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Christopher William Anderson
Apostles of Certainty. Data Journalism and the Politics of Doubt, Oxford, Oxford University Press, 2018, pp. 228

Valeria Burgio *independent researcher*

Anderson's book is a historic reconstruction of how data are used, in journalism, to build a culture of truth and objectivity. Far from being the exclusive prerogative of Data Journalism, the use of data dates back to the time when sociology and journalism were attempting to build a scientific basis for their undertakings, developing a social research methodology of a quantitative nature. This was especially true of the United States in the first half of the twentieth century. The book therefore reviews the phases of this attempt by journalism to pursue the methodological rigour and mathematical foundations of the more survey-based social sciences, highlighting the mutual mistrust between the discipline of sociology and the practice of journalism. Moreover, it illustrates the difficulties encountered by journalism schools, not only to enter the academic world, but also to include the study of scientific subjects such as statistics in their curriculum.

It all started in the early twentieth century with the growing popularity, in the Anglo-Saxon world, of the survey research: a social analysis based on the collection, through door-to-door surveys, and on the processing of data. In particular, Anderson meticulously examines an American movement that has largely been ignored in academic research, the *Men and Religion Forward Movement,* viewing it within the context of a more general proliferation of quantitative investigation techniques. In a context of religion-based activism and social reformism (hence the reference to "apostles" in the title), the intent became to base a "culture of truth" on data as a form of factual evidence. Both data journalism and empirical survey-based social sciences appear to be rooted in this movement. However, as Anderson notes, the development of social sciences from the 1920s to the 1940s emphasized the disciplinary boundaries that divided it from journalism: as revealed by the author's content analysis on a body of scientific sociological journals of those years, sociology considered journalism to be a lesser rigorous field of social investigation, whose purpose was to create communities of opinion, rather than to conduct social research. Unlike journalism, social sciences, based on positivism, drew increasing inspiration from the natural sciences. Consequently they presented themselves as objective and empirical sciences that sought to "meet rigorous standards of objectivity, verifiability and generality" (p. 88), just like the hard sciences. One way to do this was to observe statistical rigour in the research methodologies, which led to a visualisation of precise and accurate but hard to interpret mathematical models.

A central figure in the book is the journalist and academic Philip Meyer

who, in the 1960s, sought to reconcile journalism and social sciences through *Precision Journalism*, the goal of which was to apply quantitative methods to news reporting. Capitalizing on the developments in computer science, precision journalism based investigative reporting on the recognition of patterns, on the emergence of data correlation and trends. This was a decisively innovative proposition in a news world dominated by the new-narrative journalism of Gay Talese, Tom Wolfe or Joan Didion. Meyer sought "to treat journalism as if it were a science, adapting scientific methods, scientific objectivity and scientific ideals to the entire process of mass communication" (Meyer 1991, quoted at p. 116). Meyer had an intuition (and then confirmation, given that he is still alive) of how important technological development would become to the field of journalism for seeking evidence in news reporting. As machines progressively moved from the back of the newsroom to the front-desk, databases were preparing to become not only useful tools for market research or starting points for fancy visualisations, but first and foremost the epistemological foundation for the practice of journalism.

In the meantime, however, databases had become fundamental tools for qualitative methodologies: Anderson dedicates a chapter to *computational journalism*, a system of news reporting based on cross-checking and an assessment of the coherence between one news item and another based on available databases, hence on semantic and algorithmic criteria.

One of the many merits of this finely documented book is the relativisation of the impact of the so-called digital revolution that began in the 1990s. The change in practices was due primarily to the speed and ease of tracking news, and was not accompanied by a shift in the epistemology of journalism, which had long sought in data, and not just in facts, irrefutable proof of the news. This was already evident in the "discourse" of journalists relative to their own practices: according to a content analysis conducted on publications aimed at journalism professionals, such as *Editor & Publisher* (1907-2016), the new computer technologies and access to databases would not in and of themselves be a guarantee of hewing closer to reality, but might rather accelerate and facilitate existing practices.

Data visualisation on the other hand is not a central argument in this book, whose focus of interest lies more in the epistemological foundations of data journalism than in their translation into graphics. There are however some ideas on the subject that deserve further exploration: the only images in this book are excerpted from *Messages of the Men and Religion Forward Movement* and are a condensation of what not to do in visualisation given that, as Anderson himself points out, they omit numbers and use approximative techniques of visual translation. Despite their scant scientific rigour, the author uses these images to demonstrate the merit of this pioneering movement, which offered visible numerical proof of widespread social problems, thereby increasing public awareness and stimulat-

ing bottom-up policies of a clearly progressive nature. Rather than a truthful representation of reality, these investigations thus served to mobilise public opinion and awaken political consciences. Their role was of a more persuasive nature, in the sense that they relied on a certain type of visual rhetoric associated more readily with advertising than with analysis. Those were the years that Michael Friendly labelled as "the dark age of data visualisation" (Friendly 2008, 529), when data visualisation disappeared from the sciences, because it was considered illustrational and lowbrow, but enjoyed widespread popularity in post-war attempts at informing the public, particularly in Germany, where the pictorial statistics of Isotype were being developed. Because he restricted the geographical sphere of his analysis to the United States, Anderson does not mention these European experiences and omits all information regarding the move from pre-Nazi Europe to the USA, especially in the person of Rudolph Modley. Anderson does however remark on the progress made in the field of visual journalism in the United States in the 1950s, which witnessed a proliferation of magazines rich in data visualisations, such as *Survey Graphics* and *Fortune*, models for contemporary data journalism.

Anderson on the one hand richly documents the history of the development of an ideology, that of journalistic objectivity, which generated something of a sect embodied in a variety of figures in different historical periods: the "apostles" in the title of the book are the journalists engaged in an almost religious search for objectivity and truth. On the other hand, he distances himself from this ideology, which still attempts to stand proudly, and sometimes unquestioningly, against the populist fake-news factory. The "culture of truth" would seek to lead journalism towards a rather simplistic view of how information can become certainty and would omit an important element in the process of newsmaking: the recognition of the doubts, errors and corrections that must be addressed along the path towards reliable reporting. The mechanisms for fabricating "fake news" are in fact inherent in the production logic of contemporary journalism, which is integrated into a social-mediated space, and they cannot be considered to be the product of an imaginary antagonist against which honest journalism must take a stand.

Through the lens of STS, the author expresses his perplexity about whether data alone can guarantee the objectivity of investigative journalism: because databases are often provided by governments, they have certain limits with respect to the phenomena they serve to quantify. Quoting Star and Bowker (2000), Anderson reminds us that databases, only apparently objective, are always the result of a process that in making choices, includes and excludes. In the words of Bruno Latour, "one should never speak of 'data' – what is given – but rather of *sublata,* that is, of 'achievements'" (Latour 1999, 42). Or one should speak of *capta* (Drucker 2011), objects selected and categorized by someone towards a specific end, rather than fragments of reality.

The chronological account of the evolution of the culture of truth in journalism shows that objectivity is subject to historical relativism, and in this sense, the book echoes the famous work by Daston and Galison (2007) on the evolution of the concept of objectivity in scientific discourse: at one period in time it means neutrality and the coexistence of different voices and points of view (the "she said/he said" approach); in another period it meant "second order objectivity", which considers the database as a collection of transparent elements that unambiguously translate facts as they are. In the evolution of his thinking, manifested in the corrections and prefaces to the various editions of his book *Precision Journalism* (which counted four editions, each of them revised and corrected, between 1973 and 2002), Meyer himself understood that the scientific objectivity he aspired to was the prerogative of an antiquated vision of science, and that even social studies on modern science understand scientific data as the result of negotiation and mediation (Latour 1987). As Anderson correctly points out in the conclusion to his book, "The essence of modern science – at least in its ideal form – is not the achievement of certainty, but rather the fact that it openly states the provisionality of its knowledge" (p. 180). That is why the author invites journalists to humbly sustain a "policy of doubt" and to refrain from challenging the aberrations of populism with the presumption of truth, with the risk of being proven wrong when events turn against the hypotheses they sustain: admitting the provisionality of the results, while constantly seeking to move forward and delve deeper, will guarantee credibility and trust.

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Alberto Ardissone
L'uso delle tecnologie in sanità. Il punto di vista del paziente cronico. [The use of technology in healthcare. The point of view of the chronic patient], Milano, Angeli, 2018, pp. 206

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As *Tecnoscienza*'s readers will know, the theme of the relationship between technology and health has been an important issue for a long time. The theme is characterized by its breadth and the many implications that health has in daily life. We have become increasingly aware of this relationship during the Covid-19 pandemic that has transformed everything: work, relationships, well-being, economy, international relations, even the wars active around the globe.

Alberto Ardissone explores the relationship between health and technology, as well as an array of connected complexities, observed in the pre-Covid-19 period. He focuses particularly on the choices of patients with respect to the search for information about their health through the Internet. The topic has become relevant in recent years to understand how people's awareness changes in relation to the possibility of exploring their own health thanks to blogs, peer groups, second opinions, tips about medicinal drugs, informal chat about health and much more.

The book is divided into two parts.

The first part focuses on an analysis of Internet access and citizens'/patients' health information. The second part describes the results of research conducted online on a variety of Facebook groups attended by chronic patients and concerning specific diseases.

In the first part, the book acknowledges the importance of the Internet for the contemporary era and defines a series of opportunities and complexities that this exposure to digital information can assume for patients suffering from chronic pathologies.

This massive exposure to the Internet is impressive for its rapid development and for the potential it can offer to citizens/patients, but at the same time it also defines a progressive loss of organizational boundaries as well as those between public and private life. This description is followed by a presentation of some theoretical lines of enquiry that the author considers central for analysing the context of digital health.

The author introduces a review of sociological theorizations that allow him to grasp/study technological development in relation to the role of citizens/patients. He distinguishes between the techno-supportive approaches whose points of synthesis can be found in the label of "patient empowerment", and the conflict-symbolist approaches whose gaze focuses on the limits of the rationalist approach.

The first branch of approaches is defined in relation to "techno-euphoric" analysis that emphasize the triggering role of technology in developing patients' knowledge and ability to take care of their health needs. The goal of economic savings and (estimated) improvement in the quality of health services certainly stand out among these approaches. Thus, the reference to the "empowerment" becomes a *passepartout* that will help patients to increasingly improve their knowledge and their ability to interact competently and appropriately with their own bodies. This is even more true with respect to the ability to manage one's own health needs starting from the vast amounts of health data that are increasingly available and shareable.

The other areas of approaches include interactionist, culturalist and constructivist views exploring new complexities for health and well-being. Among these, the author includes the contributions of critical sociology, specifically the socio-material approach that connotes Science and Technologies Studies (STS). Through a quote from Lupton (2014, 610) it is recalled how "technologies are defined as material actors in relation to human actors whose outcome results in a plurality of assemblages between humans and technologies for an infinite combination of material and non-material, of human and non-human" (p. 32). A brief section seeks to reiterate the role of this approach in understanding technology-patient interactions in healthcare. It has been crucial in recent years to recognize the processes of co-construction of technologies in healthcare by reclaiming the temporariness of the balances that this relationship manifests. The reference to STS goes so far as to include the latest labels by Lupton (2017) that focus on the definition of "affective atmosphere", an expression that wants to emphasize the intimate value that can be generated in this relationship. Or even referring to other Lupton's works the author recalls the pervasiveness of human-non-human interaction that now seems to unite many experiences through various types of wearables.

Another window on critical approaches is reserved for the concept of bio-politics that defines the weight of political power to every aspect of human life, recalling in it the pervasiveness of market logics in every social sphere. This approach indicates how the stimulus and marketing policies aimed at the proper management of one's own health should be considered as an extension of the influence of neoliberalism that pushes patients to consider themselves customers and to become entrepreneurs of their own health.

In addition, the book includes among these approaches a reference to the "surveillance society" by which attention is directed to the increasing penetration into daily life of the technologies and practices needed to record, probe, monitor, and discipline people's behaviour.

A final section of approaches to the study of digitisation is reserved for interactionist perspectives that draw their inspiration from Goffman's

work. This view, the author reminds us, is very useful to recall the complexity that is generated between the standardisation processes of centralised and unifying procedures of digitisation systems compared to the specificity of individuals, their clinical histories, and their representation of the state of well-being and illness.

At the end of this review of approaches, Ardissone proposes an "integrated" approach aimed at grasping the multifaceted viewpoints required when dealing with a complex issue such as digitisation in health care. He promises to draw on these points of view in the research to follow.

The research presented relies on a survey conducted with over 2,000 patients/citizens in Italy. The research aim was to offer at least three different layers of analysis: the socio-demographic characteristics of these users; the trust they place in the apps aimed at the Facebook group's chronic diseases; and, finally, the intent of those who turn to the Internet to find information related to their particular health condition.

The results of the survey help us to understand how the Internet is a "particular" gateway. The data shows that more educated people look more carefully at the sites of medical societies, while less educated people look more widely at generic sites. The more educated show a greater interest in being involved in decisions about their own health. Age seems to influence mainly the demand for "second opinions" and more generally to be more active in these types of groups. With regard to the gender of the respondents, the research confirms that it is women who want more comprehensive information and prefer the websites of scientific societies, while men choose their own sources quite indifferently. The research then develops through a series of elaborations proposing and/or recovering a series of labels also discussed in the literature. For example, it highlights how lurkers are mainly the most educated and the youngest in these thematic groups.

Among the results, it is worth mentioning the confirmation that the use of specific apps for one's own chronic pathology – more prevalent for males and younger people – allows patients/citizens better autonomy from the dominance of specialists.

Thus, the work developed in this book can be very useful in understanding some of the complexities of the relationship between the web and the search for data related to one's own health by chronic patients, as well as by family members who turn to the network to understand more about the illnesses of their relatives/friends.

The main path of exploration of the book is consistent and allows the author to summarize approaches with a theoretical framework developed in recent years concerning digitalization in healthcare. The book is also characterised by being a tool for exploring the theme and a series of related phenomena that are also characteristic of the Italian scene. Finally, among the merits of the book we can certainly include the research, which involved a large group of patients/citizens, representing members of about

190 Facebook groups.

Turning to the less successful parts of the book, we can first of all mention the book's title: *The use of technology in healthcare*. One of the risks the reader might encounter is to expect coverage of the vast presence of information technology in healthcare, which is of great interest in the field of medical informatics, sociological, and sociotechnical approaches. In this book, however, the idea is to explore the more specific phenomenology of people who search for health information on the web and who, because they are chronic patients, are interested in becoming more informed through the experience of peer groups in order to share information to improve their health conditions. Similarly, the extensive review of approaches to these issues presented in the first part seems only partially to provide the specificity of interest that then emerges in the subsequent research. On closer inspection, it is precisely the focus on technology and the different ways of studying it that could perhaps have been better focused.

At some point, the author argues that, "[c]onsequently, the technological tools of e-Health and m-Health can be qualified as objects produced in precise social, and therefore historical and geographical, contexts, incorporating cultures, needs, aspirations, choices, meanings, policies, constraints and potentials, merits and defects present in those societies. In this way, we can study technologies by first considering their different natures" (p. 41, my translation). This statement, among others, seems oriented to restore a kind of static and non-processual idea of these technologies. As recently recalled by Magaudda and Neresini (2020), the STS approach requires considering technology, science, and the relationship with users as a system of unstable equilibrium. For this reason, Ardissone's work should have considered, especially in the research chapters, getting closer to the contexts in which the online data was accessed, the trajectories of use of this data, which strategies and networks contributed to the production of data in the different communities observed, what caught the attention of group members, and the reasons for this interest.

The symbolic side of such access is well-documented by the research and analysis carried out, but for instance on the point of how technology enters the care processes, imposing its rules and constraints, cannot be solved only by identifying who uses apps or wearables.

STS studies, among others, have shown in recent years that the contexts of health service delivery generate a multiplicity of interpretations and different ways of using technologies (Crabu 2016). In Italy, for example, the telemonitoring service for cardiology chronicity is differentiated region by region and very often integrated by private remote monitoring and sometimes relying on general practitioners. The latter are included among the figures of reference in the survey but without defining a specific section on them to understand, for example, how their role enters into the management of chronicity and the management of information related to chronicity.

At the same time, the inclusion of technology in care processes asks us to take note of the need to recognise the agency of technologies and the political dimension of their existence among us in a plurality of "political" arenas that are far from stable and homogeneous.

Despite these aspects, it is important to acknowledge the book's efforts in exploring the topic in a very broad manner and it has the merit of adding interesting descriptions to the search for health data on the Internet by chronic patients. The digitization processes in healthcare in Italy are still in their infancy. Hopefully, the contributions of those exploring these topics will increase. At the same time, we hope that awareness will increase about how STS sensitivity can provide interesting research questions to understand these emerging phenomena.

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Barbara Czarniawska and Tor Hernes (eds.)
Actor-Network Theory and Organizing (2nd edition), Lund, Studentlitteratur, 2020, pp. 392

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This second edition of *Actor-Network Theory and Organizing* has been updated from the original version fifteen years previously. The book comprises a variety of chapters that draw from Actor-Network Theory (ANT) ideas and tenets, situated in organizational learning and Science and Technology Studies. There are sixteen chapters, most of which describe research in the field from many different countries including Sweden, Central America, Denmark, Norway, Italy, Poland, Finland, the US and the UK. Further added to this richness of sources is the variety of settings. There are examples from engineering to healthcare, which create

narratives to bring ANT ideas alive. As someone with a varied work background, I found I could relate to many of the accounts. The chapters outside my experience were also presented very clearly and accessibly, and were rewarding in their insights. In particular, I found Chapter 4 *Artefacts Rule* a fascinating read, situated in the area of software development, which I would normally have found intimidating and alien. A real strength of the book is that it invites the reader into these different worlds with the purpose to better understand what ANT *does* rather than what it *is*, much like the search for a "spink" described in Chapter 11 *The Making of Knowledge Society.*

The book is framed in Chapter 1 *Constructing Macro-Actors According to ANT*, and describes the development of the Macro-Actor from the work of Callon and Latour. In the first chapter there is historical development from the first to the current edition regarding the political nature of ANT, and reflections on the seminal work *Actor network theory and After* (Law and Hassard 1999) addressing reflexivity and criticality. In Chapter 1, ANT is now positioned as a diaspora of approaches which Law terms "material semiotics". This provides the rationale for the selection of chapters. The authors also highlight the influence of important publications around and after the publication of the first edition, such as Latour's (2005) *Reassembling the Social*, and subsequent, important works that have shaped ANT. The aim is the same as the first edition: "How power emerges through organizing". The authors go back to Greimas as the source for the idea of the "actant", which challenges the notions of heroism and anthropocentrism by introducing narrative trajectories and anti-programmes, expanded upon in other chapters. For example, Chapter 2 *Technological Strategy as Macro-Actor* describes anti-plans in strategic research, Chapter 3 *The Little Engine That Could* draws from a field example to describe anti-programs as engine- and project-programs, and Chapter 8 *Macro-Actors and the Sounds of the Silenced* explores compliance and alignment in the context of the anti-program.

A lot has been written about ANT in the last 15 years; to reflect this in ANT terms, we might see this book as a macro-actor. My own experience of navigating ANT has been through building networks of ANT-in-the-field experiences, and the theoretical connections developed through situating ANT, and finding my own path through journal articles, blogs, and conversations. I would argue that the publication of the new edition of this book serves to develop other networks around how these ideas are enacted in different situations. The works within *Actor-Network Theory and Organizing* have formed part of the networks and will continue to do so, but there is always the dilemma of situating the knowledge in the "now". Chapter 3 does this by providing a commentary. Updated references and appropriate amendments to terminology are included in the remaining chapters, notably in Chapters 5, 6, 9, 10 and 12. The chapters are the same as the first edition, with the omission of *My name is Lifebouy*

by Lena Porsander and *Explaining the Macro-Actors in Practice* by Peter Hagglund. Chapter 16, *Actor-Network Theory, Organizations and Critique* by Rafael Alcapipani and John Hassard, is a new addition to the current, second edition. This chapter is a reflection on developments in ANT from ANT and after, and theorises about the applicability of ANT to Management and Organizational Studies and Critical Management Studies in terms of symmetry and performability.

In the second edition, many of the chapters follow Latour's (1996) *Aramis* and Mol's (2002) *Body Multiple* in their weaving together of events over time, and emulate Law's notion of ANT stories. In that sense I would argue that the chapters hang together by tracing and retracing ANT themes to build a more detailed and in-depth picture, but the chapters do not need to be read in a particular order. In Chapter 3 *The Little Engine That Could* there is a real sense of "what happened next?" and "how do we make sense of this?". The chapter draws out an engaging story of engineering operations, referring to Latour's sleeping policeman and bulky hotel keys. The operational aspects are very accessible and well described, which would allow non-technical readers to appreciate the details in the field. The timings, risks and scale of engineering activities are conveyed in such a way that brings across the importance of how humans and non-humans are considered. Chapter 8 *Macro-Actors and the Sounds of the Silenced* draws from a constellation of examples such as the use of CS spray in the UK police force and Swedish food wholesaler's practices, to demonstrate programs and anti-programs. In Chapter 15 *Net-working on a Neonatal Intensive Care Unit*, transcript excerpts are used to examine three sequences of events in a Neonatal Intensive Care Unit in the UK to develop an ANT story. In this chapter, the distinction between complexity and complication is presented, alongside how to "cut the network". This leads on to the discussion of Serres' blank objects/quasi-objects which circulate in social relations. Chapter 2 *Technological Strategy as Macro-Actor* explores the interconnectedness of strategy and humaneness in the context of ANT's notion of symmetry, and against the backdrop of technology strategy research. This chapter makes some very interesting observations regarding how language indicates humanness, for example, through the development of "skills". The chapter puts forward an approach to strategy which is more performative, and shifts the focus away from strategy as a purely human endeavour, following the "practice turn" in strategy theory.

Stories unfold in subsequent chapters, weaving in some of the well-known aspects of ANT such as symmetry and black boxes. In the setting of human resources, Chapter 6 *The Organisation as Nexus of Institutional Macro-Actors*, a challenging recruitment situation from a university in Sweden is described in an ANT way, by shifting focus away from human agency. The resulting description plays out the notion of the institution as macro-actor and the trust of the nomination committee as a black box. Black boxes are further investigated in Chapter 7 *Powers in a Factory*, an

ethnographic study of a business is described using the idea of "core sets", and how enrolment in the core set is regulated through the techniques of demonization, demarcating rationality and expertise, and rational emotionality. Callon's work on irreversibility is also drawn from, where networks become black boxes. The story is about mergers and takeovers, and how outward behaviours scuppered redundancy plans. In this chapter, ANT allows for an account without reduction, a retelling rather than a representation. This story also emphasises the constant work required to build and stabilize networks as dynamic entities rather than the reduced representations of causal flow process diagrams. The notion of the black box is extended to the "leaky black box" as described in Chapter 5 *Organizational Routines and the Macro-Actor* and Chapter 11 *The Making of Knowledge Society*, which draws from existing studies of organisational practices in manufacturing and non-profit organisations in the US. By this, the authors refer to the organisational routines as quasi-stable actor networks. In Chapter 11, black boxes are related to part of the Intellectual Capital Project in the government in Denmark. Like Chapter 2, *Technological Strategy as Macro-Actor* really challenges humanness, and examines our motives in the workplace for a human-centred focus, and perhaps explains the reluctance from some to take on ANT ideas such as symmetry.

Different settings and scenarios are presented in other chapters, such as Chapter 10 *The Internet Web Portal as an Enrollment Device,* which explores markets, as well as Chapter 12 *The Reformatting of Electricity and the Making of a Market* and Chapter 13 *Productive Power, Organized Markets and Actor Network Theory.* Chapter 10 describes how internet portals enrol citizens to education in the new market by drawing from economic sociology, which allows for different interpretations of the market economy in terms of choice and state power. Chapter 12 treats the economy as an object within the Norwegian electricity market reform in the 1990s. It draws from the stabilization of variable ontologies, and the ANT notions of translation, enrollment and association. The history of the market highlights how the integrated hierarchy came about, through market reforms and from the move away from state governance and the co-operative market, and toward commodification and internal governance. Chapter 13 considers markets and macro-actors, or actor-networks. It explores conceptions of power in organizational economics and economic sociology in relation to making markets. This is based on ANT and Foucault's notions of power, postulating that power in economic sociology can be conceived of as resource asymmetries in deep structures. The chapter extends Callon's treatment of power through ANT, and presents the market as shaping behaviours and power.

Callon's ideas are further included, most notably with the four principles of translation, in a number of the chapters. For example, Chapter 9 *Materiality and Organizing* focuses on IT systems from an ANT

perspective, and how these can be viewed in an organizational change context where IT is viewed as part of the social structure rather than causal and deterministic. The four principles are applied to draw out significant stages of the project, including power dynamics and the enrollment of politicians. It is interesting to see how the social defines big projects such as IT, and provides an insightful account of when the social and material are brought together. Chapter 14 *Actor-Networks* draws from Callon's four principles to develop two alternative versions of ANT: entrepreneurial and ecological. The entrepreneurial version is played out with a study which investigated an innovation in an Italian Small to Medium Enterprise (SME), and the ecological version describes the implementation of a management accounting system in the Italian Government. Evolutionary theory in relation to ANT is discussed in Chapter 4 *Artefacts Rule* in the context of open-source software projects.

The stories included in the chapters are evocative and engaging, leading the reader by the hand into ANT readings of workplace scenarios, and how this changes how we might "see" the situations arising. This book is a collection of very clear examples taken from the field and presented in narrative form. ANT ideas are interwoven through the stories, bringing theory to life, which is indicative of ANT being enacted as a diaspora of approaches, as well as a sensibility. The book is invaluable to the researcher seeking to articulate ANT in different situations, and to scholars of STS and other disciplines, to expand their knowledge of what ANT *does* in theory and practice.

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Habiter en oiseau [Inhabiting as bird], Arles, Actes Sud, 2019, pp. 224

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Vinciane Despret's *Habiter en oiseau* [*Inhabiting asbird*] is published by Actes Sud in the collection Mondes Sauvages, a collection giving voice to researchers who go in "diplomatic mission" in the world of other living beings. And this is the intent of this book which brings us to the discovery of the world of birds and in particular to the relationship between birds and the researchers who, through the years, have developed theories and methods on birds. She has therefore conducted a thoughtful investigation on the "ecology of thoughts" (p. 55, my translation) concerning birds and their attachment to a territory. Vinciane Despret is philosopher and ethologist. She is an internationally recognized scholar on animal studies and on the relation between humans and non-humans. Her research is often associated to Bruno Latour, Isabelle Stengers and Donna Haraway whose works are mentioned in the book and to whom the book is dedicated. The book can be also related to other STS researches (Callon 1984; Law e Lynch 1990; Law and Lien 2012; Granjou and Mauz 2009) and feminist studies (Singleton 2012) on the sociology of scientific practice in interaction with the animal world.

It is a passionate journey through time at the discovery of how the territory as research object is mobilized in studies facing the same question: what are the "functions" of the territory for birds? According to dominant theories the territory has mainly two functions: assuring food supply and reproduction. Despret's intent here is to give voice to other studies and research methodologies – mainly remained in the shadow – which have taken the distance from those general theories in order to highlight the complexity of the relation between birds and the space they occupy. What these studies have in common is to show the limitation of talking about "functions" and that there is no *one* way for birds to inhabit a territory.

The book is an invitation to slow down in the way of doing research and to acknowledge the multiplicity of birds' modes of existence. As the author claims, the intent is not to become more "sensitive" which does not mean much (and which eventually can even provoke allergies) but to become capable of paying attention and to acknowledge that other beings are worth and entitled to receiving attention. In this regard, she claims sharing Donna Haraway's commitment in becoming with other species and of being "in responsible relation to always asymmetrical living and dying and nurturing and killing" (Haraway 2008, p. 42).

In this she starts by evoking the relationship with a blackbird which comes to her window and has caught her attention by its singing. In this anecdotal episode is the essence of the book. Singing is the only thing that

matters for that bird and is an invitation to attention. But it is also a reminder that our responsibility as researchers is to receive and welcome those others' matters and not to generate them (Despret 2020b).

The book is divided in two parts. In the first one, she introduces the main theories on the birds/territory and some potential counter-stories that deserve attention. In the second part, she elaborates more what these other forms of attention may produce.

In the chapters of the first part, she introduces the research object: the fact that birds settle and develop a specific relation with the space, with a tree which is chosen as headquarter, where they develop routines and organize their living. In other terms, they become territorialized. As she explains, it is starting from the beginning of the 20th century that systematic studies appear and elaborate general hypothesis on the "functions" of the territory for birds. The term territory however is not new and dates back to the 17th century with the first observations on birds' territorial behaviours. On this regard, Despret recalls that it is in that period the idea of territory for humans emerges in connection with land use as appropriation and of property as an individual right. As she explains, if in the ornithological domain a theory of the territory as appropriation was never explicitly affirmed, it is no doubt that a certain terminology referring to the domain of appropriation has been largely used in studies on birds as well as the fact of focusing mostly on birds' aggressive and competitive behaviours. This tendency towards anthropomorphism reaffirms in the 20th century and goes in parallel with methods and practices of appropriation (bird breeding) for aesthetic reasons but also in order to kill them for research purposes. As she claims, the territory has nothing innocent.

The aim is to develop comprehensive theories of the territory, the most important of them are focused on reproduction and assuring food supply. These theories manage to persist in time because either they are simple to observe (like feeding practices) or because alternative studies do not bring to other new general "theories" and therefore most of the time they would not be published.

Despret's intent is precisely to account of the many studies claiming that territory cannot be reduced just to food (or reproduction) and that there would be a bias between food and birds' social organization.

She argues that in mainstream theories everything goes too fast and differences are not sufficiently taken into account. Birds have been approached through pre-established analytical frameworks whereby the tendency is "to silence" rather than listening to them. This tendency is even stronger in the '50s when economic theories are mobilized to explain animals' behaviours. In this period the theory of regulation becomes dominant. It claims that the territory has the function of regulating the population in order to avoid a surplus of specimens on a given territory and therefore limited resources in food. Birds would become aggressive and kill other birds in order to prevent that too many males reproduce, which may

produce a deficit in food. As Despret claims, this theory has been many times falsified. Some researchers show in fact that underpopulation may represent even a bigger risk for the maintenance of species (the human one included). What is rather put forward is the fact that all species are inter-dependent one another. The theory of regulation is the one closest to the concept of territory as property, but also the one that has encouraged the most brutal practices by researchers who, in order to test it, have killed thousands of specimens. The theory of regulation is therefore understood by Despret as a theory of inattention for not caring about one's own object of research. And this seems even more absurd today in view of the disappearance of species.

Moreover, these theories would be clearly gender biased, limiting female mainly to a passive role. Other researchers have instead observed that also female may become territorialized by choosing a territory – included the male occupying it– adapted for reproduction and also by defending it. Interestingly, then, not only female sing, even if less than males, but their singing would be very elaborated and in any case worth of attention.

In the second part of the book she develops what is anticipated in the first one, that is what do these alternative stories produce? Here the author talks about the territory by referring to Deleuze and Guattari in *Thousand plateaus* ([1980] 1987), that is as a performance or matter for expression.

The interest is no longer to try to formulate comprehensive theories on the territory but to follow and account for the thousand possible ways in which birds become territorialized. Here Despret goes back to some key concepts connected to mainstream theories to better explain her point. Concerning the idea of property, becoming territorialized is therefore not so much the act of making a space "*sien*" ("one's own", that is something that one possesses) but rather "*soi*" ("self") that is an expression of oneself. In this she recalls the central role of singing in this process of territorialisation. The song is way to territorialise a space as well to become with that space. The singing would be then an extension of the bird's body in space like the spider with its web. In this sense there would be a dynamic of reciprocity: "Appropriating a place consists in conforming it to oneself and in conforming to it" (p. 121, my translation).

In the same way, aggressiveness – which was seen as a primordial characteristic of the territory – is also reconsidered in this view. By referring to Deleuze and Guattari (1987), she recalls that "if aggressiveness is a constitutive element of the territory, it does not explain it" (p. 151, my translation). Fights are in fact less dramatic than one thinks and singing plays an important role in dealing with conflicts and in particular in avoiding them. As showed by different researchers it is mostly winners who sing. Showing the quality of the singing and displaying one's own colourful plumage work then as self-promotion aiming to warn potential intruders that going into a fight would be unnecessary costly. The singing is then all about spectacularization mainly addressed to other males, whereby "the winner is not the

best fighter, but the best actor" (p. 63, my translation).

Moreover, the outcome of the fighting would be most of the time already established in advance whereby the intruder almost never wins. So, the author wonders, why do birds keep on fighting? In this regard Despret claims that, if it is true that the territory is a way of organising distance (for assuring resources), in reality it is also a way of creating one's own neighbourhood and sociality. It is said that one of the neglected functions of the territory is the social one whereby fighting is an opportunity to redefine and negotiate what happens at the borders.

In this sense, the territory is a system of conventions which establishes what is allowed and what is not. It becomes then a system of anticipation to simplify complexity and uncertainty. As she explains "the territory only exists through territorialization and deterritorialization since it is always in relation to some entries and exits from the territory that it takes shape. Territories only exist in action" (p. 144, my translation). Territories are then forms which enact and organise relations and give shape to a society. Everything happens in local negotiations and in the composition among different forces. What is affirmed is a performative conception of the territory and the capacity to affect (and of being affected).

In the last part she comes back on the central role of singing in this performative process of territorialization. A territory is proposed as melodic composition or even as partition, that is as a way to organise and distribute singing time with the neighbours of the same species but also with other species, resulting in polyphonic collaborations, or what she calls "expressive cosmopolitics" (p. 176, my translation). In this sense she agrees with Haraway's proposition – after Despret's performative reading (2020a) – of calling our era Phonocene to remind the multiple sonic ways of inhabiting the earth as well the risk for them of becoming silenced.

By inviting us to follow birds' parades and singing, this book brings us also to the heart of the posthumanist debate on agency and on the relationship between human and non-human, on post-qualitative investigations of the relationship between the researcher and their object of research and on ethics and responsibility in doing research in anthropocenic times. This book is an original and engaging reading for researchers interested in these topics.

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Juliane Jarke
Co-creating Digital Public Services for an Ageing Society. Evidence for User-centric Design, Cham, Springer, 2021, pp. 228

Linda Tonolli *Università di Trento*

In recent years the Science and Technology Studies (STS) debate about how ageing, technology and society are intertwined is rapidly emerging, as living conditions improve and life expectancy increases, especially in wealthy countries. The growing importance of this phenomenon is extensively supported by EU and national fundings that promote projects to design new technologies and services for the aging society. These research trajectories lay on normative narratives that describe ageing as a problem to fix, and so they lead to an extensive development of assistive technologies that strongly focus only on a medicalized, individual dimension of aging (Cozza et al. 2017). These approaches picture humans as isolated biological machines, forgetting that humans are also (and especially) social beings, made by their relationships with others and the context they live (and age) in. In this context, STS researchers have been fruitful in highlighting two aspects of the phenomenon of active ageing technologies. The first aspect is that STS scholars analyzed how behind the apparent healthy and

positive attitude of the "active ageing" policy concept lay neo-liberal economic logics, of which the "silver economy" represents their intent of capital exploitation towards a specific tailored social group (e.g.: Peine and Neven 2019). The second aspect is that STS analyze design as a phenomenon and designers as key agents in the construction of new collective imaginaries. For example, Lucy Suchman (2007) reminds us that information technologies are "sociomaterial configurations" that join together social imaginaries and materialities. From these two starting points, STS critical scholars such as Juliane Jarke stand for re-configuring the engagement with technology design for older adults (and our older selves). Inspiring social gerontology and human-computer interaction (HCI), these scholars question the representations of "age" that are often scripted into technologies and call attention to the risky consequences of their use, such as the reinforcement of negative ageing stereotypes and social discrimination. Involving older adults at the very beginning of a design process, allows to re-configure implicit stereotypes, negotiating together with the older participants the "rules of the game", setting common goals and agendas and inspiring enthusiasm, desirability and sense of ownership in respect of the design process and outcome. Designing alternatives to the traditional system design approach of service provider-client opens up to meaningful ways of "success". This is one reason why interdisciplinary research, which includes fields such as design, social sciences and computer science, adopts more collaborative and inclusive approaches to design. In fact, the aim of these research approaches is to co-create strategies and artifacts (digital and not) together with the people that will use them. These projects are grounded in the tradition of field studies, in which ethnographic intents combine with design purposes.

It is the case of Juliane Jarke's book, *Co-creating Digital Public Services for an Ageing Society. Evidence for User-centric Design*. Coming from a very interdisciplinary background (that includes STS studies, Media studies, Informatics and Philosophy), Juliane Jarke has been working since 2014 as senior researcher at Bremen University, where she is also associated with the Institute for Information Management (ifib) and the Centre for Media, Communication and Information Research (ZeMKI). Her research focuses on public sector innovation, digital (in)equalities and participatory design. From 2016 to 2019, she led a work package on Participatory Design in Civic Tech and Open Data in the EU-funded project MobileAge. In this action research project, her research group studied effective methods for co-creating digital public services with and for senior citizens. Her book is at the cutting-edge between STS and co-design, offering an uncommon in-depth account of three co-design projects which are part of MobileAge. Project after project, she builds an incremental narrative of learning outcomes that can serve as guidelines and advice for researchers and practitioners with similar design intents.

The aim of the book is to address the lack of engagement of older adults

in co-design projects, both on a theoretical and on a practical level. Therefore, the book opens with an in-depth literature review that frames the aging phenomenon through an interdisciplinary prism (first chapter, *Ageing Societies and Technological Innovation*). From unfolding concepts such as Ageing Society and Old Age, Jarke outlines the intimate relationship between ageing identities as socio-cultural constructs and information technologies, and how they shape each other, underlining the performative power of technology design and use. In particular, the author's perspective considers ageing as "a material-discursive practice", adopting Karen Barad's perspective, and supporting the concept of "media generation" (Bolin 2017) in order to distinguish across generations – i.e. every generation grows up sharing experience through media that shape that particular generation in unique ways. Therefore, there is not a unique definition or meaning of ageing, because it is a phenomenon that depends on the context (as design is, as it will be shown in the project chapters). Among the policy responses to ageing societies, the author focuses her work on the World Health Organization initiative "Age-friendly cities and communities". Jarke depicts the complexity of digitalization under different aspects, underling that the WHO model does not address technology enough to support people's later life.

In the second chapter, *Co-creating Digital Public Services,* the author articulates her proposal to fill the gap in an ideal inclusive process of digital transformation: through co-design. In fact, if social inclusion is also a matter of digital inclusion, in order to achieve digital inclusion, a design process needs to allow digital participation. The design approaches to do this vary, and Jarke outlines them using Arnstein's notorious *Ladder for Participation* essay to explain the different types of participation and how they are translated into design approaches, such as system design, user-centred design, co-design and participatory design. The author also shows how in the design history of digital public services, the tendency to move from an "administration centric" to a "customer-driven" approach should become predominant. Like in the first chapter, where she was pointing out the lack of involvement of older adults in the design of technologies, in this chapter Jarke documents the lack of citizens involvement in the design of digital public services, standing for a more inclusive and democratic design.

Moving to the more "practical" chapters, the chapters from the third to the sixth are dedicated to three projects that were part of the MobileAge EU project. All the projects share common topics such as mapping, the use of municipality open data and building friendly neighborhoods. The first two projects described in the fourth and fifth chapters, *Co-creation in Practice I: Co-creating a Digital Neighbourhood Guide (Bremen Osterholz)* and Chapter 5 *Co-Creation in Practice II: Co-creating a Digital Walking Guide (Bremen Hemelingen)*, were conducted by the author and her research group, in Bremen (Germany). Instead, the third project based in Zaragoza (Spain) and described in the sixth chapter, *Co-creation in*

Practice III: Co-creating Ageing-Friendly Routes (Zaragoza) has been included by the author for its comparative interest, even though she did not conduct the project, but participated to its planning and evaluation.

Jarke's book examines the MobileAge EU project under three aspects of analysis, evaluation and comparison: the politics of participation (which actors participate in the projects and how), sharing expertise (initial users become co-creators), enabling change (on a personal, social and digital level). These aspects highlight how power dynamics and interdependencies between stakeholders play in design processes, and need to be taken carefully into consideration when planning a co-design process.

In conclusion, this book is for those who have just begun research in the field of design, ageing and technology and look for a good companion to navigate the state of art and to study examples of well-tailored co-design projects. In fact, the first two chapters offer a robust theoretical frame of the main research and design issues in this field, while the following ones provide extensive descriptions of projects the author was involved in. Similarly, this book is a precious resource also for senior researchers and co-design practitioners, since the projects accounts (from the third to the sixth chapter), that constitute the main body of the book, offer in-depth details of the design processes that STS researchers, designers, stakeholders, computer scientists, can find informative and inspiring.

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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.

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Felix Tréguer
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*

Counter-History of the Internet from the 15th to the 21st Century). By announcing from the onset that it is going to narrate the History of the Internet from the 15th century onwards, this book reminds us that debates that are framed as being about the Internet as a technology are actually the continuation of a much older discussion on the level of freedom that should be afforded to the public sphere, defined as the socio-technical assemblage (or *dispositif*) through which members of a society discuss political matters. This debate has been ongoing for centuries, and predates both computers and the Internet.

Félix Tréguer, the author, is now a post-doctoral research fellow at the Centre de recherches internationales at Sciences Po Paris, and is also affiliated to the newly created Centre Internet et Société of the CNRS.He is also known for his involvement in La Quadrature du Net, an NGO he is a founding member of, which advocates for the protection of human rights on the Internet. This NGO has close historical ties to the free software movement.

L'Utopie déchue is a title that reflects a feeling of disillusion felt by many activists close to the hacker and the free software culture. It is divided in four sections, and fourteen chapters, not including the introduction and the conclusion.

While digital utopias born in the 1970's brought an immense enthusiasm to the idea that computers could become a tool for emancipation, many are beginning to question these beliefs in light of the development of the platform economy, digital labour exploitation, pervasive surveillance, algorithmic control and the establishment of enclosures controlled by global tech corporations. What went wrong?

To answer this question, section 1 of the book, "Genèse (XVe-XXe siècle)" (in English: "Genesis 15th-20th Century") starts off by reminding readers of the link between surveillance, censorship and the census, which were all the responsibility of two elected officials called censors in the Roman Republic. He then tells the tale of a century-old struggle between the state's tendency to establish control over the public sphere, and attempts to subvert it. When the printing press allowed the spread of new ideas, monarchies across Europe drew from new theories on sovereignty and the "*raison d'État*" (in English: state interest) to invent new modes of surveillance and censorship of the public sphere. This same scenario played out at the invention of the radio, when states struggled to contain the expansion of amateur and privately-owned radio stations. By the mid-20th Century, liberal democracies, while guaranteeing freedom of speech, provided fertile ground for corporate control aligned with state interests over the public sphere.

In section 2, called "Informatisation (1930 - 1980) (in English: "Digitisation (1930 - 1980)"), the author recounts the invention of computers and of the Internet. In the next section 3, called "Subversion (1980 – 2001)", he tells how computers, first seen as the ultimate artefact of industrial social

control embodied by the corporate culture and image of IBM, turned into a promise of emancipation and of a free, democratic and borderless public sphere freed from the influence of the state and from mass media oligopoly. This new utopia is described as having also led to many practical realisations, like the personal computer or the World Wide Web. These practical realisations heralded a new era of freedom and challenged the gate-keeping powers of an oligopolistic cultural and media industry. They threatened the equilibrium between freedom of expression and control of the previous era, and section 4, called "Reféodalisation (1990 – 2020)" (in English: "Reverting to feudalism (1990 – 2020)" describes how a strong response from states has led to what Félix Tréguer, quoting Shoshana Zuboff (2018), describes as surveillance capitalism: a system which tends towards total surveillance and where humanity, translated into data, becomes the subject of capitalistic accumulation.

Throughout his book, he talks from a Foucaldian perspective where the "state" is not so much an institution as a type of governing rationality where power is not centralised but may be distributed across a variety of actors (see: Foucault, 1998 [1976]). The level of entanglement between private and public in Internet Governance, especially surveillance, makes this approach relevant. It is also unspecific enough that it can be applied to several eras through which the actual institutional setups of states have greatly evolved. The main shortcoming of this book is that this conception of the state at times tends to lack sociological finesse. It does not matter, however, as the aim of *L'Utopie Déchue* is not to provide an in-depth socio-political analysis of specific public policies in a given domain of state intervention. Instead, it situates contemporary debates on Internet governance, online censorship and surveillance into a long-term account of a centuries-old struggle, that has remained defined by the same fundamental divides despite, or maybe regardless of the evolution of the technical elements that co-constitute a public sphere it defines as a socio-technical *dispositif*. Seen from this angle, censorship and surveillance are two sides of a same coin. And although they are exercised on and through socio-technical means, Félix Tréguer convincingly shows that the topic of contention is not the computer or the Internet (or any other artefact) as such, but the politics of public speech, human rights and the relationship between citizens and the state.

Yet in the concluding chapter of the book, Félix Tréguer leads his reader through a sharp turn to the infrastructure, and ends up questioning the very existence of computers on political grounds. He argues that maybe these *should* become the topic of contention as such. The very title of this concluding chapter, "Arrêter la machine?" (in English: "Should we stop the machine"), sounds like a provocation. Current decision-makers are committed to growth through perpetual, preferably permissionless, innovation.Even privacy advocates who defended the General Data Protection Regulation (GDPR) usually presented their demands as a way to build

"trust" in the digital economy, not as a means to stop the construction of such an economy or at least forbid some of its potential innovations. For many years, policy and even scholarly discussions on topics such as digital copyright, dataveillance or informational privacy has been focusing on regulating the *use* of technology through various legal, political and market constraints and incentives. What Félix Tréguer tells us is that this is important, but perhaps not sufficient, and that this insufficiency could explain the failure of activists to effectively challenge the power structures of surveillance capitalism.

L'Utopie déchue ends on a reference to the work of Jacques Ellul, who was an influential political philosopher and sociologist, as well as a protestant theologian, who has published many books offering a critical analysis of what he dubbed the "technological society." Arthur Miller's *Assault on Privacy*, which was quite influential in the early debates that led to the adoption of contemporary privacy and data protection legislation, was published in 1971. It opened with a long quote of Jacques Ellul's *Technology Society*, followed by a socio-political analysis of computers in society, a discussion of the right to privacy as part of a strategy to mitigate harmful effects of information technology, before concluding on yet another quote of Jacques Ellul.

In 1964, Lewis Mumford had written about the opposition between "authoritarian" and "democratic" techniques. Ivan Illich published *Tools for Conviviality* in 1973, quoted by Félix Tréguer in his book, which pleaded for a radical change in the theory and practice of human technology. These normative and moral reflections on technology were not just philosophical discourses limited to a restricted audience of contemplative thinkers, but made their way into practice, and influenced the movement in favour of personal computers in the 1970's and 1980's, as those were seen as a way to steer away from authoritarian computing (embodied by companies like IBM) towards a more democratic system. They were also influential in the shaping of public decision-making. Since then, however, there has been an intellectual shift from attempting to regulate artefacts, to regulating their uses.

Science and Technology Studies (STS) have been studying the role of socio-technical controversies in the social construction of technology for a long time. This approach has led, in the field of Internet Governance studies, to a "turn to the infrastructure" in which sociologists and political scientists study the material layers of the Internet to unbind the relationships between the material, the technical, and the political (Musiani et al. 2016). Such studies usually take a non-normative approach.

Félix Tréguer's concluding interrogation, coming from the field of political science, is more radical because it is the product of engaged action-research by someone who has long been a prominent human rights activist. It calls for more than mere legal or even technical patches on a digital socio-technical ensemble of networked computers that may be fundamentally

authoritarian in nature. This is why he speaks about a need to "stop the machine" (p. 308). In questioning whether we should accept the existence of computers, in a way, he appears to suggest that the problem would be solved if we got rid of computers. By doing so, it could be argued that Félix Tréguer falls into the trap of some kind of reverse technological solutionism (Morozov 2014). His provocative suggestion, however, should rather be understood as a call to reflect, and to make us look once more at technology itself, not only its uses or its controversies, through a moral and political lens.

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Julia Watson
Lo-TEK. Design by Radical Indigenism, Köln, Taschen, 2019, pp. 417

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The wetlands of my home town Bogotá (or *humedales* as they are called in Spanish) are one of the most biodiverse ecosystems of the city and its surrounding plateau. Today they are at the center of many development pressures and controversies, as well as numerous conservation efforts. From politicians, urbanists, designers, to activists, almost everybody has an opinion about how these patches of "nature" should be either preserved or dried out in the name of progress. However, few have said about how we could work with the wetlands to thrive together. In contrast, research efforts in the recent decades have uncovered that these wetlands are not just the outcomes of the particular natural ecological conditions of the area,

but importantly that their existence is also a product of the intentional stewardship – and later abandonment – of a complex agro-hydraulic landscape of *camellones* (in English: ridges) tended by local Indigenous groups over millennia (Rodríguez Gallo 2019). This system supported a highly diverse, resilient and rich way of life until the Spanish conquest and further colonization erased, through genocide and ontological occupation of territories and ways of living, the very practices and knowledge that maintained that landscape. All we have left are traces of that landscape as seen from old aerial photographs and from the many indigenous water-related words inscribed in the topography of the area (Rodríguez Gallo 2019).

Julia Watson's Lo-TEK: Design by Radical Indigenism is a highly visual, detailed compilation of more than 100 similarly sophisticated indigenous landscapes and their related infrastructures from around the world. Unlike the vestiges of the ancient *camellones* in the plateau of Bogotá, all examples catalogued in the book continue to support indigenous peoples' everyday lives today. Through their tending and maintenance of these infrastructures, indigenous people contribute to the larger wellbeing of the ecosystems themselves. In the book, this wide variety of human-nature symbiotic infrastructures is reframed as Lo-TEK, that is "sustainable, adaptable, and resilient technologies that are borne out of necessity (p. 21)"; placed in contrast to what are often referred as Lo-Tech, that is "simple, unsophisticated, uncomplicated and primitive technology" (p. 20). Her book has the explicit aim to create a design movement that can help us – though there is very limited explanation about who "us" might be – rebuild an understanding of both indigenous philosophy and vernacular architecture, which as she argues, already generate sustainable climate-resilient infrastructures. To aid in this movement building task, in the book, the author proposes various resources organized in three parts.

First, a very broad outline for a new mythology of technology partly inspired by the methodology of radical indigenism as defined by Eva Maria Garroutte (2018) that is combined with a handful of other eclectic concepts such as cultural keystone species. The second part contains a basic lexicon that is assembled and then identified, and highlighted throughout the examples in the next section of the book. The last section is the compendium of examples proper, concretizing some of the possibilities of Lo-TEK by describing, in accessible terms, how for example the ingenious boma acacia corrals of the Maasai, the polyculture milpa forest gardens of the Mayans or the wastewater treatment system developed by the Bengalese in Kolkata emerged and are kept alive. The exemplars in this section are divided by the particular ecosystem within which they work, namely: mountains, forests, deserts, and wetlands. The exemplars are fleshed out through various strategies – for example, descriptive narratives that locate these technologies within their larger cultural context, the sourcing and curating of a large body of photographs, and the creation of a series of compelling architectonic and visualizing devices that document particular

details of their configurations. I consider this section the most vital contribution of the book, and would hope they continue developing. One possible direction for further development is to address the critical need to find non-verbal forms to communicate out not only technical details, but also the relations, ontologies and the forms of governance that make these configurations of people, place, non-humans and stories, possible (see: Haraway 2013). These aspects remain under addressed in the analysis and visual representations in the book. However, there are interesting seeds found in the book to further the "drawing things together" that Latour (2008) once invited designers to explore further. I also found that the lexicon section would merit expansion. More than providing pointers to further reading and examples hinting to how these terms might manifest, it could offer more in-depth explanations and explicit links to think through and communicate collectively; so that important concepts such as "radical indigenism" can be actually applied and mobilized to build the movement.

Many of the issues raised by the book will be familiar to STS scholars, although STS scholarship is not the book's main audiences. The author's narrative and each of the examples in the compendium, draws our attention to the socio-technical character of all technology and the preeminence of infrastructure in contemporary understanding of the world (Star 1999), something discussed extensively in STS, albeit from a different angle. Also, its continuous attempts to reframe what counts as technology and innovation will resonate – and contrast – with feminist STS research agendas that invite us to look critically at innovation (see: e.g., Suchman and Libby 2000) by paying close attention to forms of care (Puig de la Bellacasa 2017), repair and maintenance without privileging preoccupations with the "new".

In general, the book offers an accessible and important testimony of the complex, plural and rich knowledge and practice systems that exist today. I, however, remain curious to learn more about how indigenous communities themselves (and not only unidentified us) could also use these resources to continue repairing and tending to their worlds, and reconfiguring their own ecological knowledge. It seems to me that their ability to mobilize their own knowledge, and not the fact that we (designers or STS scholars) are able to do so, is particularly urgent. As the compilation makes it also painfully obvious, most of these Lo-TEK are under enormous encroaching pressures, putting them at risk of following the steps of the *camellones*, which once supported a unique way of life in the place I call home.

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