabitants of a "symbiotic planet" (Lynn Margulis), or inventors of new technologies for a new era "after nature"? What relevance does art have for them in these questions so central to humanity?

With *After Nature: Ulrike Crespo Photography Prize*, art photographers are encouraged to explore their own gaze on humans and nature. In the exhibition series linked to the prize both at C/O Berlin and at the Crespo Foundation in Frankfurt am Main, the most varied photo-artistic viewpoints on local and global discourse will be presented, which so moves and affects us humans.

# FOREWORD

Stephan Erfurt
CEO, C/O Berlin

Humans have always been inspired by nature. It is the very resources of this planet that enable life itself to exist. Yet since the start of the Anthropocene, and since we humans began to irrevocably alter the system of our Earth, not only have the worlds of flora and fauna come under threat, but we ourselves, too. Will we succeed in adjusting our economic, social, and cultural systems in order to halt human-led worldwide environmental destruction? And what role does photography play in these processes? Ecology has been a constant theme in photography since the latter half of the twentieth century.

As early as 1969, the United States Information Agency opened an exhibition in the Amerika Haus titled *Poisoned Environment: The Problem of the Contamination of Air and Water*. Several years ago, we established an internal working group at C/O Berlin to address sustainability issues within our own institution. We now intend to anchor this highly topical area in our programming by exploring the ecological consequences of image production in *Image Ecology*. This exhibition shares a global cross section of innovative artistic approaches that connect with the environment, as well as the conservational practices and surroundings that encompass it. The multimedia works on display are not merely representational objects, but also reflections on the very ecology of image-making from a global perspective.

*Image Ecology* marks the start of C/O Berlin's sustained engagement with preserving our unique environment. We intend to and will continuously engage with what might well be the most urgent question of our day. It is my honor to announce that we have found our ideal cooperation partner, the Crespo Foundation. Each year, we will jointly award a prestigious photography prize to two artists, which will result in two exhibitions that visually reflect on ecological questions. This prize is bound to become an international model, and its artistic outcomes are certain to be as illuminating as they are inspiring. We at C/O Berlin are confident of this.

My special thanks go to the Crespo Foundation, which has made *Image Ecology* possible. We look forward to a close collaboration over the coming years. Equally, I would like to thank our curators for *Image Ecology*, Boaz Levin and Kathrin Schönegg, as well as our curator Katharina Täschner for overseeing the future prize awards and my colleague Louisa Seelis for organizing our cooperation with the Crespo Foundation.

# IMAGE ECOLOGY: AN INTRODUCTION

Boaz Levin, Kathrin Schönegg

What does it mean to think of photography ecologically? In response to a growing awareness of the urgency of our climate crisis, artists are trying to find radical new ways to explore its causes and engage with its consequences, while also imagining other possible futures.

At the time of writing, the concentration of carbon dioxide in the Earth's atmosphere measures nearly 423 parts per million (ppm), and it is still rising. For the entirety of preindustrial human history, the level remained below 300. As a result of the burning of fossil fuels, the annual rate of increase over the past half century has been a hundred times faster than previous natural increases, such as those that occurred at the end of the last ice age, nearly twenty thousand years ago.[1] As is now widely known, carbon dioxide absorbs and radiates heat. Functioning like a greenhouse—or lens—it causes the earth's temperature to rise and the oceans to acidify, with deadly consequences for life on earth.

But how can one represent such processes, the toll they take, their origins and causes? We have become horribly accustomed to seeing images of climate catastrophes, of charred forests, flooded coastal communities, and ravaged ecosystems. Yet such images, though gut wrenching, tell us little about how we got here. Often shot from above, these devastated landscapes, whose dimensions exceed the human scale, offer a sense of a catastrophic sublime. The result can be awe inspiring, but also numbing. Individual images of such "extreme weather events" run the risk of giving the impression that climate change is something distant and separate from us. That a flood, a wildfire, or an oil leak on one side of the planet should have its origins and causes somewhere else entirely remains outside of the proverbial frame.[2] All the while, the photographic image itself remains transparent and placeless, as if it were weightless and immaterial, simply data or light, and not itself a product of energy, labor, and matter in exchange with the world.

Ecology is the science of the world's biosphere, its web of life, from the bacterial to the planetary. It is the study of relationships, of material flows, of change and exchange. Its basic tenets are that everything is connected, that out of nothing, nothing is created, and that everything must go somewhere. It is holistic, demanding that we break away from our tendency to divide our experience of the world into many disparate domains or spheres that are observed in isolation, instead viewing all life forms, humans included, as dialectically and inextricably bound together with one another.[3] In this way, it is also profoundly intersectional, recognizing that

A CATALOG'S TALE

How did I get here? What journey—or journeys—had to be taken for *me* to be held by *you*? The question of my journey's story quickly implodes into a multitude of others: What am I made of? What fibers and glue hold me together? Where will I end up if left here on this shelf for too long? From pulp I came, and to pulp—at best—I shall return. This is the tale of industry, of exchange, of waste, of life. The traffic of images and words, as they circulate in book form.

what we call ecological, racial, and economic justice (and injustice) are always intertwined.

The exhibition *Image Ecology* presents the works of artists dealing with different aspects of our ecological crisis, while considering how images, too, are implicated in it. These artists explore ecological relations and interdependencies—flows of energy, material, labor, and waste—often considering their own material conditions and methods as a part of these flows. Photography is disentangled as an ecological practice, a generative medium that is defined as much by the nexus of material, labor, energy, and waste that its production and circulation require as by what it represents. In short, the artists in *Image Ecology* all explore photography not merely as a means of pictorial representation *of* our world but also as a form of material exchange *with* it.

The exhibition builds on the research presented in *Mining Photography: The Ecological Footprint of Image Production* (2022), a project that told an environmental history of the medium through five of its key material "resources."[4] *Image Ecology* focuses on new methods and contemporary artistic approaches to this topic, with fresh thought given to photography and the processes it entails, which are reexamined as part of our metabolic exchange with the world we live in.

## ENVIRONMENTAL PHOTO HISTORY, OR: FIRE CARRIED BY WIND

From its advent, photography was valued for its ability to picture the world around us in a way that was perceived as direct and detailed. These two qualities—immediacy in production and fidelity to nature in representation—were invoked by various photographic pioneers and reviewers as a means to distinguish this new image process from established media such as painting or drawing. The various names given to photography during the years of its invention—back in 1844, photogenic arts, daguerreotypes, calotypes, cyanotypes, ferrotypes, anthotypes, chrysotypes, thermographs, and so on existed side by side—also testify to an initial lack of orientation that was only resolved in the years to come by practical and, above all, commercial considerations such as the reproducibility of individual processes and the cost per print in each case.[5] Common to all the early efforts was a description of the photograph as a "natural image," one that emerged virtually of its own accord: this was at odds with the many photographic instruction manuals that discuss the ubiquitous struggle with the recalcitrant material, which could only be persuaded to record the world with great difficulty.[6] William Henry Fox Talbot, whose process forms the basis for all later positive-negative recopying processes, published the first illustrated volume of photographs in history in 1844—which is also the first general history of the medium's interpretation—attributing the agency of an image's formation to various forces: things themselves, light, the sun, chemistry, and so on. As a "pencil of nature," photography produced "sun pictures," which were "impressed by the agency of Light alone."[7] His interpretation can serve as an example of the dominant understanding of the medium in the nineteenth and twentieth centuries.

Yet, the medium's birth at the height of industrialization coincided with the emergence of climate change and was closely intertwined with it. It was during the first few decades of the nineteenth century, just as photography was being invented, that the concentration of carbon dioxide in the atmosphere began rising exponentially. Several of the medium's first protagonists—such as Nicéphore Niépce and William Henry Fox Talbot—had also worked for years on developing internal combustion engines. Niépce's internal combustion engine successfully powered a boat upstream and was called the *Pyréolophore,* or "fire, carried by wind." The innovation that allowed him several years later to fix a photographic image for the first time was his use of Bitumen of Judea, a naturally occurring raw petroleum sourced from the Dead Sea region, which, he discovered, became insoluble when exposed to light. In Germany, the first photographic corporation, AGFA, was founded in the late nineteenth century as an aniline manufacturer, Aktiengesellschaft für Anilinfabrikation, producing artificial dyes—magnificent indigos, purples, reds, and blacks at first, and later every color of the rainbow—from coal tar: a viscous black carcinogenic byproduct of the creation of coke and coal gas from coal. And although its invention is usually credited to several white men working in France and England, the production of photographic images was contingent from the start on a vast global network of material and—often marginalized and precarious—labor: copper had to be produced at

WRAPPING I

Was I wrapped?! Forgoing my wrapping would reduce a considerable amount of waste, but it would mean sending me out naked, bare, exposed to the elements. Plastic, oil, fossilized sunshine—solar power turned into energy via plant photosynthesis millions of years ago, decomposed under high pressure and heat, crushed by sediment, compressed between Earth's mantle and crust—turned into disposable wrapping. Yet, when not wrapped, I am told, I run the risk of getting damaged, which often leads to my being rejected, extracted from circulation, sent back, hastening my pulpy fate. A typical double bind: wrap me in oil-derived plastic or risk sending me unprepared—mere fodder—to our cut-throat world of picky customers, of prepaid returns at your fingertips. Anywhere between twenty-five and forty percent of my book kin are returned to their publishers, a majority of which is then pulped.

the new center of global production in Wales (made possible by the abundance of local coal) having been sourced from around the globe; photographic paper was produced at first from cotton and flax—the former having been grown in the US, which came to dominate the world cotton market through its reliance first on slave labor and later on the sharecropping system—and then from wood pulp, sourced by rampant deforestation; gelatin came from cows, in quantities enabled by the concomitant emergence of industrial farming and slaughter; and, of course, silver—sourced from the far-distant frontiers of colonial extraction, using unregulated labor in the treacherous mines of Potosi in today's Bolivia and in Mexico and Chile—of which, by the end of the twentieth century, the photographic industry would become the largest consumer.[8]

In other words, rather than the *Pencil of Nature*, photography—when considered through the entire elaborate process it is contingent upon, its *metabolism*—might be thought of as the pencil or imprint, not of a pristine untouched "Nature," but of something else, of an altered world-ecology, a carboniferous fire ignited: *The Pencil of the Capitalocene*.

Climate change is the product of specific socioecological relations, which, scientists now widely recognize, have come to alter our planet on a geological scale. Although it is often attributed to industrialization, this runs the risk of confusing cause and effect, obfuscating the ways in which industrialization itself was contingent on planetary-scale environment making and the fact that it was only made possible by the specific relations between power, capital, and nature that took shape during early capitalism.[9] It was a particular advantage offered by fossil fuels that led to their adoption: unlike hydraulic energy, which was widely and cheaply available in the nineteenth century, fossil fuels are mobile, which meant they could be used in cities where workers were abundant, increasing capital's bargaining power and its ability to extract value from labor.[10] At the same time, the emergence of fossil fuels was deeply intertwined with the concomitant shift of agriculture to the colonies (which freed up domestic labor and land for industry and urbanization in Europe).[11]

Thus, the responsibility for carbon emissions has always been vastly unequal, shaped by specific power relations, and motivated by a search for profit and an ideology that lays claim to Nature as a disposable resource. Currently, the wealthiest ten percent of the global population is responsible for fifty percent of global emissions, while the poorest fifty percent is responsible for less than ten percent. The realization that climate change is not the product of humanity as such—as the now widely used term *Anthropocene* implies—but of the specific violent socioecological relationship characteristic of capitalism has led an increasing number of scholars and activists to describe this era as the *Capitalocene*.

Capitalism's emergence in the "long" sixteenth century as a "world-ecology" marks the beginning of this era, setting the stage for the industrialization that followed. It was spurred by the advent of the process described by environmental historian Alfred Crosby as the "Columbian exchange"—whereby Old World diseases, animals, and crops flowed into the Americas, and New World crops flowed into the Old World—and by what historical geographer Jason W. Moore describes as the emergence of a pair of violent abstractions, "Nature" and "Society," which were now thought of as separate domains.[12]

*This* is the abstract—capital N—Nature of Talbot's title. Nature as either "resource pool or a rubbish bin."[13] The yet-to-be-commodified frontier, valuable only inasmuch as it can be the subject of extraction. Nature as free "gift." It is a Nature that is conjured as external—held to have imprinted these images by its own agency—while, as if by sleight of hand, the reality of the labor and materials required for the production of these images recedes into darkness. The camera seems to perform all the work on its own. Historically, photography's value and authority has always derived not only from its ability to faithfully reproduce our surrounding world but also from its ability to *hide* everything its own production entails, the processes and relations its making requires, real-existing, lowercase nature: silver mined using cheap labor, cotton grown and harvested by slaves, gelatin produced from slaughtered cows, all used to produce this magic "pencil."

The photographic image offered a disembodied gaze. As historians Lorraine Daston and Peter Galison have shown, the medium's emergence during the mid-nineteenth century coincided—and was intertwined with—the rise of a moralized sense of "noninterventionist

WRAPPING II

Shrink-wrapping was only invented around the mid-twentieth century, born out of a combination of military logistics, new communication technologies, and industrialized agriculture. It is often credited, on the one hand, to the invention of heat-shrinkable tubing, used to protect electrical wiring, and, on the other, to the development of processes for vacuum-sealing deep-frozen poultry. Heat-shrinkable tubing was essential for the rise of new telecommunication technologies, while chicken has since become the world's most common bird, a staple "fast food" whose footprint is of geological proportion, with an estimated sixty billion fowl slaughtered a year. Yet another precursor was the Dow Chemical Company's polyvinylidene chloride, invented in the 1940s to make the mesh required for the ventilated insoles used in US military combat boots for tropical environments. By the end of the decade, the company had introduced Saran wrap, a thin clingy plastic film for covering food. Telecommunications, industrial slaughter, war: the history of plastic wrap. As an alternative, I'm wrapped with the waste paper used to calibrate the printing process.

objectivity," whose watchword was "Let nature speak for itself."[14] The idealizing interpretation by the drawing artist applied until then became obsolete. Scientific representations were now made according to the paradigm of "mechanical objectivity"—claiming, that is, not to interpret change, or embellish what was seen. Photography, which replaced the "interfering, weary artist" with a mechanical device, was the ideal pictorial medium for the time. By virtue of its method of production, it could claim to be objective, free from the taint of human will and whim. Such a perception of photography powerfully materializes the dualistic understanding at the heart of the Capitalocene. In this, as Jason W. Moore described in his essay for this catalog, photography built on previous visual technologies that had established the conventions of "instrumental realism" at the beginning of the Age of Capital. Their project is one that creates nature in this modern form, "as something that could be mapped, abstracted, quantified, and otherwise subjected to linear control."[15]

The same year, 1844, that Talbot began publishing his book, Karl Marx wrote, "Man *lives* from nature, i.e., nature is his *body,* and he must maintain a continuing dialogue with it if he is not to die. To say that man's physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature."[16] Marx came to conceive of human labor as what he called "social metabolism" (*Stoffwechsel*), a process by which humans, through their own actions, mediate, regulate, and control "the metabolism" between themselves and nature, changing it, while simultaneously changing their own nature. This "metabolic interaction," he wrote, is the "everlasting nature-imposed condition of human existence."[17]

Yet, as Marx presciently noted, capitalist production, in its single-minded pursuit of monetary profit and growth and its preference for exchange value over use value, inevitably brings about a "rift" in this life-sustaining process. While capitalism develops through nature, soil is depleted of its nutrients, materials are mined to exhaustion, and the excess of production results in pollution: sewage, emissions, trash. It is important to note, however, that this is not a rift between humans and some sort of pristine Nature that is merely acted upon (which would simply tally with the dualism mentioned above). Rather, capitalism, as Moore writes, is a project and process within the web of life. It is essentially a way of organizing nature, which, extracted to exhaustion, reaches its own limits. To compensate for this exhaustion, Marx shows, earth and other "resources" are plundered *elsewhere*. The rift thus travels and extends, expanding the market with it. Nutrients are imported and waste is dumped—from, and to—the market's "frontiers." Marx observed this logic in action: starting in the 1840s to support the depleted earth of English farmers, massive amounts of guano were imported from Peru to use as fertilizer, wreaking havoc on its local ecosystem. Meanwhile, effluents in England were dumped into waterways—rather than being returned to the soil as fertilizer—and treated as "waste."

The notion of a "metabolic rift" has in recent decades been increasingly recognized as central to Marx's thought and invaluable to any analysis of our planetary ecological crisis. And while Marx's initial analysis was written in the context of the second industrial revolution and its effects on soil cycles, it can be seen to bear on the question of planetary boundaries within an extractivist capitalist economy (and ecology) more generally.[18]

## A METABOLIC TURN

What if we were to think of image production, too, as a metabolic process, rather than simply treating images as if they appeared out of thin air? Throughout its history photography has rarely been confronted with its own material conditions and process. We tend to interpret a photograph for what it shows. Like a window on the world, the photograph itself is barely perceptible and recedes behind the pictorial representation on its surface. From the writings of the photographic pioneers (William Henry Fox Talbot) to the theories of art (Clement Greenberg) and media studies (Roland Barthes), it was considered a medium of transparency; it was precisely this invisibility of the medial that was identified as the particular specificity of the photographic.[19] In this way, photography has traditionally embodied the very dualisms that ecological thought, based on processes, relationships, and interdependencies, has long sought to negate. The process used to produce it and the materials that underlie it—that is, the real-existing nature on which photography is contingent—is conventionally thought of as an "externality," rather than as integral to its meaning.

Photography is valued for being fixed, while to think ecologically is to think of the world as ever changing. (Mis)understanding photography as an immaterial, unmediated slice of space and time, we lose sight of the fact that each individual image is produced by resources and labor from across the world and thus contributes to its transformation. Yet, it is precisely the role photography has played in establishing and sustaining this modern dualism that makes it all the more relevant for a new generation of artists attempting to deal with the underlying causes of the current climate crisis. Confronted with the challenges of documenting climate change, artists are rediscovering image making as a metabolic process,

shining a light on the ways in which our material relation with the environment is more generally ignored. Often inspired by indigenous epistemologies, artists have been exploring modes of narration that undermine such dualisms. Instead, meaning is attributed *relationally*, not only to what is shown in an image, but to everything that has made it, or that it has made: energy, materials, labor, waste. This recent artistic preoccupation with ecology thus follows on from the "material turn" that has taken place in the history of photography since the 1990s in parallel with and in response to digitalization and which has developed in three phases. First, in the mid-1990s, discourses on authenticity and utopian dreams and fears accompanied the proclaimed "end of photography." Second, in the 2000s, there followed an actual decline in analog processes in everyday life, as a result of which the production of equipment such as film, paper, and analog cameras was discontinued.[20] Third, as a reaction to this, discourses on the infrastructures and conditions governing the circulation of photography as a supposedly immaterial "networked image" established themselves.[21] Meanwhile, an "analog turn" has been proclaimed since the 2010s, which goes hand in hand with an increasing interest in "alternative processes" in artistic practice.[22] Thus, at the turn of the millennium, photographic processes of the nineteenth and twentieth centuries that had fallen out of use were first technically rediscovered and then, at the end of the 2000s, artistically investigated and integrated into aesthetic practice. Another decade on, the distinction between analog and digital has finally been recognized as obsolete, and with it the debate that it triggered on the (new) DNA of the medium has dried up in the "post-digital" turn.[23]

If today's artists primarily focus on manual work and experimental procedures and processes, this is done under new conditions, because the emphasis on the materiality of the medium, the procedures of abstraction, and the handmade nature of experimental practices are no longer limited to a self-referential discourse around photography, but have entered into the discussion on ecology and climate change. Even though some of the works result in formally abstract outcomes, the approach is different. The world it sets out to "depict" is engaged with in a way that acknowledges this relation as one that goes beyond mere analysis or representation, cognizant of the material and social exchange it entails and is dependent on—its metabolism. Because photography is itself a rule-governed chemical-physical process, it is ideally suited to the "discourse of reference" (recording) alongside the "discourse of mimesis" (imaging), which is being taken up again today.[24] In many of the works represented in *Image Ecology*, the focus goes beyond the pictorial result: protophotographic processes are employed to dissolve the dominant notion of photography as a cut through time and space and to understand photography not as a permanent image but as one in constant flux (Léa Habourdin). The category of indexicality is discussed anew when materials found in the field are integrated into the image-making process to influence the result visually and, more importantly, epistemologically (Susanne Kriemann, Coline Jourdan). And antiquated processes and techniques such as heliogravures or cyanotypes, as well as artisanal lenses and cameras, are used to redefine the potential of the obsolete (Julian Charrière, Munem Wasif, Tristan Duke). Complementing these practices that rediscover old techniques and invent new methods are various artworks that investigate the materiality and infrastructures of digital imagery (Revital Cohen and Tuur van Balen, Su Yu Hsin, Tobias Zielony). Lastly, collaborative and interdisciplinary approaches are used that involve scientists, activists, gardeners, or workers of various kinds while addressing the areas where environmental, social, and economic justice intersect (Ignacio Acosta, Louise Purbrick, and Xavier Ribas, Carolina Caycedo, Richard Frater).

## CLOSING THE CIRCLE

The exhibition is arranged in four overlapping thematic chapters, each representing different stages of a metabolic cycle. The circular structure begins with a section dedicated to "energy," followed by sections devoted to "material," "labor," and "waste," before ending up back where it began: with "energy." In this, the exhibition's structure is an attempt to give a sense of the interconnectedness of these different aspects upon which our ecology and life depend. These "stages" are always part of a single flow: energy and labor are applied to materials, which are transformed into goods or services and eventually released back into the environment as emissions and "waste." Ideally, this "waste" itself becomes a source of material or energy, by being recycled or composted or by sheer decomposition over time, but under a capitalist world-ecology more often than not "waste"

COVER

No wraps, no finishes, no lamination. Cardboard made from pulp, and that's it. Hardcovers—glossy, laminated using carbon-derived paints and film—must be removed before pulping is possible. This cover, like my pages and wrapping, is therefore itself made of pulp—the afterlife of another book. I was bound where I was printed, limiting the need for transportation. My pages are stitched together, rather than glued, with the hope that this will make me more durable, lengthen my shelf life, stave off my fate as pulp.

is simply shifted away, displaced, and dispersed to become a pollutant. Many of the works explore several if not all of these aspects of our social metabolism and are spread between different chapters. The hope is that this circular—rather than linear—narrative will allow the viewers to appreciate the extent to which these questions are intertwined. One cannot be considered without the others: to speak about labor is to speak about the transformation of energy and material into waste, to speak about waste is to consider its creation from energy and material and labor, and so on and so forth. Crucially, our material environment is inextricable from our social environment. The modern separation between "culture" and "nature" is one of the dualisms this exhibition attempts to overcome. The dividing up of the exhibition into sections thus aims to render the continuity of the metabolic process tangible, while emphasizing the changes and shifts it entails. By tracing these themes as they unfold across the globe, *Image Ecology* highlights the interconnectedness of environmental destruction on a planetary scale, while emphasizing its radical inequality and the unequal distribution of responsibility for its causes.

The work in each section explores these different aspects of the metabolic process as they are reflected in the environment or in photographic production or both. Photography allows for the transformation of light—energy—into images. As film scholar Nadia Bozak has written, it can be thought of, in essence, as a form of "fossilized sunshine," the poetic term used by environmental historian Alfred W. Crosby to describe petroleum and other fossil fuels.[25] As we have seen, this transformation takes place using a myriad of material "resources," from silver to gelatin to salts and chemical substances to rare earths and conflict minerals. At every point in this process, labor is involved: whether in the mining of gold, copper, tin, or rare earths for electronic components, in the production of semiconductors, or in the transportation of water that this process requires. And finally, all this material, labor, and energy ultimately results in "waste": be it in the form of emissions or pollution or, at best, biodegradable matter that can then return to the cycle as a source of materials, nutrients, and energy, and thus, life.

We would like to thank all the artists and the authors, as well as the experts and professionals who contributed to our research. We would also like to thank Kai Fischer, Marcel Kirschner, and Udo Tober of the Leipa paper mill in Schwedt for their insights into paper production and recycling. A special thank-you is due to Martin Granderath for his work on the loans, production, and general management of the exhibition.

**1** Rebecca Lindsey, "Climate Change: Atmospheric Carbon Dioxide," NOAA Climate.gov, May 12, 2023, https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide. **2** The effects of such events often manifest at a distance, both temporally and physically, from the time and place they first occur. Recent studies have shown that the pollution caused by forest fires can linger for weeks and travel thousands of kilometers, while the damage caused by other toxins is often revealed decades later. See Allison Hirschlag, "The Long Distance Harm Done by Wildfires," BBC Future, August 24, 2020, https://www.bbc.com/future/article/20200821-how-wildfire-pollution-may-be-harming-your-health. **3** See Barry Commoner, *The Closing Circle: Confronting the Environmental Crisis* (London: Jonathan Cape, 1972). See also John Bellamy Foster, *Marx's Ecology: Materialism and Nature* (New York: Monthly Review Press, 2000). **4** See Boaz Levin and Esther Ruelfs, eds., *Mining Photography: The Ecological Footprint of Image Production* (Leipzig: Spector, 2022). **5** G. T. Fischer, *Photogenische Künste: Gründlicher Unterricht über die Theorie und Praxis des Daguerreotypiren, Photographiren, Kalotypiren, Cyanotypiren, Ferrotypiren, Anthotypiren, Chrysotypiren, Thermographiren, mit Einschluss der Kunst farbige Daguerreotyp-Portraits hervorzubringen* (Leipzig: Pesth, 1844). **6** See Kathrin Schönegg, *Fotografiegeschichte der Abstraktion* (Cologne: Walther König, 2019). **7** William Henry Fox Talbot, *The Pencil of Nature* (London: Longman, Brown, Green, and Longmans, 1844). **8** Boaz Levin, "The Pencil of Cheap Nature: Towards an Environmental History of Photography," *Philosophy of Photography* 14, no. 1 (forthcoming). See also Katherine Mintie, "Material Matters: The Transatlantic Trade in Photographic Materials during the Nineteenth Century," *Panorama: Journal of the Association of Historians of American Art* 6, no. 2 (Fall 2020). **9** Jason W. Moore, "The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis," *The Journal of Peasant Studies* 44, no. 3 (2017): 594–630. **10** Andreas Malm, "Who Lit This Fire? Approaching the History of the Fossil Economy," *Critical Historical Studies* 3, no. 2 (Fall 2016): 215–48. **11** Moore, "Capitalocene." **12** See Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, CT: Greenwood Publishing Group, 1972). See also Jason W. Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London: Verso Books, 2015), 181–92. **13** Raj Patel and Jason W. Moore. *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet* (Oakland, CA: University of California Press, 2017), 23. **14** Lorraine Daston and Peter Galison, "The Image of Objectivity," *Representations* 40 (October 1992): 81–128. **15** Moore, *Capitalism in the Web of Life*, 86. **16** Quoted in John Bellamy Foster, *Marx's Ecology* (New York: Monthly Review Press, 2000); emphasis in the original. **17** Karl Marx, *Early Writings* (New York: Vintage, 1974), 328. **18** See John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift: Capitalism's War on the Earth* (New York: Monthly Review Press, 2010), 46. **19** See Talbot, *The Pencil of Nature*; Clement Greenberg, "The Camera's Glass Eye: Review of an Exhibition of Edward Weston" (1946), in Greenberg, *The Collected Essays and Criticism*, vol. 2, *Arrogant Purpose, 1945–1949,* ed. John O'Brian (Chicago: University of Chicago Press, 1986), 60–63; Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. Richard Howard (New York: Hill and Wang, 1981), 4–5. **20** See Hubertus von Amelunxen, ed., *Fotografie nach der Fotografie* (Dresden: Verlag der Kunst, 1996); Geoffrey Batchen, "Phantasm: Digital Imaging and the Death of Photography," *Aperture* 136 (1994): 47–51; William J. Mitchell, *The Reconfigured Eye: Visual Truth in the Post-Photographic Era* (Cambridge, MA: MIT Press, 1992). **21** See, by way of introduction, Daniel Rubinstein and Katrina Sluis, "A Life More Photographic: Mapping the Networked Image," *Photographies* 1, no. 1 (2008): 9–28. **22** See Ruth Horak, "The Analog Turn," *EIKON: International Magazine for Photography and Media Art* 88 (2014): 49–58. On the how-to books that have emerged from these alternative processes, see John Barnier, ed., *Coming into Focus: A Step-by-Step Guide to Alternative Photographic Printing Processes* (San Francisco, CA: Chronicle Books, 2000) and Christopher James, *The Book of Alternative Photographic Processes* (2002; Boston: Cengage, 2016). **23** Florian Cramer, "What Is Post-Digital?," *APRJA* 3, no. 1 (2014). **24** Philippe Dubois, *Der fotografische Akt: Versuch über ein theoretisches Dispositiv* (Amsterdam: Verlag der Kunst 1998), 30–40, 49–58. **25** Nadia Bozak, *The Cinematic Footprint: Lights, Camera, Natural Resources* (New Brunswick, NJ: Rutgers University Press, 2012).