Sacha Loeve and Bernadette Bensaude-Vincent

Carbone. Ses Vies, ses œuvres [Carbon. Its lives, its works], Paris, Seuil, 2018, pp. 342

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Using charcoal to draw abstract forms that emanate energy, brightness, materiality, and blackness, in the paintings of Korean artist Lee Bae, carbon black acquires different forms and meanings. Quite literally, it is a pigment made of soot obtained from burning plants or a chunk of carbonized wood assembled in massive black and chalky sculptures (Serafin 2019). Yet charcoal goes beyond materiality. The artist uses it as a metaphor for spirituality, purity, and essence as, in the Korean tradition, carbon is a powerful source of metaphysical experience. It is a material that intimately connects to life and time, and their transformation.

In the fascinating and highly informative book *Carbone*, Sacha Loeve and Bernadette Bensaude-Vincent offer a portrait of carbon that merges together all these different facets. Carbon is a technoscientific object that falls outside the boundaries of one history, definition, or scientific discourse.

If some carbon might develop into exhaustible forms like coal and oil, other forms remain unlimited, as by mass carbon is among the most abundant elements in the universe. So how can we explain its different modes of existence? What narration should we prioritize to account for the many ways carbon, its properties, and reactions can be studied, anticipated, and experienced?

Carbon is certainly more than a chemical element. The authors insist on the multiplicity of its signatures and heteronyms which are explored in great detail and with a persuasive writing. "Multiplicity" is used to convey an understanding of carbon as a quasi-object that redefines, to put it with Michel Serres, its status based on the connections it creates with the context.

Carbone joins a number of recent books attempting to consider the different identities of the element. Dag Olav Hessen's book *The Many Lives of Carbon* (2018) and Robert Hazen's *Symphony C* (2019) are two examples of the growing interest in recounting the history of carbon beyond the realm of chemistry. Like these accounts, in *Carbone* the substance is released from its status as a chemical element and becomes a milestone of the anthroposphere and its relation to the Earth. Yet Loeve and Bensaude-Vincent seem to provide an even larger perspective, which draws inspirations from the history of science and technology, STS, cultural studies, and philosophy.

The book is divided into three sections focused on the *invention*, *civi-*

lization, and *temporalities* of carbon. The first section looks at carbon primarily through the history and ideas of the natural sciences. The different understandings of carbon are always situated, emerging from a mixture of social, cultural, scientific, and economic conditions that characterized western societies from the early modern period through modernity. In the second and third sections, carbon abandons its disciplinary cradle to become the main protagonist of human history. The authors claim that the evolution of human culture is indeed marked by the effort to domesticate and inscribe carbon in everyday life, from the mastery of fire to coal mining, and the mechanization of labor to current policies to reduce Co2 emissions in the atmosphere. As a matter of fact, carbon has both shaped human welfare and now mockingly exposes it to risks that are unprecedented in history. Rising concentrations of carbon dioxide are the principal cause of climate change and, therefore, a primary public enemy in the fight for a sustainable future. At the same time, carbon acts as a currency and a credit equivalent to a given amount of emissions, and thus performs a fundamental role in the financial market.

Taken collectively, all of these signatures show carbon's ability to cross disparate realms of knowledge, from science and technology to politics, economy, design, and culture. Living and inert, natural and cultural, carbon acts as a kaleidoscopic object with an intimately hybrid nature, one manifested in its power to acquire as many forms as the periods of punctuated evolution of our societies.

Following this evolution, the authors reached as far back as Virgil's *Aeneid,* where the mephitic air of the Mefite di Rocca San Felice in central Italy was deemed toxic. Gaseous exhalations of carbon dioxide and sulfuric acid wafting from the fumaroles caused the vegetation to perish and were regarded by the inhabitants of that region as lethal for human beings. Loeve and Bensaude-Vincent emphasize how carbon – already in such a distant past – was deeply inscribed in popular culture and collective memory as an element closely associated with risk and peril. This "geomythological" (p. 23) narrative persists in some of the later conceptualizations and scientific studies of carbon as, for example, toxic air, gas, and ultimately Co2.

Throughout the sixteenth, seventeenth, and eighteenth centuries, carbon became a primary object of interest for a rich generation of natural scientists and philosophers, especially in Europe. Robert Boyle, Joseph Priestly, Antoine Lavoisier, and Henry Cavendish sought to discover the real nature of carbon, investigating the products of its reactions and its many properties and forms, and ultimately tried to establish an exhaustive nomenclature. In the nineteenth century, Dmitry Mendeleev used carbon to express the material identity of a chemical element that remains invariant as a standard measure notwithstanding its possible conversions. Carbon embodied a combination of materiality and abstraction, turning into a metaphysical substance that, following Mendeleev, became an exemplary

illustration of what the term "element" means in his periodic table. But, as the authors point out, carbon would soon "emancipate" (p. 63) itself from chemistry to become the principal *fuel* of human civilization. Carbon fossil – the backbone of life accumulated in the Earth's crust due to photosynthesis – intermeshes geological time with human temporalities when burned and dispersed in the air. It ignited the industrial revolution, and favored a political and economic system that profited from subordinate labor (Malm 2016). The carbon-based development of our society and the accumulation of capital are two complementary processes which reveal how "techno-optimism" and the exploitation of fossil fuels have led to both resource scarcity and social inequality.

Although the authors dwell upon carbon fossil in the second half of the book, it feels that the history of carbon does not tell us that much about the history of coal. With many "modes of existence" and its own role in our economic systems, coal is not reducible to carbon but might instead require its own biography, which surely goes beyond the scope of this book. However, the multiple systems of knowledge tracked by Loeve and Bensaude-Vincent offer a very erudite picture of carbon as an agent of history, and guide the reader through stories that interweave human culture, natural history, and cosmic processes. The authors feel the urgency of delivering as many ontologies of carbon as possible, and this makes a case for what they term "ontography" (p. 284). Carbon is indeed mobilized in its role as graphite that writes its own histories – as on Lee Bae's canvas, where carbon black is the author of its shapes. Far from indicating a metaphysics of the object, ontography is not a synonym for ontology. Instead, it is a narrative that draws the combination of ontology and biography in its making. In other words, it is a process of writing (*écriture*) of ontologies. Drawing on Gilles Deleuze, the authors emphasize the role of ontography as a disposition of ontologies.

Ontography is also used as a synonym for plurality. It gives a voice to the many lives of carbon. In this respect, carbon suggests both ontological and epistemological pluralism as the diversity of modes of existence of carbon invites for tolerance among the different forms of knowledge. Hence, following Bruno Latour and Étienne Souriau, showing the plurality of carbon would discard totalizing forms of knowledge and deconstruct dominant narratives.

Despite the different yet intertwined lives of carbon assembled in the book, we never feel a sense of disorientation. Some readers may still wish for a privileged perspective to emerge. Such a red thread, more openly framing the authors' purpose and position, would be especially valuable in a moment in which a proliferation of post-histories, -truths, and -humanisms often swells into a postmodern relativism and individual systems of values. A privileged angle would not necessarily come across as reductionist or imposing a dominant narrative. It can be a vision, a claim or a belief that many people could share and adhere to, generating a sort of collective

awareness. One may start from the assumption of carbon as a *marker*, namely an indicator, or evidence that designates the most profound transitions in our social, ecological, and geological history, and then trace back carbon's career in light of this fundamental assumption. The current disruption of carbon cycle, for example, is a global biogeochemical marker of the Anthropocene, a term describing a proposed geological epoch characterized by the all-encompassing influence of human systems on Earth's ecology and geology. Fly ashes are another set of markers that derive from combustions processes, which leave their mark in strata and are measured as material sediments of the Anthropocene. Plastic, a carbon-based material, is another anthropogenic marker that is relevant for understanding the Earth under human pressure. Against this backdrop, as a marker, carbon is not only an agent of human history, but an agent of Earth system history under human influence.

The question of the Anthropocene is certainly not overlooked by the authors. It comes towards the end of the book in a section addressing how the age of carbon influences the Earth's temporalities. The authors approach the question by referring to a *récit* (p. 263) that has at times generated techno-aesthetically mediated and sublime experiences of nature where "man" is placed at the center of the Earth and dominate the planet. According to the authors, verticality and linearity are the privileged dimensions of the Anthropocene that are rooted in geological culture. On the contrary, they argue that carbon would, also in this case, invite to consider the multiple temporalities that fall outside narrow geochronological definitions.

In this context, it is worth mentioning that current interdisciplinary discussion on the Anthropocene points out to the need of defining the proposed new geological epoch from a perspective that interlaces the study of the Earth system with that of human phenomena and their different timescales. This investigation requires an effort that goes well beyond assessing "verticality" as the only dimension of the Anthropocene and draws instead on a plurality of methods and approaches expanding beyond the earth sciences. Also importantly, recent attempts to discuss knowledge in the Anthropocene show how the concept has acted as a powerful tool not only for rethinking human history, but also for fostering new research directions in which the (earth and environmental) sciences, the humanities, and the arts can cooperate to experiment with new ways of producing knowledge to cope with the global environmental crisis (Renn 2020). In this respect, adopting a perspective from energy history or Earth System Science could help reinforce existing links between carbon's different modes of existence and the current Anthropocene predicament. By focusing so meticulously on the heteronomies of carbon, the authors are left with little space to elaborate on an even more expanded history that would include the prospect of the future in human-carbon interaction. But what *Carbone* achieves is

already extremely rich, persuasive, solid, and driven by gargantuan research work. It bears witness to the authors' remarkable ability to deal with the extraordinarily inexhaustible subject of carbon, one which still leaves much to be said, as Lee Bae's charcoal reminds us.

References

Serafin, A. (2019) *Lee Bae's fascination with charcoal continues to burn bright*, in "Wallpaper", November the 22nd 2019 (https://www.wallpaper.com/art/lee-bae-exhibition-galerie-perrotin-new-york)

Hessen, D.O. (2018) *The Many Lives of Carbon*, London, Reaktion.

Hazen, R.M. (2019) *Symphony C: Carbon and the Evolution of (Almost) Everything*, New York-London, W. W. Norton & Company.

Malm, A. (2016) *Fossil Capital, The Rise of Steam Power and the Roots of Global Warming*, London, Verso.

Renn, J. (2020) *The Evolution of Knowledge, Rethinking Science in the Anthropocene*, Princeton, Princeton University Press.

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L'Utopie déchue. Une contre-histoire d'Internet, XVe-XXIe siècle. [The Fallen Utopia. A Counter-History of the Internet, from the 15th to the 21st Century], Paris, Fayard, 2019, pp. 350

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A few decades ago, the Internet was heralded by many as a new frontier, a promised land where freedom would reign. It would bring the world together in a global village, end conflicts, and challenge monopolies of old. Today, the Internet has become almost frightening, and definitely highly contentious. For example, end-to-end encryption has become more and more widely accessible, but it regularly comes under attack by law enforcement and intelligence agencies. Social media are accused of depriving their users from their privacy and of facilitating the spread of dangerous "fake news" and terrorist propaganda, fuelling calls for "content moderation" mechanisms that amount to a restoration of censorship under a new name.

These debates all seem rather new because the technology at play is new. *L'utopie déchue* (in English: *The Fallen Utopia*), a book derived from the author's doctoral dissertation in political science, thus surprises us with its subtitle: *Une contre-histoire d'Internet, XVe-XXIe siècle* (in English: *A*